

m



INUS

2017.2018 | Educator Guide | The Ultimate Guide for Educators

USE THIS BOOK TO PLAN YOUR NEXT LEARNING EXPERIENCE WITH CRANBROOK INSTITUTE OF SCIENCE | SCIENCE.CRANBROOK.EDU

Programming is aligned with new Michigan K-12 standards and can be adapted to meet individual teacher requests. Please request any specific content you'd like addressed during your visit when you register.

PLAN YOUR FIELD TRIP

Field Trips Encourage & Support Classroom Learning

Planning a field trip at Cranbrook Institute of Science is easy. We offer programs at our beautiful Bloomfield Hills museum, at your school or virtually through videoconferencing.

REGISTRATION BEGINS AUGUST 28. 2017

FIELD TRIP AND SCIENCE ON THE GO! PROGRAMS AVAILABLE OCTOBER 3. 2017-JUNE 8. 2018

REGISTER ONLINE at science.cranbrook.edu (requires a 50% deposit at time of registration) **OR REGISTER BY PHONE** 8am-4:30pm, Monday-Friday 248 645.3210 • A NON-REFUNDABLE 50% deposit is required when submitting your registration. Balance is due no later than the day of your visit.

In order to make the registration process as easy as possible, USE THE PLANNING WORKSHEET for taking notes and exploring options.

FIELD TRIPS PLAY AN IMPORT-ANT ROLE FOR STUDENTS AND EDUCATORS. A new learning environment provides the opportunity to build team and small group skills and engage students on an intellectual, social and physical level.

By integrating classroom learning with physical objects and handson experiences, STUDENTS HAVE AN OPPORTUNITY TO BETTER UNDERSTAND CONCEPTS and how they connect to the world around them.

TEACHERS & CHAPERONES



Teacher and chaperone involvement in the visit greatly improves the students' experience.

- 1. Chaperones are FREE at the ratio of 1 for every 3 preschool and kindergarten students, and 1 for every 5 students in grades 1-12. Teachers are always FREE.
- 2. Additional chaperones (beyond the recommended ratio noted above) are always welcome at an additional fee of \$10 per person.
- 3. Please note: To qualify for group rates a minimum of 20 paying guests is required.
- 4. Due to classroom space limitations, chaperones may not be able to attend all programming.
- 5. Please brief your chaperones in advance so they will feel comfortable and know what is expected of them and the students in their charge. We ask that all chaperones supervise and stay with their group during the entire visit.

We reserve the right to shorten your group's visit due to behavior issues that impact other guests or museum property.

HELPFUL HINTS

- Programs start on the hour and run 45 minutes. Due to limited space, we are only able to store coats and lunches.
- Food and beverages are only permitted in designated areas. Chewing gum is not permitted in the museum.

PLANNING WORKSHEET

REGISTER AT 248 645.3210. HERE'S THE INFORMATION NEEDED FOR REGISTRATION.

• Interested in Science on the Go! field trips at your school? See pages 22-23 for more information. • Interested in Science on the Screen! videoconferencing field trips at your school? See page 24 for more information. Please note: To qualify for field trip group rates a minimum of 20 paying guests is requred.

_									
1	ELL US ABOUT	/0U		School N	Name				
Ν	lame			District					
E	Imail			School (Office Phor	ne			
F	hone			Street					
A	Alternate Phone			City		County			
				State + 1	Zin	county			
				Jotate	219				
	WHEN WOULD YO	U LIKE IO VISI	1?						
1 Г	ST CHOICE		2ND CHOICE						
D	ATE ARRIVAL	DEPARTURE	DATE AR	RIVAL	DEPARTUR	E			
_	TIME	TIME	TII	ME	TIME				
1	ELL US ABOUT	OUR GROUP							
G	GRADE(S)	# STUDEN		# TEACH	IERS	# CHAPERONES			
S	TUDENTS, AND 1 FOR EVERY 5	STUDENTS IN GRADES 1-12.	TEACHERS ARE ALWAYS	S FREE.	IONES ARE FREE	AT THE RATIO OF FFOR EVERT 3 PRESCHOOL AND RINDERGARTEN			
A G	DDITIONAL CHAPERONES (BEYO ROUP RATES A MINIMUM OF 20	ND THE RECOMMENDED RATI PAYING GUESTS IS REQUIRED	0 NOTED ABOVE) ARE ALW . NOTE: DUE TO CLASS RO(AYS WELCOME AT AI OM LIMITATIONS, CH	N ADDITIONAL FE IAPERSONES MAY	EE OF \$10 PER PERSON. PLEASE NOTE: TO QUALIFY FOR FIELD TRIP Y NOT BE ABLE TO ATTEND ALL PROGRAMMING.			
V	WHICH PROGRAMS ARE	YOU CONSIDERING?							
Ρ	ROGRAM #1			PROGRAM	1 #3				
Ν	IOTE: See page 4 for an o	verview of all programs	and pages 8-23 for	detailed descrip	tions of each	program.			
Ĺ	ET'S WORK OUT	LOGISTICS			(Cafe lunches are \$5.50 per person. See page 26 for details and menus				
W	ILL YOU NEED SPACE FO	R LUNCH?) YES		🔿 NO				
S	TUDENTS WILL:		BRING THEIR LUNCHES			EACHER WILL PRE-PURCHASE LUNCH FROM THE CAFE			
D	OES YOUR GROUP HAVE A	NY SPECIAL NEEDS?	YES		O NO	EXPLAIN			
W	ILL YOU ARRIVE:		🔘 BY CAR		🔿 BUS				
W	ILL ANYONE BRING A WH	EELCHAIR?	🔾 NO		🔿 YES	HOW MANY?			
D	O YOU AUTHORIZE CRANI	BROOK TO PHOTOGRAP	H YOUR STUDENTS F	OR PROMOTION	AL PURPOSES	5? 🗘 YES 🗘 NO			
F	PAYMENT OPTION	IS	(DECISTED.					
P 1 2 3 4	PER STUDENT PRICING SOME PROGRAMS HAVE AN ADDITIONAL FEE. ON 1 PROGRAM \$12 SEE PRICING & PAYMENT ON PAGE 5 FOR DE 2 PROGRAMS \$15 COMPLETE LISTING. BA 3 PROGRAMS \$17 PLEASE NOTE: CRANBROK INSTITUTE OF A A 4 PROGRAMS \$19 FIELD TRIPS. EXTRA CHAPERONES + \$10 PER PERSON.			ONLINE AT SCIENCE.CRANBROOK.EDU (REQUIRES 50% CHECK DEPOSIT AT THE TIME OF REGISTRATION OR CREDIT CARD BY PHONE: 8AM-4:30PM, MONDAY-FRIDAY 248 645.3210 CASH IN PERSON A NON-REFUNDABLE 50% DEPOSIT IS REQUIRED WHEN SUBMITTING YOUR REGISTRATION. BALANCE IS DUE NO LATER THAN DAY OF VISIT.					
E	EXTRAS AND ADD)-ONS							
R	ECEIVE OUR FREE TEACHE	R E-NEWSLETTER			🔿 YES	O NO			
11	NTERESTED IN SCIENCE-RE	LATED PROFESSIONAL D	EVELOPMENT SEE PAG	GE 25	YES	○ NO			
В	ECOME A MEMBER AT CRAI	NBROOK INSTITUTE OF S	CIENCE SEE PAGE 31		L J YES	U NO			

PROGRAMS AT A GLANCE CRANBROOK: SUPPORTING YOUR CURRICULUM GOALS!

CRANBROOK INSTITUTE OF SCIENCE MAKES IT EASY TO RELATE FIELD TRIPS TO THE NEW MICHIGAN K-12 SCIENCE STANDARDS AND GRADE LEVEL CONTENT EXPECTATIONS.

