



Summer 2016  
**EUREKA!**



# COURSE CATALOGUE

<b>Rookie Group 1: Staff Leader: Erin</b>
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Dates:	Wednesday, July 6 and 7
Title:	Fun with Code!
Instructor:	Holyoke Codes: Lissie Fein and Andrew Pasquale
STEM	Computer Science
Location	On Campus (Holdsworth Hall room 308)
Workshop Summary:	Using the Scratch programming platform, this workshop is an introduction to the basics of computer programming. Girls will use these basic skills to make their own video games, animations and other fun projects!

All Eureka Groups	Friday, July 8- Field Trip to Look Park
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Dates:	July 11-13
Title:	T-Shirts and Bubblegum: The Science of Growing Important Crops
Instructor:	Elisha Allan-Perkins, Michelle DaCosta, Kelly Allen, Rachael Bernstein
STEM	Plant and soil science
Location	On Campus with field trip on third day
Workshop Summary:	This workshop explores the roles of plants in our everyday lives and the types of research we do on these crops here at UMass. Learning activities will start in the laboratory and end on the final day with a field trip to the UMass Farm.

Dates:	July 14
Title:	Endangered Species In Our Water
Instructor:	Dave Perkins/US Fish and Wildlife
STEM	Environmental Conservation
Location	Field trip : Richard Cronin Aquatic Resource Center US Fish and Wildlife Service 51 E. Plumtree Rd Sunderland, MA
Workshop Summary:	Girls will explore lab cultures, take samples at local waterways, and try trout fishing in order to learn about the work scientists are doing to save local aquatic endangered species such as freshwater mussels and Puritan Tiger Beetles.

All Eureka! Groups	Friday July 15 TED-x Talk at MGHPCC in Holyoke
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Dates:	July 18
Title:	The Buzz About Bumble Bees: Pollination and Bee Disease
Instructor:	Lynn Adler, George LoCascio, Kristen Michaud
STEM	Wildlife Biology, Bees
Location:	On Campus
Workshop Summary:	This workshop focuses on what pollination is, why it matters, and an exploration of bee disease as one issue affecting pollinators. During the workshop, girls will look at flowers to identify reproductive parts, observe live bumble bee colonies,

	identify different kinds of bees and colony structures. Each student will then have the opportunity to learn about research methods for studying bumble bee disease, including bee dissection, counting disease cells under a microscope, and inoculating bees.
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Dates:	July 19-20
Title:	MathSpring Intelligent Tutoring System
Instructor:	Danielle Alessio, Beverly Woolf, Ivon Arroyo
STEM	Math, Computer Science
Location	On Campus
Workshop Summary:	MathSpring is an intelligent tutoring system for grades 5-10 that individualizes instruction. The systems helps students solve math problems with animated hints and provides a learning companion to work with. This workshop will give students an opportunity to engage with math in a fun and interesting way while providing graduate researches insight on how to improve the math tutor.

Dates:	July 21
Title:	The Science of Friendship and Stress
Instructor:	Jana Lembke and Fiona Ge
STEM	Psychological and Brain Sciences
Location	On Campus-room 423 Tobin Hall
Workshop Summary:	Ever wonder why some friends get along better than others? We'll explore research in the field of social psychology to learn about what characteristics make for a good friendship - and how to best deal with stress when we have difficulties in our social relationships.

All Eureka! Groups	Friday, July 22 Field Trip to Mystic Seaport
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Dates:	July 25
Title:	CO <sub>2</sub> and You
Instructor:	Ezra Wood and Ben Demming
STEM:	Chemistry, Public Health
Location:	On Campus
Workshop Summary:	We will learn about the sources of carbon dioxide in the world, and measure its concentrations in real time. We will also study phase transitions (solid to gas, solid to liquid, etc.) and have a good time with dry ice fog.

Dates:	July 26
Title:	Seeing the Forest for the Trees: Explore and Learn About Forest Trees in the UMass Campus Forest!
Instructor:	Lena Fletcher
STEM:	Ecology, Environmental Conservation
Location:	On Campus
Workshop Summary:	In this workshop we will explore the amazing forest on the UMass campus. Many of the native trees found in Massachusetts can be found in the campus forest. We will walk to the campus forest near the Sylvan dorm area, teach students to identify some of the native forest species, consider the ecology of trees and why some grow in some places, and not others, and make observations of the forest ecosystem. Connections will be made to the trees and forested areas in their communities.

