



GREAT LAKES
Science Center
Stay Curious.

EDUCATOR GUIDE

2016 - 2017

- Coming Soon: *Design Zone*
- **NEW!** Literacy Standards covered in our hands-on workshops
- Ohio Title 1 Schools: Free Admission and Demos
- Expanded options for younger grades
- Career Days for Grades 6-12



GreatScience.com
216-621-2400

We make STEM come alive!

At Great Lakes Science Center, **we make science, technology, engineering and math (STEM) come alive** for more than 65,000 field trip students each year. We believe in the value of using real scientific challenges to encourage curiosity and experimentation. We remain committed to developing informal science education programs that inspire young minds, improve STEM literacy and cultivate the creative, critical thinkers who will shape the future of Northeast Ohio. Thank you for choosing Great Lakes Science Center. Stay Curious!

Table of Contents

What's New for 2016 - 2017	3-5
What to See and Do	6-7
Career Day Programs	8
Professional Development for Educators	9
2016 - 2017 Education Supporters	10
Ohio Standards	11
Programs by Grade Level	12-17
<i>Pre-K – Kindergarten</i>	12
1-2	13
3-5	14
6-8	15-16
9-12	17
Planning Your Field Trip	18
Pricing and Reservations	19



Teacher Tidbit

Did you know? The Ohio Lottery's Partners in Education program recognizes and rewards star students and teachers throughout the State of Ohio. Outstanding teachers are nominated for their excellence, leadership, creativity, dedication and commitment to education.



Academic All-Stars are recognized for achieving academic excellence, citizenship and leadership both in and out of the classroom. The program runs from September-May for grades K-12. To nominate a teacher or student visit ohiolottery.com and click on "supporting education," or call 216-774-5688 and someone will be happy to assist you.

What's New for 2016 - 2017

DESIGN ZONE

**CREATE YOUR
EXPERIENCE:
DANCE BEAT, SKATE PARK,
ROLLERCOASTER AND MORE**

OCTOBER 1, 2016 - JANUARY 2, 2017

What does it take to create a blockbuster video game? How many beats per minute does a DJ need to get bodies moving on the dance floor? What goes into creating a roller coaster or skate park to produce the most fun and biggest thrills? Discover how game developers, music producers, coaster designers and other creative problem solvers do what they do in Design Zone with hands-on activities that show how design concepts and math become real world experiences in the arts, entertainment and extreme sports.



OMSI
OREGON MUSEUM OF SCIENCE AND INDUSTRY



Design Zone was produced and is toured by the Oregon Museum of Science and Industry. This exhibit was made possible by a National Science Foundation (NSF) grant.

Call 216-621-2400 to book your field trip

What's New for 2016-2017

FEBRUARY 2017

Build It!

Engineering fun, one brick at a time

LEGOs iconic multi-colored bricks have been capturing the imaginations of kids of all ages around the world for decades. *Build It!* brings the love of LEGOs to life-sized proportions and encourages creativity and free play through the endless possibilities represented by the popular bricks.



What's New for 2016-2017

Cleveland Clinic Dome Theater

Enhance your students' educational experience by adding a film shown in our **newly renovated** six-story high domed theater to your visit! Educator guides that include information on national content standards as well as pre- and post-visit activities are available for our films. Visit GreatScience.com and click on "Educators" for more details. Pricing is also available for movie-only field trip experiences. Please see page 18 for details.

NEW! Tiny Giants Opens October 2016

In an adventure of giant proportions, "Tiny Giants" reveals the astonishing lives of some of the smallest animals. Using the incredibly immersive power of specialty 3-D cameras, audiences are transported into another world in a very intimate way and experience the titanic battles these creatures face to survive. Produced by BBC Earth.

NEW! Dream Big Opens Spring 2017

All around the world, engineers are pushing the limits of ingenuity and innovation in unexpected, imaginative and amazing ways. "Dream Big" takes viewers on a journey of discovery from the world's tallest building to a bridge higher than the clouds and a solar-powered car race across Australia. Audiences witness how today's engineers are shaping the world of tomorrow.