SUBJECT	PROGRAM	GRADES
ANTHROPOLOGY & SOCIAL STUDIES Pages 8-9	ANCIENT ROME: AGE OF THE CEASARS - NEW	4 5 6 7 8 9 10 11 12+
	ARCHAEOLOGY EXPEDITION	3456
	BODIES BOUNDING! - NEW	K12
	FRONTIER MICHIGAN	K123
	FUR TRADE HISTORY ALIVE!	3 4 5 6 7 8 9 10 11 12+
	HISTORY OF CHOCOLATE - NEW	3 4 5 6 7 8 9 10 11 12+
	HUMANITY IN MOTION - NEW	5678
	MONEY!	345678
	STARS OF THE PHARAOHS (Planetarium Program)	3 4 5 6 7 8 9 10 11 12+
	THE PEOPLE OF THE THREE FIRES	3456
ASTRONOMY & SPACE SCIENCE Pages 10-12	COSMIC COLORS - AN ADVENTURE	
(programs presented in the Acheson Planetarium)	ALONG THE SPECTRUM	7 8 9 10 11 12+
	EVOLUTION OF THE STARS	8 9 10 11 12+
	NIGHT SKY OBJECTS AND BEYOND	123456789101112+
	DEASON FOR THE SEASONS	P K I Z 3
		456789101112
	SECRET OF THE CARDBOARD ROCKET	K1234
	SOLAR SYSTEM EXPLORATION	456789101112+
	STARS OF THE PHARAOHS	3 4 5 6 7 8 9 10 11 12+
	STORIES IN THE STARS	5 6 7 8 9 10 11 12+
	WORLDS OF WEATHER	4 5 6 7 8 9 10 11 12+
	YOUNG STARGAZERS SKY JOURNEY	P K 1
PLANETARIUM Page 13	CHRISTMAS LIGHTS!	K 1 2 3 4 5 6 7 8 9 10 11 12+
ENTERTAINMENT	MYSTERY OF THE CHRISTMAS STAR	3 4 5 6 7 8 9 10 11 12+
	SPACEPARK360	K 1 2 3 4 5 6 7 8 9 10 11 12+
	SPACEPARK360: LUCID DREAMING EDITION	K 1 2 3 4 5 6 7 8 9 10 11 12+
		(7.0
CHEMISTRY Page 14	CHEMICAL REACTIONS - NEW (LEGO® Bricks Program)	678
EARTH SCIENCE Pages 14-15	CONTINENTAL DRIFT TO PLATE TECTONICS	5 6 7 8 9 10 11 12+
	DINOSAURS	3 4 5 6 7 8 9 10 11 12+
	DINOSAURS AT DUSK (Planetarium Program)	3 4 5 6 7 8 9 10 12+
	DINOSAUR TALE	PK12
	EARTH SYSTEM SCIENCE	6 7 8 9 10 11 12+
	ICE AGE MICHIGAN AND THE BIG MELTDOWN - NEW	4 5 6 7 8 9 10 11 12+
	JOURNEY TO THE CENTER OF THE EARTH	1 2 3 4 5 6 7 8 9 10 11 12+
	ORIGIN OF THE GREAT LAKES	456789101112+
	SAVAGE SEAS - NEW	4 3 6 7 8 9 10 11 12+
ENGINEERING Pages 16-17	APPROACHES TO PROBLEM SOLVING - NEW	45678
	FROM DREAM TO DISCOVERY (Planetarium Program)	3 4 5 6 7 8 9 10 11 12+
	LEVERS TO LIFT OFF	5 6 7 8 9 10 11 12+
	PEGBOARD CHALLENGE - NEW	5678
LIFE SCIENCE & ECOSYSTEMS Page 17-19	ANIMAL DIVERSITY	45678910
	DNA STRUCTURES AND REPLICATION - NEW	6 7 8 9 10 11 12+
	DECODING DNA - NEW	6789101112+
	TRANSCRIBING DNA AND RNA - NEW	6 7 8 9 10 11 12+
	GREAT LAKES FOOD WEB	4 5 6 7 8 9 10 11 12+
	HOW WE USE WATER	2 3 4 5 6 7 8 9 10 11 12+
		56/8
	MICHIGAN ECUSTSTEMS	4 3 0 7
	OUTDOOR SCAVENGER WALK	PK1234
	PHOTOSYNTHESIS - NEW (LEGO® Bricks Program)	678
	UNDERSTANDING AIR - NEW (LEGO® Bricks Program)	678
	WEBS, WINGS, AND CRAWLING THINGS -	
	NEW (live invertebrates)	PK123456
	YOU, ME, AND THE BLUE PLANET	4 5 6 7 8 9 10 11 12+
PHYSICAL SCIENCE Pages 20-21	ELECTRICITY AND MAGNETISM	2345678
THISICAL SCIENCE I ages 20 21	FORCES AND MOTION	K123456
	INQUIRY INVESTIGATION	PK12345
	LIGHT AND SOUND	12345678
	MATTER AND ENERGY	12345678
	PHYSICS OF FLING!	2 3 4 5 6 7 8 9 10 11 12+
	WAVES AND ENERGY - NEW	678
	WEATHER	45678
AT YOUR SCHOOL Pages 22-24	SCIENCE ON THE GO!	PK12345678
	SCIENCE ON THE SCREEN!	2 3 4 5 6 7 8 9 10 11 12+

PRICING & PAYMENT

PLAN YOUR FIELD TRIP

Prices include admission, all exhibits, parking and chaperone resources for exploring the museum

	PER STUDENT
1 PROGRAM	\$12
2 PROGRAMS	\$15
3 PROGRAMS	\$17
4 PROGRAMS	\$19

|--|

ADDITIONAL CHAPERONES/ADULTS	+\$10
APPROACHES TO PROBLEM SOLVING	+\$3
ARCHAEOLOGY EXPEDITION	+\$2
HISTORY OF CHOCOLATE	+\$1
ICE AGE MICHIGAN AND THE BIG MELTDOWN	+\$1
ENGINEERING: LEVERS TO LIFT-OFF	+\$5
SAVAGE SEAS	+\$1

PHYSICS OF FLING! (MAX 30 STUDENTS PER PROGRAM)

IF PROGRAM FACILITATED AT CRANBROOK	\$400
IF PROGRAM FACILITATED AT YOUR SCHOOL	\$550
IF PROGRAM SPLIT BETWEEN BOTH VENUES	\$450

SCIENCE ON THE GO!

SMALL GROUPS (MAX 30 STUDENTS PER PROGRAM)	\$275
FOR EACH ADDITIONAL PROGRAM	\$175
LARGE GROUPS (MAX 150 STUDENTS PER PROGRAM	\$325
FOR EACH ADDITIONAL PROGRAM	\$200

CALL FOR MULTI-PROGRAM PRICING AT 248 645.3210

FAMILY SCIENCE NIGHT

(MAX 300 PARTICIPANTS PER PROGRAM)

\$675*

PER STUDENT/PERSON

*BASED ON STATION SELECTIONS, ADDITIONAL MATERIAL FEES MAY APPLY

SCIENCE ON THE SCREEN!

(MAX 30 STUDENTS PER PROGRAM, PRICE PER PROGRAM)

\$125

AT THE TIME OF REGISTRATION:

- A NON-REFUNDABLE DEPOSIT of 50% of your total invoice is due. Balance is due no later than day of visit.
- You will be required to provide a final attendance count 21 calendar days prior to your visit.
- You are responsible for full payment for the final attendance count provided or the number of attendees present the day of visit and will be charged the greater amount at time of check-in.
- Due to space limitations, only pre-registered students are guaranteed a program.
- Additional chaperones beyond the recommended ratios are welcome for \$10 per person.
- To qualify for field trip group rates a minimum of 20 paying guests is required.
- Cranbrook Institute of Science membership discounts and admission do not apply to field trips.

FOR CANCELLATIONS MADE MORE THAN 30 CALENDAR DAYS FROM DATE OF VISIT:

- Reschedule with no additional fees.
- Your 50% non-refundable deposit will be credited towards a future field trip occurring before June 8, 2018.
- Remaining pre-payment greater than 50% will be refunded by check to the person who completed the reservation.

CANCELLATIONS MADE LESS THAN 30 CALENDAR DAYS FROM DATE OF VISIT:

- Your 50% deposit is forfeited.
- Any remaining payment will be credited to a future field trip occurring before June 8, 2018.

TABLE OF CONTENTS

P.1-5 PLANNING A FIELD TRIP

Field Trip Programs



P. 8–9 anthropology & social sciences



P. 10–12 astronomy/space science in the acheson planetarium



P. 13 entertainment in the acheson planetarium



P.14 chemistry



P. 14–15 earth science



P. 16–17 engineering



P. 17–19 LIFE SCIENCE AND ECOSYSTEMS



P.20-21 physical science

- P. 22-24 Science on the GO! Field trips or science on the screen! Field trips
- P. 25 professional development and other opportunities
- P. 26 Science shop, cafe and lunch orders
- P. 27–28 galleries, exhibits, explore lab
- P. 29-30 scouts, overnight school field trips, camp, birthday parties
- P. 31 MEMBERSHIP, TRANSPORTATION AND MAPS

Welcome to Cranbrook Institute of Science

Founded by Detroit philanthropists George and Ellen Booth in 1904. Cranbrook's 319-acre campus is one of the world's leading centers of education. science and art.