Dates:	July 27
Title:	Protecting Your Privacy on the Internet
Instructor:	Amir Houmansadr, Shahrzad Naseri, Fatemeh Razaei
STEM	Computer Science
Location	On Campus
Workshop Summary:	We go on the Internet almost every day for different activities. For instance, we use different social networking websites, send and receive emails with our friends, and do online shopping. Unfortunately, in many of these activities we compromise important private information about ourselves. In this workshop we will give examples of how we expose ourselves online. We will also talk about some mechanisms to protecting private information on the Internet.

Dates:	July 28
Title:	Your Human Genome
Instructor:	Courtney Babbitt, Trisha Zintel, Jason Pizzollo
STEM	Biology
Location	On Campus
Workshop Summary:	Workshop participants will engage in hands-on DNA isolation, and will examine DAPI-stained swabs of their own genomes. Additionally, we will talk about “what if someone asks to sequence your genome?”, which is going to be a more and more critical question as these student become voters, parents, and patients.

All Eureka Groups	Friday, July 29- Eureka!-Thon “teach back” at Girls Inc.
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# COURSE CATALOGUE

<b>Rookie Group 2: Staff Leader: Kianna</b>
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Dates:	July 6
Title:	The Buzz About Bumble Bees: Pollination and Bee Disease
Instructor:	Lynn Adler, George LoCascio, Kristen Michaud
STEM	Wildlife Biology, Bees
Location	On Campus
Workshop Summary:	This workshop focuses on what pollination is, why it matters, and an exploration of bee disease as one issue affecting pollinators. During the workshop, girls will look at flowers to identify reproductive, observe live bumble bee colonies, identify different kinds of bees and colony structures. Each student will then have the opportunity to learn about research methods for studying bumble bee disease, including bee dissection, counting disease cells under a microscope, and inoculating bees.

Dates:	July 7
Title:	Nanomaterials for Renewable Energy
Instructor:	Kevin Kittilstved, Fumitoshi Kato
STEM	Chemistry
Location	On Campus
Workshop Summary:	The sun provides the earth with light, heat, and energy... a lot of energy that is mostly reflected back into outer space. This workshop will introduce Scholars to the science behind turning sunlight into electricity or fuels using nanomaterials that are thousands of times smaller than a grain of rice!

All Eureka Groups	Friday, July 8- Field Trip to Look Park
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Dates:	July 11
Title:	Building with Macaroni: Why Buildings Don't Fall Down!
Instructor:	Carl Fiocchi
STEM	Engineering
Location	On Campus
Workshop Summary:	This workshop will focus on how the weights of different loads are calculated to see if buildings can withstand certain weights. Students will work in teams of two using macaroni, wood, skewers and hot glue to create a structure and then see if it stands up to loading!

Dates:	July 12-14
Title:	We Are All Made of Stardust!
Instructor:	Alexandra Pope and Stephen Schneider

STEM	Astronomy
Location	On Campus
Workshop Summary:	From the Big Bang to the formation of the first stars and galaxies to our solar system, we will explore how and when the atoms and molecules we are made of were created and give the students an appreciation of the size and layout of our Universe. We will integrate lessons with hands-on activities and field trips, which include trips to the UMass Astronomy Observatory and the UMass Sun Wheel.

All Eureka! Groups	Friday July 15- TED-x Talk at MGHPCC in Holyoke
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Dates:	July 18
Title:	Forensic Geology: The Sands of Crime
Instructor:	Isla Castaneda
STEM	Geosciences
Location	On Campus
Workshop Summary:	Mr. K, a millionaire and the owner of a coal mine, throws a party on his private beach for the investors and board members of his mine. The following morning Mr. K's body is discovered nearby in an abandoned sandy parking lot. In this lab activity, students use information about mineralogy, chemical composition, grain size, sorting and roundness of sand grains to take samples from Mr. K and five suspects to determine who committed the crime.

Dates:	July 19 and 20
Title:	Tree Climbing is Science????
Instructor:	Brian Kane and Mark Reiland
STEM	Environmental Conservation and Math
Location	On Campus
Workshop Summary:	This workshop will involve basic tree climbing skills, incorporating trigonometry, vectors, friction and other concepts from Newtonian mechanics. Girls will get the chance to perform math and physics with their bodies as we practice climbing trees and calculating the process.

