



**SUMMER 2018
COURSE
CATALOGUE**

Rookie Group 1 Staff Leader: Yeji Intern: Lesley

Dates:	July 10
Title:	Seeing the Forest For the Trees
Instructor:	Lena Fletcher
STEM	Environmental Conservation and Forestry
Location	Outside on Campus/ Start in Design Bldg. first 30 minutes
Workshop Summary:	Scholars will explore the amazing forest on the UMass campus. Many of the native trees found in Massachusetts can be found in the campus forest. Scholars will walk to the campus forest near the Sylvan dorm area, learn 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 11
Title:	Birds in Our Neighborhood
Instructor:	Susannah Lerman
STEM	Environmental Conservation
Location	Heritage Park in Holyoke
Workshop Summary:	Scholars will learn about some of the cool wildlife and ecology they can observe in their neighborhoods. They will assist with the transformation of Heritage Park into a living laboratory. This will include bird banding, using nets to safely catch birds around the park, and searching for the birds that were marked in previous years. Scholars will have an opportunity to handle live birds and observe how birds use different habitat features commonly found in our parks and backyards.

Dates:	July 12, July 16-18
Title:	Design Your World
Instructor:	Carl Fiocchi 7/12, Erika Zekos 7/16, Patricia McGirr 7/17, Mark Hamin7/18
STEM	Landscape Architecture & Regional Planning
Location	Design Building
Workshop Summary:	Participants will investigate a landscape on campus, determine what qualities of the landscape are most important to them, and using materials provided, create a space that will reveal those qualities to people who visit the site. Participants will gain an understanding of the relationship between site and design, ecology and art, and how landscape architects begin their work by discovering what really matters about a particular site.

July 14	Look Park Field Trip
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Dates:	July 19 and July 23-25
Title:	Creative Computing with Scratch
Instructor:	Ben Marlin
STEM	Computer Science
Location	Design Bldg.
Workshop Summary:	This workshop will introduce scholars 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.

July 20	Friday Field Trip to New England Aquarium
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Dates:	July 26
Title:	Endangered Species in Our Water
Instructor:	Jen Lapis/ US Fish and Wildlife Service
STEM:	Environmental Conservation and Ecology
Location:	Fort River Wildlife Preserve: 69 Moodybridge Rd., Hadley, MA
Workshop Summary:	Scholars will tour the Fort River Birding and Nature Trail located at the Fort River Division of the Silvio O Conte National Fish and Wildlife Refuge. The tour will include discussion about the history and purpose of the refuge, as well as hands-on activities related to the ecosystem including exploring the macro-invertebrates and other animals that live in refuge waters and learning about animal adaptations with pelts and skulls.

July 27	Friday Eureka-thon Prep
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Dates:	July 30 and 31
Title:	Good Germs!
Instructor:	Miriam Hernandez
STEM	Natural Science
Location	ISB 364
Workshop Summary:	Scholars will use observation, discussion and even games to learn how bacteria and plants help each other survive. During this two day workshop, scholars will dig up plants from the garden, and the find 'good bacteria' on their roots to grow on a Petri dish so they can observe, draw and take pictures of it under a microscope. Then, scholars will expand their understanding microscopic organisms to answer the question "how many living organisms are living in a drop of water?"

Dates:	August 1
Title:	DIY Herbal Skin Care: Plants are Medicine!
Instructor:	Hannah Logan
STEM	Sustainability
Location	Franklin Permaculture Garden
Workshop Summary:	Explore the world of herbal medicine and the chemical reactions at play when we introduce herbs to various solvents, and our skin. In this hands-on workshop, scholars will create their own salves, lip balms, sugar scrubs, and salt scrubs using herbs grown in UMass' own Permaculture Gardens, while investigating the properties of each ingredient and how they work to heal our skin!

Dates:	August 2
Title:	Emotions, Motions, & Notions: How The Brain Controls Behaviors
Instructor:	Sarah Winokur
STEM:	Neuroscience and Behavior
Location:	On Campus
Workshop Summary:	In this workshop, you will learn about the structure and function of the brain with fun hands-on games, mini-experiments, and sheep brain dissections! Prepare to expand your minds and stimulate your synapses as you learn how the brain understands and responds to the complex world around you.