200,000 ARTIFACTS & OBJECTS IN THE INSTITUTE'S COLLECTIONS!

Cranbrook Institute of Science is Michigan's Museum of Natural History. As a natural history and science museum, Cranbrook fosters in its members and visitors a passion for understanding the world around them. Drawing from its vast collection of more than 200,000 objects and artifacts, the Institute offers public programs, exhibits, events and lectures throughout the year. School trips to Cranbrook offer the chance to meet science professionals active in their fields and the opportunity to interact with a unique, world-class collection of objects and artifacts.



It's easy to plan a field trip to Cranbrook Institute of Science.

- It's easy to plan a field trip to Cranbrook Institute of Science. The Institute of Science offers over 80 field trip programs as well as special and permanent exhibits, planetarium shows, and seasonal events.
- All programming at the Institute is aligned with the new Michigan K-12 Science Standards and emphasis is placed on your group's grade level.
- Our registration experts work with you to customize a field trip experience unlike any other. With options such as interacting with hands-on artifacts, a planetarium visit, lunch at the Institute, even a visit to our gift shop, we can help plan a memorable experience for your students.



ANTHROPOLOGY & SOCIAL STUDIES

EXPLORE THE HUMAN EXPERIENCE ACROSS TIME AND PLACE

ANCIENT ROME: AGE OF THE CAESARS - NEW

GRADES 4 5 6 7 8 9 10 11 12+

Hail Caesar! March deeper into the story of the Roman Empire in Ancient Rome. Drill with your centurion and see if you can keep in formation. Explore the geography and cultures of the Empire as all roads lead you to Rome. There, discover how Roman government and law forms the basis for that of our modern United States of America. *Offered Feb. 6-June 8, 2018*

ARCHAEOLOGY EXPEDITION

GRADES 3 | 4 | 5 | 6

Participate in a simulated archaeological dig! Just like professional archaeologists, students excavate a site to unearth artifacts. After mapping, recording and interpreting their findings, students piece together what life was like for the earliest inhabitants of Michigan and present the results of their inquiry. All students take home an expedition souvenir.

Offered Oct 3-Nov. 21, 2017 and Apr. 11-June 8, 2018. Program occurs outdoors; dress appropriately for the weather. There is a \$2 up charge per student for this program. What Does It Mean To Be Human?

BODIES BOUNDING! - NEW GRADES K | 1 | 2

Human beings' body structure, advanced intellect and diversity of cultures make us unique creatures on Earth. This program allows young learners to investigate through physical play and observation of Institute animal collections. How does a human's skeleton compare to a cat's or a bird's? Walk, hop, bound, bend and stretch to imitate animals and begin to explore human expression through dance and movement play.

Participants should expect modest to moderate fun physical activity for a portion of the program time.

FRONTIER MICHIGAN GRADES K | 1 | 2 | 3

Explore a time of great change in late 18th Century Michigan as fur traders, Native Americans, farmers, shopkeepers, soldiers, tradesmen and servants mingled on city streets and rural pathways. Educators in period costume use hands-on materials, historical documents and artwork to bring Michigan's community history to life with a focus on labor, community roles and land use.



FUR TRADE HISTORY ALIVE! grades 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Explore the world of the 18th Century French fur trader and his Native American counterpart in the Great Lakes. This program takes place in an authentic Great Lakes wigwam and includes handson experiences with tools and fur pelts to reveal the delicate interplay between two very different cultures.

Program occurs outdoors; dress appropriately for the weather.

ANTHROPOLOGY & SOCIAL STUDIES

THE PEOPLE OF THE THREE FIRES GRADES 3 | 4 | 5 | 6

Enter the world of the Ottawa, Ojibway and Potawatomi tribes of Michigan. Artifacts, interactive games and activities combine to reveal the history of Michigan's First Peoples. The program touches upon language, sports and games, arts and cultural ideals-both past and present-of the tribes known as "The People of the Three Fires".

HUMANITY IN MOTION - NEW GRADES 5 6 7 8

In all countries and cultures throughout history, martial arts, dance forms, sports and other patterns of human movement have been important. This program gets students up and moving to explore the diversity of cultures around the world. Based upon grade Social Studies curriculum requirements and/or teacher request, learners can find themselves dancing an 18th century American social dance, moving to the five animals of Shaolin kung-fu, or following the African Diaspora in music, dance, and martial sport.

Participants should expect modest to moderate fun physical activity for a portion of the program time.



HISTORY OF CHOCOLATE - NEW GRADES 3 4 5 6 7 8 9 10 11 12+

Get a better taste of our Chocolate exhibition with this engaging program. Explore the ecology of the cacao tree, and assist our staff in caring for our own trees. Then investigate the ancient Mayan use of cacao, and make your own authentic cacao drink to try! Anthropology meets Life Science with sweet results.

Offered October 3-December 22, 2017. With teacher permission, students will make and have the option to drink cacao mixture containing cacao, corn masa, water, honey, and chili powder. There is a \$1 upcharge per person for this program.



MONEY! GRADES 3 | 4 | 5 | 6 | 7 | 8

Students learn how economics impacts their lives every day. Using collaborative activities, this program illuminates barter and money economies. Students operate their own stores, participate in trade networks and apply math skills to develop an understanding of the importance of fiscal responsibility.



ASTRONOMY -ACHESON PLANETARIUM PROGRAMS

What's Out There?

SPACE SCIENCE TAKES US EXPLORING IN OUR OWN GALAXY-AND BEYOND!

STARS OF THE PHARAOHS

GRADES 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Travel to ancient Egypt to see how astronomy was used to tell time and align huge buildings. Learn about the connection the ancient Egyptians felt with the stars and various astronomical phenomena and see some of the most spectacular temples and tombs of the ancient world recreated in their original splendor.

This program takes place in the Acheson Planetarium.



COSMIC COLORS - AN ADVENTURE ALONG THE SPECTRUM

GRADES 7 | 8 | 9 | 10 | 11 | 12+

Cosmic Colors will take you on a wondrous journey across the entire electromagnetic spectrum in this brand-new immersive program in the *Acheson Planetarium*. Discover the many reasons for color– like why the sky is blue and why Mars is red. Take a tour within a plant leaf and journey inside the human eye. Investigate x-rays by voyaging to a monstrous black hole and then back at your doctor's office. You will even see the actual color of a dinosaur–based on recent evidence. Get ready for an amazing adventure under a rainbow of cosmic light!

ASTRONOMY & SPACE SCIENCE

EVOLUTION OF THE STARS GRADES 8 9 10 11 12+

This intense, informative program is a look at the evolution of stars in general and the Sun in particular. From the turbulent cauldron of their birth through the multitude of cataclysmic ways they can meet their end, students will discover the many secrets stars hold.

This is a partially live-narrated program.



NIGHT SKY OBJECTS AND BEYOND GRADES 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

The emphasis is on all-around sky viewing. Find the Big Dipper, North Star, planets and constellations in the current sky. Observe the apparent motion of the sky. Venture into interstellar space to explore our starry home – the Milky Way Galaxy – in stunning three-dimensions!

Note: This partially live-narrated program is updated weekly to reflect the latest astronomical discoveries or topics of interest.

ONE WORLD, ONE SKY: BIG BIRD'S ADVENTURE

GRADES P | K | 1 | 2 | 3

Join Big Bird, Elmo and Hu Hu Zhu on an exciting discovery of the Sun, Moon and stars. Find the Big Dipper and the North Star. Take an imaginary trip that explores the differences between the Moon and Earth. Join them back on Earth to celebrate the idea that even though they live in different countries, they still share the same sky.



REASON FOR THE SEASONS GRADES 4 5 6 7 8 9 10 11 12+

This exciting live presentation demonstrates why the start of the seasons depends on your location on Earth as well as Earth's position around the Sun. Observe the Sun's altitude and daily motion from various latitudes. Discover why your favorite constellations aren't visible every night. Could the seasons and the ever-changing sky at night be linked? Find out!

SEASON CHANGES & MOON PHASES GRADES 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Discover the reason for the seasons in this exciting live presentation! Learn why the start of the seasons depends on your location on Earth as well as Earth's position around the Sun. Observe the Sun's altitude and daily motion from various latitudes and visit Mars! Discover the phases of the Moon and uncover the mysteries of both solar and lunar eclipses.