Dates:	July 21-28
Title:	Creative Computing with Scratch
Instructor:	Ben Marlin and Deepak Ganesan
STEM	Computer Science
Location	On Campus
Workshop Summary:	This workshop will introduce participants to computer programming with Scratch using hands-on exercises and mini-projects focused on animation and games. The later sections of the workshop will focus on building scratch applications that use external inputs from a variety of sensors including wireless activity sensors on smart phones.

All Eureka! Groups	Friday, July 22 Field Trip to Mystic Seaport
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All Eureka Groups	Friday, July 29- Eureka!-Thon "teach back" at Girls Inc.
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# COURSE CATALOGUE

<b>Vets Group 1: Staff Leader: Erica</b>
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Dates:	July 6
Title:	Plant Detectives
Instructor:	Elisha Allan-Perkins, Michelle DaCosta, Kelly Allen, Rachael Bernstein
STEM	Plant, soil and insect science
Location	On Campus
Workshop Summary:	Plants are constantly under attack from the same types of organisms that make humans and animals sick, and they also endure stressful conditions from their environment. In this workshop, we will learn about the different ways plants can become sick. The students will work as groups to diagnose a sick plant using a variety of laboratory techniques that plant pathologists (or "plant doctors") use every day. We will also talk about what researchers are working on to keep plants from becoming sick and the impacts that these problems have on society.

Dates:	July 7
Title:	Growing Edible Ecosystems: Permaculture Tour & Tasting
Instructor:	Xochiquetzal Salazar
STEM	Agriculture and Permaculture
Location	On Campus
Workshop Summary:	Permaculture is an agricultural design science that models healthy, natural ecosystems in order to create resilient, man-made systems like communities, economies, and gardens. The UMass Permaculture Initiative is changing the way students interact with their food and surroundings with the creation of on-campus permaculture gardens. As part of the Healthy and Sustainable Food System Initiative, UMass Permaculture serves as a hands-on teaching tool for students to learn about local, healthy food systems. In this workshop, we will explore one of our award-winning permaculture gardens and learn about how we can draw upon nature in order to create edible ecosystems that are good for the earth and for people. There will also be a chance for participants to get their hands dirty and taste new things!

All Eureka Groups	Friday, July 8- Field Trip to Look Park
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Dates:	July 11-14
Title:	What You Don't Know Could Hurt You: The Connection Between Cancer and Cosmetics
Instructor:	- <u>Dr. Joe Jerry</u> - UMass Amherst Professor of Veterinary & Animal Sciences, Science Director of PVLSI (Pioneer Valley Life Sciences Institute - a Baystate Medical

	Center-UMass Amherst Research Partnership), Co-Director of Rays of Hope Center for Breast Cancer Research - <u>Dr. Sallie Schneider</u> - Director of Biospecimen Resource and Molecular Analysis at PVLSI - <u>Dr. Karen Dunphy</u> - UMass Amherst Research Assistant Professor of Veterinary & Animal Sciences - <u>Dr. Laura Vandenberg</u> - UMass Amherst Assistant Professor of Environmental Health Sciences
STEM	Public Health, Environmental Science, Molecular Biology
Location	On Campus (ISB 364)
Workshop Summary:	Is there a connection between cosmetics and cancer? What kind of techniques and research are scientists doing to battle cancer? During this important, hands on and informative workshop, scholars will meet with the team of cancer researchers to learn the answer to these questions and more.

All Eureka! Groups	Friday July 15- TED-x Talk at MGHPC in Holyoke
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Dates:	July 18
Title:	Light Up Your Life
Instructor:	Ruthanne Paradise and Rick Metz
STEM	Plant, soil and insect science
Location	On Campus
Workshop Summary:	Scholars will be introduced to the ideas of absorption and reflection using ropes to also identify wavelength and frequency. They will build their own spectrometers to further explore these ideas, and will be asked to identify changes while looking at a variety of different materials. The topic of emissions will also be explored, through both natural and synthetic sources..