What to See and Do

Cleveland Creates Zone

Tinker, create and test, with more than 3,000 square feet of engineering design exhibits. In these maker experiences, students are encouraged to identify variables, compare results and redesign their creations. Students problem solve their way through:

- Building and launching a rocket
- Creating and testing their own parachute design
- Designing and racing a LEGO car they build themselves
- Bending light and creating acrylic light sculptures
- Engineering the perfect shoe or hat

Critical thinking skills are emphasized here including defining the problem, testing solutions and developing perseverance. In the Zone students learn what engineers already know: failure is always an option — and a great learning opportunity.



Photo courtesy of Kristen Beck, Kristen Beck/Zumifoto.com

What to See and Do



NASA Glenn Visitor Center

Great Lakes Science Center is home to one of only 11 NASA Visitor Centers in the nation. Reinforce your curriculum as students take a look at the past, present and future of space travel, see a real space command module, learn how astronauts live and work on the International Space Station, and explore propulsion, power, and materials science.

Science Phenomena

Get hands-on with science! Our Science Phenomena exhibits encourage students to observe, investigate, predict and test the principles behind light, sound, motion, electricity and magnetism.

BioMedTech: Engineering for Your Health

Enter the world of biomedical technology and engineering. Students explore interactive exhibits, videos and educational displays focusing on genomics, stem cells, prosthetics, functional electrical stimulation (FES), nano technologies and medical imaging as they learn about the work being done by local researchers to develop innovative medical technologies.

Steamship *William G. Mather*

Climb aboard and explore this 618-foot historic flagship freighter from stem to stern. Learn about the importance of Great Lakes ecology and view onboard exhibits that tell the story of the Great Lakes. Guided tours are included with field trip admission. Open April – October.

Career Days

Career Day Programs - Grades 6-12

Programs are free for students with paid general admission. Advance reservations are required. Call 216-621-2400 to register.

Health Careers Day

November 18

Meet local medical professionals and higher education representatives to explore a variety of biomedical education programs and diverse career options in health and medicine.

Engineering Careers Day

March 3

Find out what engineers do! Discover the wide variety of internships and career paths in the field of electrical, biomedical, mechanical, aerospace, civil and chemical engineering.

Free NASA Day – Engineering for Space

Friday, October 7

Free general admission for all Ohio schools. Celebrate World Space Week and enjoy NASA speakers and space-themed activities and demonstrations. Advance reservations required. Please call 216-621-2400 for details. Does not include Dome Theater or Steamship *William G. Mather*.



Professional Development for Educators

Evening for Educators

Tuesday, October 4, 2016

Tuesday, February 7, 2017

4-8 p.m.

Join us for an evening of networking, planning, and fun and enjoy complimentary dinner and a drink ticket for beer or wine. Meet Science Center staff and participate in brief professional development sessions including:

- How to book a Science Center field trip
- Applying for field trip grants and funding
- Building support from school administration for your field trip – curriculum, learning goals and outcomes
- Making the most out of your field trip – before, during and after
- What's new at the Science Center

Evening for Educators includes time to explore the museum. Three hours of CPE credit are available upon conclusion of the event. Attend this event and receive a 10 percent discount on a future field trip. To register for either date, call 216-621-2400.

FREE! NEOSEF Planning Seminar

Tuesday, October 25, 2017

3:30-6:30 p.m.

Learn how to host a science fair at your school. The Northeastern Ohio Science and Engineering Fair (NEOSEF) is open to students in grades 7-12 in Cuyahoga, Geauga, Lake, Lorain, Summit, Portage and Medina counties. For details on this year's event, visit neosef.org. Register for the seminar at 216-621-2400.

FREE Online Resources

View our online videos and learn the science behind our most popular exhibits, and find links to Ohio Revised Content Standards. Visit GreatScience.com and click on "Educators."

FREE General Admission for Ohio Teachers

We encourage teachers to use Great Lakes Science Center as a teaching resource so we offer **FREE general admission** to Ohio teachers every day! Just bring your school ID and enjoy free admission to our signature hands-on exhibits, NASA Glenn Visitor Center and Steamship *William G. Mather*. Come and preview Great Lakes Science Center before your next field trip. Call 216-694-2000 or visit the Box Office for more information.