SECRET OF THE CARDBOARD ROCKET GRADES K | 1 | 2 | 3 | 4

What is the secret of the cardboard rocket? Two young adventurers turn an old cardboard box into a rocket and blast off on an awesome adventure to the most amazing places in the solar system! Join them as they visit the planets to learn what makes each one unique and what makes Earth such a special place to live.

This program is available in either a 30- or 40-minute format. Specify your preferred format length when registering.

SOLAR SYSTEM EXPLORATION

GRADES 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Explore the planets in our solar system, from their formation billions of years ago to the current robotic missions sent to unlock their secrets in this live presentation. Learn about the latest discoveries of comets, moons and icy bodies in the Kuiper Belt and beyond. See what the planets look like in the night sky and how they move along their orbits over time.



STORIES IN THE STARS GRADES 5 6 7 8 9 10 11 12+

Travel to the Isle of Crete where the legends of Zeus, Hercules, Orion, Perseus, Medusa and many others come to life in this live-narrated presentation. The Ancient Greeks and Romans may not have understood the nature of the stars, but they certainly had vivid imaginations as they created their mythological legends and stories looking at them.

WORLDS OF WEATHER GRADES 4 5 6 7 8 9 10 11 12+

What's the difference between climate and weather? Is Earth the only planet in our solar system that has varying climates and changing weather patterns? How does Earth's climate and weather compare to other planets in our solar system? By studying and comparing Earth's unique position within the solar system, we answer these and other climate and weather related questions. *This is a live-narrated program.*

YOUNG STARGAZERS SKY JOURNEY GRADES P | K | 1

Make the sky turn dark and sprinkle it with stars! Embark on an exciting and educational journey through the night sky, viewing constellations and visiting the planets. *This is a live-narrated program*.

ENTERTAINMENT

ASTRONOMY & SPACE SCIENCE

CHRISTMAS LIGHTS!

GRADES K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Dazzling state-of-the-art digital effects are choreographed to favorite wintry tunes and Christmas music, including: Wizards in Winter (Trans-Siberian Orchestra), Jingle Bell Rock (Bill Haley & The Comets), Merry Little Christmas (Tony Bennett), Rudolph the Red-nosed Reindeer (Gene Autry), White Christmas (Bing Crosby), Winter Wonderland (Dean Martin), and more.

Offered Nov. 1-Dec. 22, 2017.



GRADES P | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+ "Let it Snow" features a variety of festive classics

from Frank Sinatra and Chuck Berry to Burl Ives and Brenda Lee, and includes a stunning multimedia finale by the Trans-Siberian Orchestra. The soundtrack is visually enhanced with thematic animation and all-dome scenery in the audiovisual setting of the *Acheson Planetarium*. This 32-minute program is a fun and entertaining experience for all ages.

Offered Nov. 1-Dec. 22, 2017.



MYSTERY OF THE CHRISTMAS STAR

GRADES 3 4 5 6 7 8 9 10 11 12+

Journey back to Bethlehem as we examine the possible scientific explanation for the Star the Magi followed to find the baby Jesus. Using recorded sightings of significant astronomical occurrences during related historical events, we'll investigate possible dates for the birth of Jesus. This astronomical look at the Christmas story will charm and captivate audiences of all ages.

Offered Nov. 1-Dec. 22, 2017.

SPACEPARK360

GRADES P | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Riders dip toward molten pools on lo, dodge flying particles in the rings of Uranus, do a loop-the-loop through the canyons of Mars and more on nine different "rides." Set to popular music by White Zombies, U2, Stealers Wheel, Lenny Kravitz and others, SpacePark360 is an immersive, all-ages experience unlike any other.

SPACEPARK360: LUCID DREAMING EDITION

GRADES P | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

The same great visuals as SpacePark360 but this time set to the infectious music of A Burning Century, an Atlanta-based alternative-rockelectronica band with a sound that combines soaring melodies with hard-hitting rhythms.

Lucid Dreaming, the debut album from A Burning Century, is available for purchase in the Science Shop.

CHEMISTRY What is Matter?

JOIN IN THE LEGO® FUN AND DISCOVER HOW ATOMS INTERACT, COMBINE AND CHANGE!

CHEMICAL REACTIONS - NEW LEGO® Bricks Program

GRADES 6 | 7 | 8

A fun introduction to molecules, atoms, chemical notation, and chemical compounds! Students will manipulate LEGO® Brick models of atoms to demonstrate chemical reactions. This program can be used as both an introduction to chemistry, enrichment for students with a basic understanding, or as an end lesson when students have completed their chemistry lessons.



EARTH SCIENCE Ever Wonder What's Below the Ground We See?

FROM CRUST TO CORE, EARTH SCIENCE EXPLORES OUR HOME

CONTINENTAL DRIFT TO PLATE TECTONICS

GRADES 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Explore and evaluate Alfred Wegener's evidence for continental drift and the existence of the supercontinent Pangaea with numerous rocks, fossils and casts from Antarctica, Africa and Australia. See how new technology and exploration of the deep oceans provided further evidence for the theory of plate tectonics, including how the theory explains the present day distribution of earthquakes, volcanoes, mountains, rift valleys, rocks and minerals-including plate tectonic events that occurred in Michigan over 1 billion years ago!

DINOSAURS

GRADES 3 4 5 6 7 8 9 10 11 12+

Use scientific reasoning to explore the behavior, biology, ecology and evolution of dinosaurs through examination of fossil bones, eggs and casts, including complete skeletons and large skulls. Evaluate the evidence for dinosaur extinction theories and

> the relationships between dinosaurs, birds and reptiles. Use the geologic time scale to trace the range of dinosaurs and humans in Earth history.

DINOSAURS AT DUSK

GRADES 3 4 5 6 7 8 9 10 11 12+

Take to the skies and discover the origins of flight with a father and his teenage daughter who share a fascination for all things that fly. Navigate with them across continents, meet the ancestors of modern-day birds – the feathered dinosaurs – and experience the cataclysmic "last day" of the dinosaurs.

This program takes place in the Acheson Planetarium.

DINOSAUR TALE

GRADES P | K | 1 | 2

Travel back in time to visit the land of the dinosaurs. Students gain hands-on experience with genuine coprolites, bones, and teeth, and casts of claws, spikes, skulls, and more. Students simulate a fossil dig and learn the skills and tools of the Institute's paleontologist.



EARTH SCIENCE

EARTH SYSTEM SCIENCE

GRADES 6 7 8 9 10 11 12+

Compare Earth to the other rocky planets and use satellite images and rock and mineral specimens to better understand our planet as a system driven by the Sun and internal geothermal heat. Discover how aspects of physical and chemical changes and solid Earth processes-plate tectonics, volcanism and rock weathering-are linked to the atmosphere, oceans, biosphere and global climate, including the growing role of humanity as a major force in the system.

ICE AGE MICHIGAN AND THE BIG MELTDOWN - NEW

GRADES 4 5 6 7 8 9 10 11 12+

Explore the ice age and its influence on the modern world through direct study of the local surface rocks. landforms and sediments of southeast Michigan; including the transition to our warm climate period shown by fossil plants and extinct megafauna (mammoths and mastodons), and other specimens from Cranbrook's collections.

Offered Jan. 9-June 8, 2018. This program takes place in Explore Lab, the Institute's newest experiential learning space. There is a \$1 up charge per student for this program.

JOURNEY TO THE **CENTER OF THE EARTH**

GRADES 1 2 3 4 5 6 7 8 9 10 11 12+

Take an incredible customized 4,000 mile journey from the site of your school to the center of the Earth. See the sediments and handle the rocks, minerals, gems and fossils that would be encountered along the way. Discover how geologists interpret

geologic evidence and what the rocks and sediments reveal about Earth System history and natural resources in your community. Evaluate how and what we know about the deep structure and origin of our planet, its source



of internal heat and magnetic field.



ORIGIN OF THE GREAT LAKES GRADES 4 5 6 7 8 9 10 11 12+

Use rocks, fossils and geologic maps to discover how ancient continental rift valleys, shallow tropical seas, folded rock layers and great flowing ice sheets combined to produce the Great Lakes basins. Discover the fascinating story of the postglacial evolution of local watersheds and related ecosystems, including the extinct mastodon community and early Paleo-Indian hunters. Evaluate the importance of these unique freshwater lakes and the potential problems posed to this resource and its biota by invasive species, diversion, and pollution.



SAVAGE SEAS - NEW **GRADES** 4 5 6 7 8 9 10 11 12+

Investigate the evidence from specimens of the underlying sedimentary bedrock of southern Michigan for prehistoric tropical seas through exploration of fossils and their paleoecology, including an ancient mass extinction and the origin of related natural resources in the local bedrock.