August 3	Eureka-thon Grand Finale Celebration!
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**SUMMER 2018
COURSE
CATALOGUE**

Rookie Group 2 Staff Leader: Wilmarie Intern: Gabrielle

Dates:	July 10
Title:	How to Shield Your Privacy on the Internet
Instructor:	Amir Houmansadr
STEM:	Computer Science
Location:	Design Building
Workshop Summary:	We will talk about the risks to privacy while doing various Internet activities. We'll have some hands-on tasks to figure out privacy concepts, and we'll talk about the best practices to protecting privacy online.

Dates:	July 11
Title:	Time Travel 101: Digging Up The Past
Instructor:	Isaac Larsen
STEM	Geology
Location	Morrill 3 Rm. 108 and outside
Workshop Summary:	The workshop will be a geocaching-style tour of the geology around the UMass campus. Scholars will use maps to find stations located around campus, and at each station they will complete a short activity about the geologic feature located there and receive a clue for the final puzzle. After visiting all the stations, the scholars will have all the clues to complete the final puzzle. This activity will get scholars active outside, develop geospatial skills, promote environmental awareness, and teach them about both the local geology and some broad geologic concepts.

Dates:	July 12
Title:	What's at Fault: Where Do Earthquakes Come From? How Plate Tectonics Shakes Things Up
Instructor:	Laura Fatturuso
STEM	Geoscience
Location	Morrill 3 Rm. 108
Workshop Summary:	We will use a sandbox with clear sides and a moving wall to create miniature faults by compressing the sand, illustrating how the earth deforms to produce earthquakes. Before we start we will give a brief background on plate tectonics and ask the girls to make predictions and place monopoly houses in the sandbox. They will help set up the experiment and make observations and measurements of where new faults form. We can run several experiments and provide options to change the initial conditions and let the girls make hypotheses about how they will change the dynamics within the sandbox. We also have a few smaller hands-on devices that illustrate stick-slip earthquake ruptures that we could play with if we finish early or if we split up into groups.

July 13	Friday Field Trip to Look Park
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Dates:	July 16 and 17
Title:	Introduction to Climate Change
Instructor:	Ruthie Halberstadt
STEM:	Geosciences
Location:	On Campus
Workshop Summary:	<p>Day 1: Introduce the concepts of greenhouse gases, carbon dioxide, and global temperature increases. We will calculate carbon footprint (first for the students, and then give them example scenarios) and compare & discuss.</p> <p>Day 2: Look at sea-level rise impacts. Recap lessons from previous day. Do a hands-on activity demonstrating glacier mass loss and sea level rise.</p>

Dates:	July 18 and 19
Title:	Can a cow charge your phone? Can a river toast your bagel?
Instructor:	River Strong and Zara Dowling
STEM:	Conservation and Environmental Sciences
Location:	Design Building (day 1), Field trip (Day 2)
Workshop Summary:	<p>Come learn about all the amazing places that energy comes from and how we can make more from cleaner sources. We'll visit a local farm, a giant hydropower project in Holyoke, and get our hands dirty with our very own renewable energy project! On Day 1 we'll talk about what energy is, the various places it comes from, its impacts, and how it relates directly to our lives. We'll then make our own renewable energy project -- possibly a pizza box solar oven for cooking s'mores under the sun.</p> <p>On Day 2 we'll visit some local clean energy installations: the Holyoke hydroelectric facility and Barstow's Longview Farm to see their anaerobic digester (and see baby cows and sample their ice cream!).</p>

July 20	Friday Field Trip to New England Aquarium
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Dates:	July 23
Title:	Birds in the Neighborhood
Instructor:	Susannah Lerman
STEM:	Ecology
Location:	Heritage Park in Holyoke
Workshop Summary:	<p>Girls will travel to Heritage Park in Holyoke and be introduced to concepts in ecology and wildlife biology. This will include bird banding, using mist nets to safely catch birds around the park, and observing live birds up close and personal. It will also include a bird walk, which will focus on observing different birds and their habitat.</p>