Family Memberships for Ohio Educators

Ohio-licensed educators receive a special rate when joining at any level of family membership. Members enjoy a full year of free, unlimited general admission to the Science Center, NASA Glenn Visitor Center and the Mather Steamship plus free general admission to more than 360 science centers worldwide. Call 216-696-4576 or visit the Box Office for more information.

Custom Professional Development Workshops

The Center for Innovation in STEM Education (CISE) offers custom hands-on workshops and facilitated planning for schools interested in Project Based Learning (PBL), from the theoretical underpinnings of PBL curriculum to assessment strategies. CISE is a collaboration among Great Lakes Science Center, Cleveland State University and the Cleveland Metropolitan School District's MC2STEM High School. For more information and pricing, please contact Melissa Myerson with the Teaching Institute for Excellence in STEM at melissamyerson@tiesteach.org or 440-731-6609.



Education Supporters 2016 – 2017

100K +



50K +



25K +



15K +



Frederick W. & Janet P. Dorn Foundation

THE THOMAS H. WHITE FOUNDATION

10K +

Best Buy Foundation | Cargill Incorporated | The Lincoln Electric Company
PPG Foundation | Time Warner Cable

5K +

Automation Tool & Die, Inc. | BASF Corporation | M.E. & F.J. Callahan Foundation
The George W. Codrington Charitable Foundation | Dominion Foundation
FirstEnergy Foundation | Forest City Realty Trust | Giant Eagle Foundation
Frank Hadley Ginn & Cornelia Root Ginn Charitable Trust | KPMG LLP
OMNOVA Solutions Foundation | PricewaterhouseCoopers LLP
The Sherwin-Williams Company | The Sisler McFawn Foundation
The Maker Education Initiative (Maker Ed) | Tremco, Inc.
United Black Fund of Greater Cleveland, Inc. | U.S. Bank | Voss Industries, LLC

Ohio Academic Standards

Example: PSK = “Physical Science, Grade K”

BIO = Biology

CHM = Chemistry

ESS = Earth & Space Science

EVS = Environmental Science

L = Language

LS = Life Science

M = Mathematics

PG = Physical Geology

PS = Physical Science

PS-H = Physical Science – High School

PHY = Physics

RL = Reading Literature

RST = Reading for Literacy in Science and Technical Subjects

SL = Speaking and Listening

WHST = Writing for Literacy in History/SS, Science and Technical Subjects



Programs for Grades Pre-K – Kindergarten

FREE Science Demonstrations

Available by request with paid general admission. Duration: 30 minutes.
Capacity: 100 unless otherwise specified.

Bubblemania!

Bubbles come alive as students investigate molecules, shapes, colors and recycling!

PSK

Sounds Like Science

Have fun exploring the amazing world of sound.

PSK

It Really Is Rocket Science

What makes a rocket blast off into space? Students become rocket scientists as they explore the force behind rockets.

PSK; ESSK



Hands-On Workshops

\$75 per class (up to 30 students). Additional sessions will be scheduled for groups larger than 30. Duration: 30 minutes.

Sound Sleuths

Can we see sound? Use your senses to explore vibrations that allow us to hear, feel and even see sound. This workshop promotes science and literacy.

PSK; RLK; SLK; LK

Rain, Rain Come Out and Play

Students will learn what makes thunder and lightning, and that they aren't so scary!

PSK; ESSK; RLK; SLK; LK

Engineering Challenge: The Three Little Pigs

Students will become engineers and perform hands-on experiments exploring which materials can withstand the big, bad wolf. This workshop promotes science and literacy.

PSK; MK; RLK; SLK; LK

Programs for Grades 1 – 2

FREE Science Demonstrations

Available by request with paid general admission. Duration: 30 min. Capacity: 100 unless otherwise specified.

Wild Weather

Calling all meteorologists! Examine how weather develops and experience the wide variety of weather throughout the United States.
ESS1; PS1; ESS2

Bubblemania!