Offered Jan. 9-June 8, 2018. This program takes place in exploreLab, the Institute's newest experiential learning space. There is a \$1 up charge per student for this program.



ENGINEERING How Do We Solve Problems?

ENGINEERING USES ART, MATH AND TECHNOLOGY TO DESIGN SOLUTIONS.



APPROACHES TO PROBLEM SOLVING - NEW GRADES 4 | 5 | 6 | 7 | 8

Students explore a variety of approaches and tools to design solutions to everyday problems. Students will be encouraged to inquire, investigate, communicate, imagine, design and build prototypes of their solutions. Problem solving is a continuous process that requires students to fail often, and fail early. This program will empower the students to take on any problem.

There is a \$3 up charge per student for this program.

FROM DREAM TO DISCOVERY: INSIDE NASA ENGINEERING - NEW GRADES 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Experience the challenges of the next generation of space exploration in this brand-new immersive program in the Acheson Planetarium. By using exciting real-life projects like NASA's James Space Telescope and the New Horizons mission to Pluto, the show highlights the extreme nature of spacecraft engineering and the life cycle of a space mission-from design and construction to the rigors of testing, launch, and operations. Blast off and take the voyage with us! This program also contains an interactive segment that allows participants to assist in the design of a virtual space mission.

From Dream to Discovery is made possible by the generous support of the Baiardi Family Foundation. This program takes place in the Acheson Planetarium.

FROM LEVERS TO LIFT-OFF GRADES 5 6 7 8 9 10 11 12+

Engineering: From Levers to Lift-off is an education-focused program that explores many of humanity's engineering accomplishments throughout recorded history. This exciting program explains each STEM focus area (Science, Technology, Engineering and Math) through real-world applications-from the development of the simple lever and the catastrophic power of medieval siege engines to space flight.

Set in the Institute's Acheson Planetarium and other demonstration areas, Engineering: From Levers to Lift-off will take students on a journey of discovery and investigation to help them better understand how humanity achieved amazing engineering feats by using imagination and know-how. There is a \$5 up charge per student for this program. Engineering: From Levers to Lift-off is made possible by the generous support of the Baiardi Family Foundation.



PEGBOARD CHALLENGE GRADES 5|6|7|8

Learn about one of NASA's greatest problemsolving moments when engineers fit a "square peg into a round hole" and saved the Apollo 13 lunar mission crew. Then test problem-solving skills by assembling a track to guide a ball around obstacles and across a board using a limited set of tools. This program stresses engineering skills and thinking out-of-the-box.



LIFE SCIENCE & ECOSYSTEMS What is Biodiversity?

ANIMAL DIVERSITY GRADES 4 | 5 | 6 | 7 | 8 | 9 | 10

What are the most numerous animals on Earth? Learn about different animal species and their relative abundances. Examples from the Institute's collections illustrate the wide variety of life forms. Students sort and classify their animals to discover Earth's least appreciated, but most diverse organisms.

DNA STRUCTURES AND REPLICATION - NEW GRADES 6 7 8 9 10 11 12+

Students build and manipulate a 3-D model DNA from the smallest nucleotides to a completed DNA double helix. Explore the replication process using this hands on model. Students will understand the process of replication from start to finish and the terms associated with the process.

LIFE SCIENCE & ECOSYSTEMS



DECODING DNA - NEW GRADES 6 7 8 9 10 11 12+

Decoding DNA will allow students to manipulate physical models of DNA. They will understand how to describe and build a DNA codon and how codons group together to create a gene. They will then learn how to decode a gene to describe how codons work together to create a functioning gene. Students will gain a better understanding for how DNA leads to our, or other organisms, genome that makes each of us unique.

TRANSCRIBING DNA AND RNA - NEW

GRADES 6 | 7 | 8 | 9 | 10 | 11 | 12+

Learn and explore how we go from DNA to protein using hands-on manipulatives. Students will have a greater understanding for how mRNA is different than DNA, how to transcribe and translate DNA, and the importance of proteins to our everyday lives.

GREAT LAKES FOOD WEB

GRADES 4 | 5 |6 | 7 | 8 | 9 | 10 | 11 | 12+

A complex food web connects plants and animals in the Great Lakes. Students discover producers, consumers and decomposers and how they are linked to one another. They discuss how habitat loss, invasive species and pollution have affected animals, and what can be done to protect and restore the Great Lakes for them.

Offered Oct. 3- Dec. 22, 2017, and Mar. 1-June 8, 2018.

HOW WE USE WATER GRADES 2 3 4 5 6 7 8 9 10 11 12+

Take a journey through the water cycle from the Earth's surface to atmosphere and back again. Students learn about the Great Lakes as the most significant freshwater ecosystem on Earth. Demonstrations and hands-on activities reveal how precious the Earth's freshwater is and what we can do to conserve it.



I LIVE IN A WATERSHED GRADES 5 6 7 8 9 10 11 12+

Learn about your watershed and how to protect it from pollution. Working in groups, students create a model community to develop an understanding of the ways in which land use impacts the water quality of local rivers and streams, and ultimately, the Great Lakes.



MICHIGAN ECOSYSTEMS GRADES 4 | 5 | 6 | 7 | 10 | 11 | 12+

Investigate the diversity of Michigan's ecosystems. Students work in groups to design a food web in one of six different ecosystems. They explore the interrelationships between biotic and abiotic factors and how energy flows through food webs to sustain life in any ecosystem.

NATURAL SELECTION GRADES 6 7 8 9 10 11 12+

Join the young Charles Darwin on his adventurous voyage of exploration. Witness the thrill of scientific discovery through Darwin's eyes, make observations of the most beautiful natural scenery, and see the pieces of the scientific puzzle fall into place. Darwin himself reveals the simple and most beautiful mechanism that explains the evolution of all life on Earth: Natural Selection.

This program takes place in the Acheson Planetarium.



OUTDOOR SCAVENGER WALK

GRADES P | K | 1 | 2 | 3 | 4 | 5

What do living things need to survive? How do living and non-living things fit together in an ecosystem? Explore the Institute's trails on a guided tour and trace the path of resources through different ecosystems. From autumn's browning leaves to springtime buds and summer tadpoles, observe seasonal changes across Cranbrook's 319 acres.

Offered Oct. 3-Nov. 21, 2017 and Apr. 11-June 8, 2018. Program occurs outdoors; dress appropriately for the weather.

PHOTOSYNTHESIS - NEW LEGO® Bricks Program

GRADES 6 | 7 | 8

Experience a photosynthesis reaction by using LEGO® Bricks to model both the reactants and products. Students will construct various molecules important to the plant and discover that most of a plants mass comes from air and water, rather than from soil.



WEBS, WINGS, AND CRAWLING THINGS - NEW GRADES P K 1 2 3 4 5 6

Investigate the world of insects, arachnids and myriapods! Get up close with these fascinating creatures in this interactive, live arthropod program. Engage in age-appropriate explorations of adaptations, plants, life cycles, heredity, habitats, and more!

UNDERSTANDING AIR - NEW LEGO® Bricks Program

GRADES 6 | 7 | 8

Construct physical models of air using LEGO Bricks. Students will then "combust" them to produce carbon dioxide and air pollutants. Students will discuss the impacts that this may have upon air quality and the environment.



YOU, ME, AND THE BLUE PLANET GRADES 4 5 6 7 8 9 10 11 12+

Did you know that our actions impact the quality of water in the lakes, rivers and streams in our communities, and the Great Lakes? From Zebra Musselsto Phragmites and microbeads, many plants, animals, and foreign substances have been introduced to the Great Lakes region with harmful effects to its ecosystems. Learn how WE can work together to protect our most precious resource: water. Students will examine samples collected throughout Michigan and consider ways they can help.



PHYSICAL SCIENCE How Does That Work?

DISCOVER THE SCIENCE OF THE WEATHER, PHYSICS, MATTER AND ELECTRICITY THAT SURROUNDS US EVERY DAY

ELECTRICITY AND MAGNETISM GRADES 2 3 4 5 6 7 8

Examine the properties of magnets and how they act with common materials and with each other. Investigate the discovery of electricity and its connection with atoms. Create a human magnet and a human circuit, perform a hair-raising experiment, and generate lightning to observe how electricity and magnetism interact with matter.



FORCES AND MOTION GRADES K | 1 | 2 | 3 | 4 | 5 | 6

Investigate matter and the qualities scientists use to classify it as solid, liquid, or gas. Understand how to make work easier by applying pushes and pulls on simple machines like levers, pulleys, and inclined planes. Lots of activities including student volunteers and hands-on demonstrations make this a "moving" experience!