Dates:	July 24
Title:	Endangered Species in Our Water
Instructor:	US Fish and Wildlife Birding
STEM:	Environmental Conservation and Ecology
Location:	Fort River Wildlife Preserve: 69 Moodybridge Rd., Hadley, MA
Workshop Summary:	<p>Scholars will tour the Fort River Birding and Nature Trail located at the Fort River Division of the Silvio O Conte National Fish and Wildlife Refuge. The tour will include discussion about the history and purpose of the refuge, as well as hands-on activities related to the ecosystem including exploring the macro-invertebrates and other animals that live in refuge waters and learning about animal adaptations with pelts and skulls.</p>

Dates:	July 25
Title:	Preparation of Soap
Instructor:	Mingxu You and Laura Alhariri
STEM	Chemistry
Location	ISB 355
Workshop Summary:	The girls will perform a saponification reaction to prepare their own soap from coconut oil. Different colorant and fragrance additives can be added based on their own choices. The girls will learn real hydrophobic and hydrophilic concepts in chemistry, together with pH and liquid nitrogen.

Dates:	July 26
Title:	Making Everyday Things Smarter - Lego for Engineers and Computer Scientists
Instructor:	Phillip Gill
STEM	Computer Sciences
Location	Design Building
Workshop Summary:	The goal of this workshop is to introduce students to the world of Internet of Things (IoT). Students will learn, through a series of incremental learning processes, to turn on/off a strip of LED lights using their smartphone -- a real-world example of implementing smart-home light system. They will be introduced to electronics (LED lights), embedded system (Arduino), and mobile phone development (Blynk). All of these will be implemented using a graphical code, such that they don't have to write an actual code. The workshop will be designed to accommodate those students who do not have any prior experience in electronics or coding; they will work like building Lego blocks.

July 27	Friday Eureka-thon Prep
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Dates:	July 30
Title:	Sensorimotor Control: The real reason for brains!
Instructor:	Julia Choi
STEM	Kinesiology
Location	On Campus
Workshop Summary:	This interactive workshop which included four activities designed to show students some basic principles of human motor control. In one activity, students recorded electricity from their muscles while they squeezed a hand gripper as hard as they can for as long as they can. They then played a game called "rubber hand illusion" where one participant tries to convince the other that a rubber hand was her own by putting it on a table in front of them while stroking it in the same way as her real hand. In a third activity, students learned how our brains need to adapt, by trying to trace the diagram of a star while looking at her hand only as a reflection in the mirror. Finally, students experienced how the brain learns from recognizing mistakes, while throwing balls at a target with prime goggles

Dates:	July 31
Title:	Growing Edible Ecosystems: Permaculture Garden Tour and Tasting
Instructor:	Hannah Logan
STEM	Sustainability
Location	Franklin Permaculture Garden
Workshop Summary:	<p>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 the campus interacts with its food and surroundings with the creation of on campus permaculture gardens. In this workshop, scholars will explore one of the award-winning permaculture gardens on campus and learn about how we can draw upon nature in order to create edible ecosystems that are beneficial to the earth and to people. There will also be a chance for scholars to get their hands dirty and taste new things!</p>

Dates:	August 1 and 2
Title:	Human Neuroscience: Looking into your brain!
Instructor:	Youngbin Kwak
STEM	Psychological and Brain Sciences
Location	On Campus
Workshop Summary:	<p>Scholars will learn the basic concepts of human neuroscience including recent findings. They will also participate in a research study using brain imaging techniques such as functional MRI and EEG. Students will have the opportunity to go through the entire process of a human neuroscience research from data collection to analysis.</p>

August 3	Eureka-thon Grand Finale Celebration!
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SUMMER 2018
**COURSE
 CATALOGUE**

Vets Group 1 Staff Leader: Stephanie Intern: Payton

Dates:	July 10
Title:	Pharmacy and Medical Careers Day
Instructor:	Western New England University Staff
STEM	Health Sciences
Location	College of Pharmacy and Health Sciences Western New England University 1215 Wilbraham Road Springfield, MA 01119 Meet in the lobby of the building Contact: Arin Whitman 413-796-2452
Workshop Summary:	Scholars will learn about medical careers from professors at Western New England’s College of Pharmacy and Health Sciences. Careers and topics covered include pharmacy sciences, ambulatory care, occupational therapy and medical laboratory procedures.