Dates:	July 19
Title:	Brains! Humans and Sheep are a Lot Alike.
Instructor:	Beata Kaminska
STEM	Anatomy, Brain Science
Location	On Campus- Holdsworth Hall (either room 301 or 308)
Workshop Summary:	During this workshop, girls get to discover how cool brains are and how different parts of the brain work. Activities including observing brains of different animals in the lab and then picking up a scalpel and working in teams to dissect a sheep brain!

Dates:	July 20
Title:	The World of Pillbugs: A Teeny, Tiny Animals Behavior Study
Instructor:	Maggie Ugolini, Zana Cranmer, Amy Ryan
STEM	Neuroscience and Behavior
Location	On Campus
Workshop Summary:	Learn about animal behavior using teeny tiny crustaceans that live on land and breathe through gills -- pillbugs! These isopods, also known as rollie pollies or potato bugs, are a great model organism to study principles of animal behavior and the extrinsic and intrinsic factors that motivate animals to do what they do.

Dates:	July 21
Title:	The Science of Memory
Instructor:	Rosie Cowell
STEM	Psychological and Brain Science
Location	On Campus- Holdsworth Hall (room 308)

Workshop Summary:	Psychologists study memory: the things we remember and the reasons why we forget. One very interesting question is what gives rise to "false memories"? In this workshop, you will experience a demonstration in which your own eyewitness memories are distorted by misleading questions. Next you will make your own attempt at implanting your own "false memory" in someone's mind. Did your trick work?
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All Eureka! Groups	Friday, July 22 Field Trip to Mystic Seaport
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Dates:	July 25-28
Title:	Analyze your brain waves! A glimpse Into Brain Science Using Electroencephalography (EEG).
Instructor:	Youngbin Kwak
STEM	Psychological Brain Science
Location	On Campus- Kwak Lab Tobin Hall
Workshop Summary:	This workshop will introduce the scholars to the field of psychological brain sciences by having students do an EEG experiment. The scholars will be exposed to basic concepts of neuroanatomy - how different brain regions are involved in daily functionality, brain monitoring technique used in neuroscience research such as EEG and MRI.

All Eureka Groups	Friday, July 29- Eureka!-Thon "teach back" at Girls Inc.
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# COURSE CATALOGUE

<b>Vets Group 2: Staff Leader: Mariana</b>
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Dates:	Wednesday July 6 and 7
Title:	PLOP: Fluid Dynamics and the Egg Drop
Instructor:	Jennifer Ross and Anne Gershenson
STEM	Chemistry and Physics
Location	On Campus
Workshop Summary:	Scholars will explore fluids quantitatively during a discussion of diffusion, viscosity, non-Newtonian fluids, and reversibility of fluids. Activities include making “oobleck” and silly putty! As a finale, the oobleck will be used to perform an egg drop at variable heights and then the data collected from the experiment will be analyzed.

All Eureka Groups	Friday, July 8- Field Trip to Look Park
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Dates:	July 11
Title:	Growing Edible Ecosystems: Permaculture Tour & Tasting
Instructor:	Xochiquetzal Salazar
STEM	Agriculture and Permaculture
Location	On Campus
Workshop Summary:	Permaculture is an agricultural design science that models healthy, natural ecosystems in order to create resilient, man-made systems like communities, economies, and gardens. The UMass Permaculture Initiative is changing the way students interact with their food and surroundings with the creation of on-campus permaculture gardens. As part of the Healthy and Sustainable Food System Initiative, UMass Permaculture serves as a hands-on teaching tool for students to learn about local, healthy food systems. In this workshop, we will explore one of our award-winning permaculture gardens and learn about how we can draw upon nature in order to create edible ecosystems that are good for the earth and for people. There will also be a chance for participants to get their hands dirty and taste new things!

Dates:	July 12
Title:	The Chemistry of Baking
Instructor:	Jennifer Ross and Chef Simon Stevenson
STEM	Chemistry
Location	On Campus- UMass Bake Shop (building next to and behind Hampshire Dining Hall)- Girls will skip morning warmups and head to bake shop super early.
Workshop Summary:	Did you know that cooking is a science? Learn all about the chemistry behind baking, and how a well-run kitchen needs to function like a science lab. You will work together to bake loaves of bread with a dash of science magic.