INQUIRY INVESTIGATION GRADES P|K|1|2|3

Utilize this inquiry-based experience to explore the concept of what causes objects to move. As students study cause and effect relationships, they will practice the scientific process by asking questions, making observations, exploring materials, making a plan and communicating their ideas.

LIGHT AND SOUND GRADES 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

Focus on the physics of waves as we explore and describe the properties of light and sound. Discover how these forms of energy are created, measured, and controlled. Hands-on activities and student participation with percussion tubes, spectrum tubes, and more reveal the fascinating facts about these everyday phenomena.



PHYSICAL SCIENCE

MATTER AND ENERGY GRADES 1 2 3 4 5 6 7 8

Learn how scientists classify common materials through an emphasis on water, then explore "weird" substances that blur the boundaries between states of matter. Apply light, heat, electricity, and other forms of energy to matter and behold the results. Finish with a BANG when we change chemical potential energy into kinetic energy!



PHYSICS OF FLING! GRADES 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Demonstrate the power of physics using the Institute's three-ton trebuchet. Capable of launching a large pumpkin the length of a football field or more, Cranbrook's trebuchet is an awesome tool to demonstrate the principle of conservation of energy, the mathematical nature of projectile motion and the basic laws of kinematics in engaging and inspiring ways.

This amazing program is offered in three ways:

- 1. Two hours at your school
- 2. Two hours at the Institute of Science
- 3. One hour at your school and one hour at the Institute (on separate days).

Each program includes a classroom component that involves the use of a model trebuchet as well as the hands-on use of the full-scale trebuchet. This program requires even terrain and approximately 75 yards of down-range distance. Some classroom components for lower grades are not transportable and require a museum visit. See page 5 for pricing.



WAVES AND ENERGY - NEW GRADES 6 | 7 | 8

Students will gain a greater understanding for where our energy comes from and how it travels to Earth. Working in pairs, they manipulate a pendulum to model a wave and discuss various phenomena that deal with waves and energy. Students will also each go home with a special pair of glasses that allows them to see some of these waves anywhere they go.



WEATHER GRADES 4 | 5 | 6 | 7 | 8

See how solar energy drives our climate and discover the circumstances that influence our daily weather. Become a meteorologist by using current Internet data to create a forecast. Explore violent weather and learn how to protect yourself during storms. Watch lightning strike before your very eyes!

SCIENCE ON GO! We're Bringing A Field Trip To Your School!

SCIENCE ON THE GO! PROGRAMS ARE AVAILABLE YEAR-ROUND! CRANBROOK INSTITUTE OF SCIENCE COMES TO YOU TO HOST A FIELD TRIP IN YOUR SCHOOL! INSTITUTE EDUCATORS SHARE THEIR EXCITEMENT OF SCIENCE WITH INVESTIGATIVE MATERIALS AND FUN PROPS THAT PROMISE TO ENGAGE YOUR STUDENTS!

SMALL GROUP PROGRAMS

Small group programs work well for up to 30 students. Choose from a variety of topics, covering anthropology, astronomy, earth science, fluid earth, physics and life science.

CHEMICAL REACTIONS - NEW LEGO® Bricks Program

GRADES 6 | 7 | 8

A fun introduction to molecules, atoms, chemical notation, and chemical compounds! Students will manipulate LEGO® Brick models of atoms to demonstrate chemical reactions. This program can be used as both an introduction to chemistry, enrichment for students with a basic understanding, or as an end lesson when students have completed their chemistry lessons.

CONTINENTAL DRIFT TO PLATE TECTONICS - NEW

GRADES 5 6 7 8 9 10 11 12+

Explore and evaluate Alfred Wegener's evidence for continental drift and the existence of the supercontinent Pangaea with numerous rocks, fossils and casts from Antarctica. Africa and Australia. See how new technology and exploration of the deep oceans provided further evidence for the theory of plate tectonics, including how the theory explains the present day distribution of earthquakes, volcanoes, mountains, rift valleys, rocks and mineralsincluding plate tectonic events that occurred in Michigan over 1 billion years ago!

DNA STRUCTURES AND REPLICATION - NEW

GRADES 6 | 7 | 8 | 9 | 10 | 11 | 12+

Students build and manipulate a 3-D model DNA from the smallest nucleotides to a completed DNA double helix. Explore the replication process using this hands on model. Students will understand the process of replication from start to finish and the terms associated with the process.

DECODING DNA - NEW GRADES 6 | 7 | 8 | 9 | 10 | 11 | 12+

Decoding DNA will allow students to manipulate physical models of DNA. They will understand how to describe and build a DNA codon and how codons group together to create a gene. They will then learn how to decode a gene to describe how codons work together to create a functioning gene. Students will gain a better understanding for how DNA leads to our, or other organisms, genome that makes each of us unique.

TRANSCRIBING DNA AND RNA - NEW

GRADES 6 | 7 | 8 | 9 | 10 | 11 | 12+

Learn and explore how we go from DNA to protein using hands-on manipulatives. Students will have a greater understanding for how mRNA is different than DNA, how to transcribe and translate DNA, and the importance of proteins to our everyday lives.

DINOSAURS

GRADES P | K | 1 | 2 | 3

Hold a dinosaur fossil, learn how dinosaurs adapted to their surroundings and dig for fossils like a paleontologist in this program designed for younger students.

ELECTRICITY GRADES 3 4 5 6 7 8

Examine the nature of electricity by modeling electron flow, building circuits and exploring generators. Investigate the many ways that electricity impacts our lives and how different forms of energy are converted into electrical energy.

HOW WE USE WATER

GRADES 4 | 5 | 6 | 7 | 8

Learn about the Great Lakes as one of the most important freshwater resources on Earth. Join us on a journey through the water cycle from the Earth's surface to atmosphere and back again. Demonstrations and hands-on activities reveal how vital the Earth's fresh water is and what we can do to conserve it. For more information about water, curriculum, and links visit greatlakeswatershed.org.

I LIVE IN A WATERSHED GRADES 5 | 6 | 7 | 8

Learn about your watershed and how to protect it from pollution. Working in groups, students create a model community to develop an understanding of the ways in which land use impacts the water quality of local rivers and streams, and ultimately, the Great Lakes.

INQUIRY INVESTIGATION

GRADES PK | K | 1 | 2 | 3

Utilize this inquiry-based experience to explore the concept of what causes objects to move. Students practice the scientific process by asking questions, making observations, exploring different materials, and communicating their ideas.

INVESTIGATING LIGHT

GRADES 2 | 3 | 4 | 5 | 6

Students conduct experiments that illustrate principles of light, shadows, color, reflection, refraction and more in this brilliant program.

IT'S A SMALL WORLD!

GRADES PK | K | 1 | 2 | 3

Investigate the small world of insects and arachnids. Use models, microscopes, and live samples to explore the similarities and differences between insects and arachnids. Develop an understanding of the importance of the small living world around us.

MICHIGAN ECOSYSTEMS

GRADES 4 | 5 | 6 | 7

Investigate the diversity of Michigan's ecosystems. Explore six different Michigan ecosystems and construct a food web among the biotic and abiotic factors in the ecosystems. Examine the interrelationships between these factors and how energy flows through the food webs to sustain life in any ecosystem and uncover the many ways humans impact nature.

MONEY!

GRADES 2 | 3 | 4 | 5

Beg, barter and buy with this enjoyable introduction to the principles of economies and fiscal responsibility.

THE PEOPLE OF THE THREE FIRES

GRADES 2 | 3 | 4 | 5 | 6

Discover Michigan's rich culture and history of the Ojibway, Ottawa and Potawatomi tribes through interactive activities and authentic artifacts.

ROCKS, MINERALS & FOSSILS

GRADES 3 4 5 6 7 8

Using Cranbrook's world-class rock and mineral collection and authentic fossils, students will learn about the formation of rocks and minerals. Students will explore evidence that confirms that Michigan was once covered by an ocean.

STARLAB

GRADES K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

Enter our portable planetarium and journey through the night sky discovering distant stars, planets and constellations. Immerse yourself in the lore behind the pictures in the sky.

WATER, WATER, EVERYWHERE GRADES 2 | 3 | 4

Act out the water cycle, make a cloud in a bottle, view the effects of pollution on groundwater and understand the many ways that we use water with this interactive program that's bound to make a splash.