Dates:	July 11
Title:	Plant Domestication, the Original GMO
Instructor:	Ana Caicedo
STEM	Ecology & Nutrition
Location	Design Bldg.
Workshop Summary:	Scholars will learn about the process of plant domestication from weed to tasty snack, and how we can better understand and improve that process through modern knowledge of genetics. There will be a computer activity modeling the domestication process. Scholars will then do a hands on activity running and visualizing a DNA gel. Scholars will observe and compare real wild relatives of domestic plants and maybe even get to take one home.

Dates:	July 12
Title:	Your DNA, Your Medicine
Instructor:	Patrick Flaherty
STEM	Mathematics & Statistics
Location	Design Bldg.
Workshop Summary:	The girls will be learning about how computer science, statistics, and mathematics are used to understand how changes in their DNA can lead to increased risk for certain disease and how modern medicine uses DNA to design personalized treatments. At the end of the workshop the girls will: <ol style="list-style-type: none"> 1. have a better understanding of the way modern DNA sequencing works 2. design an algorithm to help make sense of modern DNA sequencing datasets 3. connect notions of statistical uncertainty with real decisions physicians and patients must make together about their risks and possible treatments.

July 13	Friday Field Trip to Look Park
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Dates:	July 16
Title:	What About Gluten? What is it, What Does it do, How Does it Work...?
Instructor:	Simon Stevenson
STEM	Enterprises
Location	Bake Shop
Workshop Summary:	We will examine different flours, discuss their protein content and gluten forming potential and how that relates to the final baked product. We'll perform an experiment with these different flours and end up discovering what gluten looks and feels like. This gluten will be used in an experiment the following day where you'll get to analyze its porosity and structure building capabilities. In addition we'll be making a bread from scratch, accurately scaling ingredients, working with raw dough, kneading, shaping, fermenting, proofing and finally baking. This is a hands on interactive class and you should be prepared to get a little messy.

Dates:	July 17
Title:	Bursting the Bubble: Scientific Properties of Dough and Bread Structures
Instructor:	Amanda Kitchla
STEM	Food Science
Location	Chenoweth Rm 127- <i>(Girls will go to this workshop RIGHT when they get off bus)</i>
Workshop Summary:	<ol style="list-style-type: none"> 1. Components in Bread (water, starch, & protein) 2. Mechanical Properties of Bread (Compression and Tensile Strength of Bread) 3. Colorimetry and Porosity of bread crust and bread crumb 4. Extensional viscosity of dough (expanding gas bubble)

Dates:	July 18
Title:	How to Catch a Murderer!
Instructor:	Yadilette Rivera Colon
STEM	Forensic Science
Location	Address: Bay Path University 588 Longmeadow Street Longmeadow, MA 01106 Building: Blake Student Commons Contact: Yadi Rivera Colon 413-565-1441
Workshop Summary:	A science themed mobile escape adventure where participants will have to solve "Who dunnit?" In the room they look at the nuances of forensic science and will even walk away with their own slime and fruit sourced DNA sample.

Dates:	July 19
Title:	Why Smart People Make Bad Decisions
Instructor:	Andrew Cohen
STEM	Psychology
Location	Design Bldg.
Workshop Summary:	The main goal is to teach the girls about how we make decisions. We are far from rational beings, but psychologists have learned a lot about how we deviate from rationality. STEM fields are built upon a foundation of an honest evaluation of information. Thus, knowing our cognitive limitations helps us to make better decisions, better evaluate information, be better scientists, and become better citizens. The workshop will consist of a series of hands-on, interactive demonstrations and games both illustrating a number of these limitations and providing techniques for how to overcome them.