Bubbles come alive during this investigation of molecules, shapes, colors and recycling!
ESS1; PS1; ES2

What's the Matter?

What's the matter with matter? De-mystify simple physical changes and dance the "Molecular Macarena" in celebration of solids, liquid and gases.
ESS1; ESS2

Math in Motion: Angry Avian

Watch in amazement as we launch objects through the room and explore how forces affect an object's motion.
PS1; PS2; M1



Hands-On Workshops

\$100 per class (up to 30 students). Additional sessions will be scheduled for groups larger than 30. Duration: 30-45 minutes.

Weather Alert!

Weather is everywhere – and so are the scientists who predict, forecast and study it! From clouds and snow to tornadoes and hurricanes, uncover the science behind weather.
ESS1; PS1; ESS2; SL1; SL2; L1; L2

States of Matter: Ice Cream Science

Can we turn hot chocolate into ice cream? Explore the properties of solids, liquids and gases in a tasty and hands-on format. (Students with dairy/chocolate allergies are asked not to participate.)
ESS1; PS1; ESS2; SL1; SL2; L1; L2

Engineering Challenge: Fairytale Towers

Students transform into engineers during this challenge to build a tower from paper that can hold up a princess and a dragon!
PS1; PS2; M1; M2; SL1; SL2; L1; L2

Programs for Grades 3 – 5

FREE Science Demonstrations

Available by request with paid general admission. Duration: 30 min. Capacity: 100 unless otherwise specified.

Energize It!

Thermal, chemical, potential, kinetic – energy is all around us in different forms. We investigate how energy can transform in a variety of ways, sometimes with explosive results!

PS3; PS4; PS5

Under Pressure

Investigate the air all around us and discover its properties through a can-crushing experience!

PS3

Out of this World

Forces are everywhere! Explore how forces such as gravity and friction affect humans, Earth and the International Space Station. Capacity: 40 per session. *PS4; PS5*

What's the Matter?

What's the matter with matter? De-mystify simple physical changes and dance the "Molecular Macarena" in celebration of solids, liquids and gases. *PS3; PS4*

It's Electric

Where does electricity come from? Help activate a few historically important devices that illustrate some pretty shocking ideas, and watch as our staff educators crackle with energy!

PS3; PS4; PS5

Hands-On Workshops

\$100 per class (up to 30 students). Additional sessions will be scheduled for groups larger than 30. Duration: 30-45 minutes.

Countdown to Launch

Do your students have what it takes to explore space? Students will experiment with chemical reactions and the physics of flight while learning the science behind space exploration.

PS3; PS4; PS5; M3; M4; M5; W3; W4; W5; SL3; SL4; SL5; L3; L4; L5

Alternative Energy: Wind Power

Students examine renewable and nonrenewable energy sources and apply the scientific process while they work in a team to design, build and test a wind turbine. *PS3; PS4; PS5; M3; M4; M5; W3; W4; W5; SL3; SL4; SL5; L3; L4; L5*

Engineering Challenge: Trampoline Rescue Mission

Students use the engineering and design process to construct a mini trampoline and work in small groups to complete an assigned rescue mission. *PS3; PS4; PS5; M3; M4; M5; SL3; SL4; SL5; L3; L4; L5*

Jumping Jitterbugs

Students explore how circuits and electricity work together while designing and creating their own Jumping Jitterbug.

PS3; PS4; PS5; SL3; SL4; SL5; L3; L4; L5

Programs for Grades 6 – 8

FREE Science Demonstrations

Available by request with paid general admission. Duration: 30 minutes.
Capacity: 100 unless otherwise specified.

Energize It!

Thermal, chemical, potential, kinetic – energy is all around us in different forms. Investigate how energy can transform in a variety of ways, sometimes with explosive results!

PS6; PS7; PS8

Force Be With You

Different forces affect objects in different ways. Explore how forces change an object's speed and/or direction.

PS6; PS7; PS8

It's Electric

Where does electricity come from? Help activate a few historically important devices that illustrate some pretty shocking ideas, and watch as our presenters crackle with energy!