Dates:	July 13
Title:	Genomics and Me
Instructor:	Li-Jun Ma
STEM	Genomics, Biochemistry and Molecular Biology
Location	On Campus- Holdsworth Hall (room 308)
Workshop Summary:	The concept of genomics will be introduced through this workshop. The girls will translate DNA to protein using an online program and the concept of errors in DNA will be introduced.

Dates:	July 14
Title:	Making a fish - What Embryos Can Teach Us About Health, Disease and Biodiversity.
Instructor:	Craig Albertson
STEM	Biology
Location	On Campus
Workshop Summary:	Students will explore some basic principles of embryology using the zebrafish as a model. They will observe "normal" zebrafish embryos at different stages to witness how development unfolds to produce a well-formed and fully functional organism. Next, students will compare "normal" development to that in a genetic mutant where one or more genes has been "turned off". This will help to conceptualize the link between genotype and phenotype. For instance a fish with a mutation in gene 'A' that has no eyes, tells you that gene 'A' most play a critical role in the formation of eyes. Finally, we will examine embryos of different fish species so that students gain an appreciation for the diversity in developmental processes, and how slight shifts in development can lead to the differences that we see among adult species.

All Eureka! Groups	Friday July 15- TED-x Talk at MGHPCC in Holyoke
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Dates:	July 18-21
Title:	What You Don't Know Could Hurt You: The Connection Between Cancer and Cosmetics
Instructor:	- <u>Dr. Joe Jerry</u> - UMass Amherst Professor of Veterinary & Animal Sciences, Science Director of PVLSI (Pioneer Valley Life Sciences Institute - a Baystate Medical Center-UMass Amherst Research Partnership), Co-Director of Rays of Hope Center for Breast Cancer Research - <u>Dr. Sallie Schneider</u> - Director of Biospecimen Resource and Molecular Analysis at PVLSI

	- <u>Dr. Karen Dunphy</u> - UMass Amherst Research Assistant Professor of Veterinary & Animal Sciences - <u>Dr. Laura Vandenberg</u> - UMass Amherst Assistant Professor of Environmental Health Sciences
STEM	Public Health, Environmental Science, Molecular Biology
Location	On Campus
Workshop Summary:	Is there a connection between cosmetics and cancer? What kind of techniques and research are scientists doing to battle cancer? During this important, hands on and informative workshop, scholars will meet with the team of cancer researchers to learn the answer to these questions and more.

All Eureka! Groups	Friday, July 22 Field Trip to Mystic Seaport
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Dates:	July 25 and 26
Title:	Birds in the Neighborhood
Instructor:	Susannah Lerman and Toni Lyn Morelli
STEM	Wildlife Biology, Birds
Location	Heritage State Park in Holyoke- skip morning warmups and head over to park when the van leaves teen center in the morning.
Workshop Summary:	This workshop will transform Heritage Park into a living laboratory and we will learn how birds respond to city life. Girls will walk to Heritage Park in Holyoke and be introduced to concepts in ecology and wildlife biology. This will include bird banding, using nets to safely catch birds around the park, and observing the birds that are banded. It will also include a bird walk, which will focus on observing different birds and their habitat. We will also discuss the urban heat island effect and its relationship to climate change. Because of all of the pavement, machinery, people, and fewer trees, city areas tend to be warmer than natural areas. So cities can give us clues about how climate change might affect natural areas, and in particular, birds, in the future.

Dates:	July 27 and 28
Title:	Energy: Where does It Come From and How Do We Get More From Renewable Resources?
Instructor:	Dwayne Breger and Leslie Breger
STEM	Environmental Conservation
Location	Day 1: On Campus in Holdsworth Hall (room 308) Day 2: Field trip to various locations including Holyoke hydroelectric, biomass pellet heating a Amherst College book depository/bunker, anaerobic digester at Hadley dairy farm
Workshop Summary:	Scholars begin with a discussion of where the energy comes that they use to power their phones, lights and homes in MA. What would happen if we couldn't get that energy source anymore? Where would we get our energy? Renewable resources! Scholars will build solar pizza box ovens to cook their own pizzas in order to harness the sun's renewable energy. The workshop concludes on day two with tours of renewable energy sites in our community including-Holyoke hydroelectric, solar at UMass (or other), biomass pellet heating a Amherst College book depository/bunker, anaerobic digester at Hadley dairy farm.

All Eureka Groups	Friday, July 29- Eureka!-Thon "teach back" at Girls Inc.
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