LARGE GROUP PROGRAMS

Large group programs work well for groups of up to 150 students and provide an up-close look at the physical sciences.

FORCE AND MOTION

GRADES K |1|2|3|4|5|6|7|8 Examine the how and why of motion, including forces, velocity, momentum, and Newton's Laws of Motion by using a trebuchet, hovercraft, sonar unit and more.

MATTER AND ENERGY

GRADES 2 | 3 | 4 | 5 | 6 | 7 | 8

Learn how scientists classify common materials with emphasis on water, and then explore "weird" substances that blur the boundaries between states of matter. Apply light, heat, electricity and other forms of energy to matter and observe the results. We finish with a BANG when we change chemical potential energy into kinetic energy!

SIMPLE MACHINES

GRADES K | 1 | 2 | 3 | 4 | 5

Explore how simple machines can help us perform work in this stage show with large props and audience participation.

WAVES AND ENERGY - NEW GRADES 6 | 7 | 8

Students will gain a greater understanding for where our energy comes from and how it travels to Earth. Working in pairs, they manipulate a pendulum to model a wave and discuss various phenomena that deal with waves and energy. Students will go home with a special pair of glasses that allow them to see light waves anywhere they go.

SPECIAL EVENTS

Bring your school community together to share in a fun and educational hands-on experience! Cranbrook Institute of Science can meet the variety of needs and interests in your school, your classroom, and your community! Our Science on the Go! programs are S.T.E.A.M. focused and perfect for school events, extracurricular clubs, latch-key programs, and community and neighborhood events.

CUSTOM SCIENCE FESTIVALS GRADES PK | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8+

Personalize your Cranbrook experience by developing a custom event to expand students' learning from S.T.E.M. into S.T.E.A.M. These festivals can occur either during or after school. Students and teachers can rotate through the programs as a whole class or as small groups. The stations can run from 10 minutes to 30 minutes.

FAMILY SCIENCE NIGHTS

GRADES PK | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8+

Students and parents can investigate the scientific world in an engaging and exciting after school event. Bring families into your school to cultivate an interest in science and extend your students S.T.E.A.M. learning by having us set up stations based on various branches of science. Events typically last two hours and require at least 12 volunteers. Now you can customize your Family Science Night by selecting your stations from over forty engaging options.

SCIENCE ON THE SCREEN! This Is Knowledge - In High-Definition

THROUGH VIDEOCONFERENCING TECHNOLOGY, WE BRING HIGH-QUALITY SCIENCE PROGRAMS RIGHT INTO YOUR CLASSROOM

VIRTUAL FIELD TRIPS

Using the latest High Definition videoconferencing technology, Cranbrook Institute of Science brings quality science programs directly to your classroom!

- Distance learning enables students to connect with our scientists and become active participants in the learning experience.
- Programs address national standards and align with the NGSS. Each 45-minute program includes teacher resource information, a session outline and any required activity kits. You must have videoconferencing equipment in your school or district to participate in Science on the Screen! virtual field trips. Connections are available via ISDN or IP.

For alternate connection options, please call 248 645.3235.

ASK THE EXPERT -EXPLORING CAREERS IN THE MUSEUM

GRADES 2 3 4 5 6 7 8 9 10 11 12+

Give your students the opportunity to meet a scientist and discover what it's like being a paleontologist, anthropologist, astronomer or other museum professional. Every program is unique, as each expert uses multi-media programs, artifacts, and their own personal experiences and research to bring their life's work to your classroom.

NATIVE AMERICA

GRADES 3 4 5 6 7 8 9 10 11 12+

Explore the history and culture of the tribes/nations of your state or province using artifacts drawn from the Institute's collections, historical photographs and documents. This program is tailored to each group's interests based upon grade level and educator requirements.



THE PEOPLE OF THE THREE FIRES GRADES 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Enter the world of the Ottawa, Ojibway and Potawatomi tribes of Michigan. Artifacts, graphics and commentary combine to reveal the history of Michigan's First Peoples. The program touches upon language, history arts and cultural ideals-both past and present-of the tribes known as "The People of the Three Fires".

THE ICE AGE AND YOUR SCHOOL: HOW COOL WERE YOU?

GRADES 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12+

Explore the world of the ice age and investigate the evidence of that remarkable past in the local landscape and prehistoric biota to place your school and community in a global context. Evaluate theories for past and present changes in global climate with a geologist that has explored the Antarctic ice sheet, including the South Pole. This program is tailored to your geographic location. Emphasis is placed on the benchmarks for your group's grade level.

PROFESSIONAL DEVELOPMENT & OTHER PROGRAMS

Add A Spark To Your School's Curriculum! Add a spark to your school's science curriculum through the Institute's Professional Development Workshops. Institute scientists and educators have spent years developing engaging programming in support of classroom curriculum. Enhance how science is taught through inquiry and interdisciplinary sessions. Educators will be empowered with ideas and activities to enhance their students' science experiences in the classroom.

THE FUNDAMENTALS OF INQUIRY

Explore the role of inquiry to create powerful student experiences in science education, including best science practices, guiding learners in developing questions and facilitating student-driven investigations at any age. This workshop supports best science practices in the classroom and is available as a half-day or day-long session.

DESIGN THINKING

Explore the Design Thinking process as a tool educators can utilize in their classrooms to encourage students' problem solving capabilities. This process emphasizes empathy in problem solving, creating a personal experience enhancing student learning.





Call us at 248 645.3211 to discuss a custom session for your group.

SCIENCE SHOP

The Science Shop at Cranbrook Institute of Science provides a wonderful opportunity to enhance the learning experience with a personal artifact that reinforces scientific concepts and provides a positive memory of the visit.

Teachers and Chaperones receive a 10% discount off their purchases at the Science Shop.

NO TIME TO SHOP? CALL AHEAD AND PICK YOUR ORDER UP DURING YOUR VISIT! 248 645.3207 *HINT! GO ONLINE TO SEE SPECIFIC PRODUCTS AND PRICES.*



LUNCH AT THE INSTITUTE OF SCIENCE



BRING YOUR LUNCH

- Lunchrooms are available on a pre-scheduled basis.
- Each child should bring a lunch container identified with the student's name.
- Food and beverages, including gum, are not permitted in the museum.

2 ORDER LUNCH FOR YOUR STUDENTS

The Institute offers lunch catering for students. Lunches must be pre-ordered at least two weeks in advance for delivery to the school's designated lunchroom area at the time of the visit.

A. \$5.50 PER PERSON

- **B.** Orders require a 50% non-refundable deposit at the time of order.
- **C.** Additional a la carte items are available for an extra charge: chips, cookies, bottled water. Call for group pricing of these items. Specify at time of ordering if anything extra will be purchased.
- **D.** Reflections Cafe accepts cash, credit cards (Visa and MasterCard) and checks (payable to Chartwells).

PLACE LUNCH ORDERS AND MAKE PAYMENT THROUGH THE CAFE DIRECTLY AT 248 645.3201



3 CHOOSE ONE MEAL OPTION FOR YOUR ENTIRE GROUP.

MEAL 1	MEAL 2
Fresh pizza slice	Turkey and Cheese or
(cheese or cheese and pepperoni)	Ham and Cheese Sandwich
Pretzels	Cheese stick or pretzels
Cookie	Cookie
Applesauce	Applesauce
Juice Box	Juice Box

Special requests? Food allergies? Ask us! We can accommodate most requests and regularly offer special dietary menus for gluten, nut and other food allergies.

ONE TEACHER/CHAPERONE EATS FREE WHEN MINIMUM OF 25 ORDERS ARE CONFIRMED.

PERMANENT GALLERIES & INSTALLATIONS

Cranbrook Institute of Science houses eleven permanent galleries that cover topics related to anthropology, astronomy, ecosystems, earth science, fluid earth, life science and physical science. Include a stop to one or many of our galleries as part of your field trip and help students see the interconnections with everything around them.

THE STORY OF US

The Story of Us showcases the very best of the Institute's nationally-regarded anthropology collection and offers an immersion experience unprecedented at Cranbrook. Visitors will experience the exhibition with the help of a virtual holographic-like personal guide and use individual touch-screen interfaces to learn more about objects that interest them.

LIFE CHANGES OVER TIME

Come face to face with a full-sized Tyrannosaurus rex skeleton cast and examines natural selection and evolution by exploring the question "Are birds the descendants of dinosaurs?"

ICE AGES COME AND GO

This exhibit presents climatic variations that have buried Michigan under ice over and over again. Hands-on interactives and visual diagrams help visitors explore issues like seasons, heat distribution and how heat travels across the globe.