PS6; PS7; PS8

Math in Motion: Angry Avian

Watch in amazement as we launch objects through the room and explore how forces affect an object's motion.

PS6; PS7; PS8

Go For Launch

See dramatic displays of chemistry and physics principles in action. From simple pressure rockets that show basic thrust, to actual fuel-burning "boosters," things will go up and come back down, with a flash and a bang!

PS6; PS7; PS8



Programs for Grades 6 – 8

Hands-On Workshops

\$120 per class (up to 30 students). Additional sessions will be scheduled for groups larger than 30. Workshops must be scheduled at least four weeks in advance to order required supplies. Duration: 45-60 minutes.

It Really IS Rocket Science

Do your students have what it takes to explore space? Students will experiment with the laws of motion, perform chemical reactions and propel objects across the room. Duration: 60 minutes. Capacity: 30 per session.
PS6; PS7; PS8; M6; M7; M8; RST6; RST7; RST8; SL6; SL7; SL8

DNA Investigations Lab

Students will explore how traits express themselves and extract their own DNA, then discover careers in biomedical technologies that impact their lives.
LS6; LS8; RST6; RST7; RST8; SL6; SL7; SL8; WHST6; WHST7; WHST8

Engineering Challenge: Parachutes

Combine the forces of lift, drag and gravity with materials and design elements to create parachutes. Students will test their designs by dropping a parachute 80 feet. Can they do it without cracking the raw egg payload?
PS6; PS8; M6; M7; M8; RST6; RST7; RST8; SL6; SL7; SL8; WHST6; WHST7; WHST8

Alternative Energy: Wind Power

Students will examine renewable and nonrenewable energy sources and apply their findings to design and build the most effective wind turbine.
PS6; PS7; PS8; M6; M7; M8; RST6; RST7; RST8; SL6; SL7; SL8; WHST6; WHST7; WHST8



Programs for Grades 9 – 12

FREE Science Demonstrations

Available by request with paid general admission. Duration: 30 minutes.
Capacity: 100 unless otherwise specified.

Go For Launch

The first step in space travel is getting off the ground. Dramatic displays of chemistry and physics principles are the stars of this show. From simple pressure rockets that show basic thrust, to actual fuel-burning "boosters," things will go up and come back down with a flash and a bang!

CHM; PHY

Energyze It!

Potential energy becomes sound, light and excitement during this colorful and loud demonstration. Simple chemical compounds can change the properties of explosions to make an engaging scientific show.

CHM; PHY; EVS; M



Hands-On Workshops

\$120 per class (up to 30 students). Additional sessions will be scheduled for groups larger than 30. Workshops must be scheduled at least four weeks in advance to order required supplies. Duration: 45-60 minutes.

Engineering Challenge: Parachutes

Combine the forces of lift, drag and gravity with materials and design elements to create parachutes. Students test their designs by dropping their parachute from a height of 80 feet. Can they do it without cracking the raw egg payload?

PHY; SL; RST; WHST

Operation Heart Dissection

Students will get a tour of the body's pump with a guided dissection of a pig heart. They will cut into the heart to reveal the four chambers, peer into the aorta, and inspect blood vessels up close. They will see how cardiac surgeons operate on this essential organ with expertise and care with a narrated, recorded surgical procedure. (Must be reserved at least four weeks in advance.) Duration: 90 minutes.

BIO; SL; RST; WHST



Pricing and Reservations

Planning Your Field Trip

1. Select your grade level

There's so much to see and do at Great Lakes Science Center. We've made it easy for you to find grade-appropriate experiences on the following pages.

Grades Pre-K – K, page 12

Grades 1-2, page 13

Grades 3-5, page 14

Grades 6-8, pages 15-16

Grades 9-12, page 17

2. Select your admission package then add a hands-on workshop and FREE demonstration

We offer a variety of admission packages to fit every need and budget, and ALL Ohio Title 1 schools receive **free general admission**. Don't forget to add a hands-on workshop and free demonstration specifically designed to support Ohio Revised Standards for science and Common Core Standards in math and social studies to your field trip. Pricing for workshops varies by topic and grade level.