July 20	Friday Field Trip to Mystic Aquarium
Dates:	July 23-26
Title:	Breast Cancer and the Environment
Instructor:	Dr. Joe Jerry, Dr. Sallie Schneider, Dr. Karen Dunphy, and Dr. Laura Vandenberg
STEM	Public Health, Environmental Science, Molecular Biology
Location:	On Campus (ISB 364)
Workshop Summary:	Is there a connection between the environment and breast cancer? During this important, hands on and informative workshop, scholars will learn from this team of cancer researchers about the answer to this important question and more. Scholars will use microscopes to observe breast tissue samples and learn to recognize cancer cells at different stages of development. They will learn about what techniques researchers and scientists use to learn about and prevent cancer and how environmental toxins may affect human health.
Dates:	July 30
Title:	DIY Skin Care
Instructor:	Hannah Logan
STEM	Sustainability
Location	Hampshire Dining Commons Classroom
Workshop Summary:	Explore the world of herbal medicine and the chemical reactions at play when we introduce herbs to various solvents, and our skin. In this hands-on workshop, scholars will create their own salves, lip balms, sugar scrubs, and salt scrubs using herbs grown in UMass' own Permaculture Gardens, while investigating the properties of each ingredient and how they work to heal our skin!
Dates:	July 31-August 2
Title:	Buzz About Pollination
Instructor:	Luis Aguirre
STEM	Biology
Location	Fernald Hall Room 102
Workshop Summary:	Day 1: Catching Insects and learning about flowers. Day 2: Making insect collections and make tea. Day 3: Bees in the lab. Dissecting bees and learning about their diseases.
August 3	Eureka-thon Grand Finale Celebration!



**SUMMER 2018
COURSE
CATALOGUE**

Vets Group 2: Staff Leader: Mae **Intern:** Maria

Dates:	July 10
Title:	More Than Meets the Eye: Hidden Clues in Primate Skeletons
Instructor:	Rachel Bell
STEM	Organismic and Evolutionary Biology
Location	Machmer Hall rm. E14
Workshop Summary:	During this workshop, the girls will have the opportunity to learn all about what bone can tell you about the animal when it was living, by interacting directly with real skeletons. With full access to the UMass Amherst natural history primate collection, we will begin by comparing primate skulls with other mammal skulls to see what makes primates unique. We will then explore the three main clades of primates and learn about what makes them different.

Dates:	July 11 and 12
Title:	Science in the Sandbox: the physics of granular materials
Instructor:	Shubba Tawari
STEM	Physics
Location	Hasbrouck rm. 214
Workshop Summary:	Is sand a solid or a liquid? You can walk on it or build sand castles at the beach, but you can also pick it up by the fistful and let it pour from your hands. If you are caught in a sandstorm, you might be forgiven for thinking it is a gas, like air. Granular materials are all around us: at the beach, on the breakfast table, in the pharmaceutical industry, or the construction industry - yet making predictions about the behavior of these materials remains surprisingly difficult. We will do a variety of experiments with grains of various types to investigate the properties of granular materials, and gain a better understanding of what it means to be a solid, a liquid or a gas

July 13 Friday Field Trip to Look Park

Dates:	July 16-19
Title:	Breast Cancer and the Environment
Instructor:	Dr. Joe Jerry, Dr. Sallie Schneider, Dr. Karen Dunphy, and Dr. Laura Vandenberg
STEM	Public Health, Environmental Science, Molecular Biology
Location	Integrated Science Building rm. 364
Workshop Summary:	Is there a connection between the environment and breast cancer? During this important, hands on and informative workshop, scholars will learn from this team of cancer researchers about the answer to this important question and more. Scholars will use microscopes to observe breast tissue samples and learn to recognize cancer cells at different stages of development. They will learn about what techniques researchers and scientists use to learn about and prevent cancer and how environmental toxins may affect human health.