MASTODONS DID NOT SURVIVE

This exhibit examines extinction through the example of the mastodon, which used to be plentiful in Michigan during the last ice age.

BY NATIVE HANDS

The rich culture of Great Lakes native peoples reflects a complex connection between objects, practices and the environment.

READING OBJECTS

Every object-a pair of shoes, a necklace, a flag-holds different meanings for different people, and how we decode objects varies depending on culture, previous experience and prior knowledge.

WOODLANDS DEN

Retained as originally created, these dioramas of Michigan plant associations capture both a reminder of the Institute's past and a glimpse of habitats increasingly threatened throughout the state.

THE MOTION GALLERY

Lose your fear of physics with handson experiments that demonstrate the basic yet profound concepts of matter in motion.

CRANBROOK OBSERVATORY

Three new telescopes, architectural changes in the viewing space, a new dome, and compatibility with the planetarium offer an astronomical experience unparalleled anywhere in the Midwest. The Observatory is open weekends throughout the year.

EVERY ROCK HAS A STORY

Was Michigan once located in the tropics? Will California crumble into the Pacific Ocean? The earth is constantly changing right under your feet and the exciting results range from earthquakes and volcanoes to granite and diamonds.

ASTRONOMY GALLERY

The Astronomy Gallery includes ViewSpace, a self-updating exhibit from the Space Telescope Science Institute.

ACHESON PLANETARIUM

The planetarium at Cranbrook Institute of Science is an intimate theater that allows you to explore and experience the universe. Preregistration required for field trips.

MINERAL STUDY GALLERY

Cranbrook founder George Booth started this mineral collection in 1926 with only a few hundred specimens. Since then, it has grown to more than 11,000 specimens.

ACHESON LIGHT LAB

Light Lab, an ingeniously subtle science lesson, is a space designed to encourage curiosity.

ICE AGE SURVIVORS

Ice Age Survivors focuses on large animals or megafauna that survived the last pulse of the Late Quaternary extinctions in North America that occurred between 11,500 and 10,000 radiocarbon years ago.

WATER IS LIKE NOTHING ELSE

See the power of water on the bed of an ancient sea, make a storm, and work with an interactive kiosk to explore freshwater issues.

THE ERB FAMILY SCIENCE GARDEN

Featuring a dynamic garden of Michigan native plants that change with the seasons and a water feature highlighting water in its vapor, liquid and solid states, the Erb Garden is open seasonally.

.

EXPLORE LAB - NEW

The Institute's newest educational and exhibition space, *exploreLAB* offers both public and field trip programming. Themed, hands-on activities, objects from the Institute's collections, changing installations, and rotating experiences create a learning and exploration environment unlike any other.

Field trip programming in exploreLAB begins January 9 and runs through June 8, 2018. Preregistration is required.

CHANGING EXHIBITIONS



CHOCOLATE September 23. 2017 - January 7. 2018

A unique tree in a lush tropical environment. A seed so precious it was used as money. A spicy drink and a sweet snack. A heavenly craving and a sublime pleasure. Chocolate is all this... and much more. Explore the relationship between human culture and this rainforest treasure in *Chocolate*.

CHOCOLATE is presented by:





Chocolate and its national tour were developed by The Field Museum, Chicago. This exhibition was supported, in part, by the National Science Foundation.



ANCIENT ROME: AGE OF THE CAESARS February 3 - July 3. 2018

This exhibition brings to life the lost and forgotten technology and inventions that set the Roman Empire apart from the rest of the world and which continue to influence us to this day. By reconstructing ancient Roman technology using the same materials and techniques that the Romans used thousands of years ago we can learn so much that would not have been possible solely by studying archaeological finds and original texts.

SCOUT PROGRAMS

WORKSHOPS AT CRANBROOK INSTITUTE OF SCIENCE PROVIDE SCOUTS THE CHANCE TO WORK WITH PROFESSIONAL SCIENTISTS WHO ARE ACTIVE IN THEIR FIELDS AND THE OPPORTUNITY TO INTERACT WITH A UNIQUE, WORLD-CLASS COLLECTION OF OBJECTS AND ARTIFACTS.





BOYS			GIRLS		BOTH	
CUB SCOUTS TIGER Sky is the Limit WOLF Air of the Wolf Finding Your Way BEAR Forensics Make it Move	WEBELOS Adventures in Science Earth Rocks! Engineer Into the Woods Walkabout	BOY Se Archaeology Astronomy Chemistry Electricity Environmental Science Fish + Wildlife Management	COUTS Indian Lore Plant Science Soil & Water Conservation Space Exploration Sustainability Weather	DAISY Using Resources Wisely BROWNIES Bugs Hiker Home Scientist Potter Sonces	JUNIORS Flowers Jeweler	OVERNIGHTS All Scout Science All Scout Astronomy Juniors/Cadettes CSI
Super Science	uper Science	Geology		Water		

WORKSHOPS

WORKSHOP INFORMATION

- Workshops include general admission to the Museum
- Schedule multiple workshops on the same day to receive a discount
- Lunch available for purchase see page 26

OVERNIGHT WORKSHOPS INCLUDE

- 2-hour workshop
- Auditorium physics program (excluding CSI)
- Planetarium program
- Evening snack
- Continental breakfast



Preview programming and register online at science.cranbrook.edu or call 248 645.3210. Advance registration required.



OVERNIGHT SCHOOL FIELD TRIPS

Overnight field trips to the Institute offer your students the opportunity to work with museum professionals active in their fields. Overnights include three mini science workshops with our science experts, a student participation auditorium program, a visit to the Acheson Planetarium, plus the visit to our museum exhibits.

Overnights are available any day of the week, contact our Scheduling Office at 248 645.3210 to check date availability and cost.



HOMESCHOOL PROGRAMS

Visit Cranbrook Institute of Science and enhance your homeschool curriculum. From hundreds of specimens and artifacts on display, to engaging programming, any homeschool classroom comes alive with a visit to the Institute!

Contact our Scheduling Office to hear how you or your group can register for a field trip: 248 645.3210.



SUMMER CAMP

Campers entering kindergarten through 5th grade utilize Cranbrook's 319-acre outdoor laboratory and the resources of a museum to explore science and create a lifetime of memories and learning experiences. Week-long day camps run during summer months.



PLAN A BIRTHDAY PARTY

We've got birthday parties down to a science! From dinosaur digs to scavenger hunts, museum tours, and private planetarium shows, we have many customizable options!

Find out more by visiting science.cranbrook.edu or calling 248 645.3193.

BECOME A MEMBER!

Membership at Cranbrook Institute of Science is a great way to open the door to discovery and explore the world of science with your family and friends. Our exceptional exhibits, planetarium, and programming deliver a day of education and inspiration. JOIN TODAY!

TRANSPORTATION & MAPS

PLEASE STAY ON YOUR BUS AND A STAFF MEMBER WILL COME TO GREET YOUR GROUP AND PROVIDE INFORMATION FOR THE DAY'S VISIT.



Cranbrook Educational Community P.O. Box 801 • Bloomfield Hills, MI 48303-0801 http://science.crnbrook.edu



science.cranbrook.edu

Educational Programs Proudly Sponsored In Part By:

ACHESON FAMILY FOUNDATION ASPLUNDH TREE EXPERT COMPANY BAIARDI FAMILY FOUNDATION BOSCH COMMUNITY FUND CHARLES STEWART MOTT FOUNDATION COMMUNITY FOUNDATION FOR SOUTHEAST MICHIGAN CONSUMERS ENERGY FOUNDATION DELPHI FOUNDATION THE DEROY TESTAMENTARY FOUNDATION DENSO INTERNATIONAL AMERICA, INC. DETROIT AUTO DEALERS ASSOCIATION CHARITABLE FOUNDATION FUND DTE ENERGY FOUNDATION FLAGSTAR BANK THE FRED A. AND BARBARA M. ERB FAMILY FOUNDATION HUDSON-WEBBER FOUNDATION IDEAL GROUP ITC HOLDINGS CORPORATION KAPPEN TREE SERVICE, LLC KAREN & DREW PESLAR FOUNDATION THE KRESGE FOUNDATION LEAR CORPORATION MARY G. STANGE CHARITABLE TRUST MASCO CORPORATION FOUNDATION OAKLAND COUNTY WATER RESOURCES COMMISSIONER'S OFFICE PNC FOUNDATION PURE OAKLAND WATER (POW) THE TOWNSEND CORPORATION UTILITY SUPPLY AND CONSTRUCTION