Field trip pricing

We offer many affordable options for field trips for groups with a minimum of 10 or more people. Rates apply to schools (public, private, charter or home school) visiting during the school year. Advanced reservations are required. Call 216-621-2400 to reserve your field trip date. The reservations hotline is open Monday through Friday, 9 a.m. to 5:30 p.m. You may also pre-register online and our reservations team will collect your information and confirm your field trip by phone. To pre-register, visit GreatScience.com and click on "Educators."

General admission - \$7 per student

Pick 2 package - \$10 per student

Pick 3 package - \$12 per student

Dome Theater only - \$7 per student

Steamship *William G. Mather* only - \$6 per student

Ohio Title 1 Schools - Free

**A 6 percent City of Cleveland admissions fee will be added to your visit.*

3. Book your experience

Reserve your trip by phone or email. Book early as many of our program dates and times fill quickly.

- By phone: Call our dedicated reservation agents at 216-621-2400 (Monday through Friday, 9 a.m. to 5:30 p.m.)
- By email at edhelp@glsc.org. Please be sure to include your school, grade level and full contact information.
- Pre-register online: save time and pre-register online. Our reservations team will collect your information and confirm your field trip by phone. Go to GreatScience.com and click on Educators>Field Trips>Book a Field Trip

Pricing and Reservations

Important Field Trip Information

Title 1 School Admission

Ohio schools with 40 percent or more of their students entitled to Title 1 services receive **free general admission** to the Science Center as part of a field trip on any school day. Dome Theater films, workshops and the Steamship *William G. Mather* are not included. Status is subject to confirmation. Please call 216-621-2400 for details.

Payment and Confirmation

A confirmation packet will be emailed to you following the completion of your reservation. Please review the packet thoroughly to ensure you have everything you need. Payment for all field trips is due 14 days prior to your visit date. Acceptable forms of payment include credit card, check, purchase orders and cash (cash payments must be made in person at the Science Center).

Admissions Fee

Please note that a 6 percent City of Cleveland admissions fee is applicable to all field trips and will be added to the cost of the visit.

Cancellation Policy

Please let us know in writing at least 48 hours in advance if you need to cancel. Payments are non-refundable and payments made toward a cancelled visit will be held as a credit toward a future visit.

Chaperones

Great Lakes Science Center requires one adult chaperone for every seven students. Chaperones within the one-to-seven ratio will receive free admission. Additional adults must pay the posted student rates.

Prepare for Your Visit

We want to make it easy to prepare for your day at the Science Center. Visit GreatScience.com and click on Educators>Educator Resources>Online Resources where you'll find a wide range of videos and other web-based materials including: Field Trip Planning 101, Exhibit Video Profiles, Web Based Science Labs, Special Exhibition Activity Guides and movie educator guides.

Lunch Options

Please let us know at the time of reservation if you plan to eat lunch at the Science Center. A reserved lunch space is included with all field trip reservations. Schools are welcome to bring brown-bag lunches to be enjoyed in our group lunch space or outdoors along the harbor (weather permitting). Pre-ordered boxed lunches are also available through the Science Center Café. Please be sure to let our reservations specialist know if you plan to order lunch. A menu and ordering information is included in your confirmation packet. All pre-ordered lunches must be confirmed and paid for at least 72 hours before your visit.

The Science Store

The Science Store carries a large selection of educational items that complement our exhibits and films. Advance orders can be placed using the Grab Bag order form included in your confirmation packet. Please call the Science Store at 216-696-5575 for more details.

Parking

Complimentary bus parking is available on a first-come, first-served basis. Buses will receive instructions on where and how to park upon arrival.



Great Lakes Museum of Science, Environment and Technology
601 Erieside Avenue • Cleveland, OH 44114



Please Circulate to:

- o *Math Teachers*
- o *Science Specialists*
- o *Teacher/Educators*
- o *Librarians*
- o *Science Club Advisors*
- o *Parent Coordinators*
- o *Home Schoolers*
- o *After School Coordinators*
- o *Community Leaders*

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