July 20 Friday Field Trip to Mystic Aquarium

Dates:	July 23
Title:	Bay State Health Careers Day
Instructor:	Bay State Health Staff
STEM	Health/Medicine
Location	Baystate Children's Hospital 759 Chestnut Street (on GPS use "695 Chestnut Street") Springfield, MA 01199 Contact: Linda Todaro Tel: 413-794-2579 See directions sheet
Workshop Summary:	Scholars will learn about medical careers from doctors and staff at Bay State Medical Center. Careers and topics covered include sleep science, pediatrics, Nursing and techniques to stop bleeding.

Dates:	July 24
Title:	DIY Skin Care
Instructor:	Hannah Logan
STEM	Sustainability Chemistry
Location	Hampshire Dining Commons Classroom
Workshop Summary:	Explore the world of herbal medicine and the chemical reactions at play when we introduce herbs to various solvents, and our skin. In this hands-on workshop, scholars will create their own salves, lip balms, sugar scrubs, and salt scrubs using herbs grown in UMass' own Permaculture Gardens, while investigating the properties of each ingredient and how they work to heal our skin!

Dates:	July 25
Title:	How to catch a murderer!
Instructor:	Yadilette Rivera Colon
STEM	Forensic Science
Location	Bay Path University 588 Longmeadow Street Longmeadow, MA 01106 Building: Blake Student Commons Contact Info: Yadi Rivera Colon 413-565-1441
Workshop Summary:	A science themed mobile escape adventure where participants will have to solve "Who dunnit?" In the room they look at the nuances of forensic science and will even walk away with their own slime and fruit sourced DNA sample.

Dates:	July 26
Title:	Broken Brains: How Scientists Learn from our Brains Mistakes
Instructor:	Merika Wilson
STEM	Physiological & Brain Science
Location	Design Bldg.
Workshop Summary:	Everybody makes mistakes. We have all misremembered things and forgotten things. Sometimes we even see, hear, or feel things that aren't there - have you ever felt your phone vibrate even though it didn't? Psychologists study these mistakes to learn how the brain works. In this workshop, you'll conduct a variety of experiments designed to trip-up your senses and mess with your memory. You will learn to think like a psychologist by using these mistakes to understand the brain. You will see what happens inside a person's brain when they do different tasks, and learn how injured brains have helped psychologists better understand healthy brains.

July 27	Friday Eureka-thon Prep
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Dates:	July 30 and 31
Title:	Light Up Your Life!
Instructor:	Ruthanne Paradise
STEM	Chemistry
Location	ISB 355
Workshop Summary:	Color is introduced and the girls will be asked about the colors that we observe for familiar items. This introduces the ideas of absorption and reflection. Using ropes introduce them to the idea of wavelength and frequency. This will be connected to wavelength and frequency of light and visible color. To further explore this connection they will build their own spectrometers (which they will bring home on Day 2). These spectrometers are used with ipads or cell phones to observe the difference in colors from the sun and a variety of light sources (incandescent, fluorescent and LED lights; emissions from electric discharges through various gases). As they examine the transmission and absorption of light through a variety of materials they will be asked to identify any changes. To conclude the day they will collaborate on a summary document

Dates:	August 1
Title:	Smart Things That Are Changing The World
Instructor:	Kevin Kittilstved
STEM	Chemistry
Location	
Workshop Summary:	Students will get hands-on experience with nano materials that are being used in state-of-the-art lighting and displays - QUANTUM DOTS. They will learn about the electromagnetic spectrum, what makes the red-green-blue pixels (RGB), and the absorption and emission of light energy.

Dates:	August 2
Title:	Testing Model Structures: Jell-O Earthquake in the Classroom!
Instructor:	Haiying Gao
STEM	Geosciences
Location	(On Campus)
Workshop Summary:	Students learn how engineers design and construct buildings to withstand earthquake damage by building their own model structures using toothpicks and marshmallows. They experiment to see how earthquake-proof their buildings are by testing them in an earthquake simulated in a pan of Jell-O.

August 3	Eureka-thon Grand Finale Celebration!
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