

Online STEM Program for Gifted Students of Color - Watson
Appendix B. Tables

Table B1. ALA Online Program Schedule for Saturdays and Sundays.

ALA Online Program Schedule	
Timeframe (in Eastern Standard Time)	Activity
Saturday Schedule	
9:00 AM - 10:00 AM	60 minute lesson
10:00 AM - 10:20 AM	Break
10:20 AM - 11:30 AM	70 minute lesson
11:30 AM - 12:30 PM	Lunch Break
12:30 PM - 1:30 PM	60 minute lesson
1:30 PM - 1:50 PM	Break
1:50 PM - 3:00 PM	70 minute lesson
Sunday Schedule	
10:00 AM - 11:00 AM	60 minute lesson
11:00 AM - 11:10 AM	Break
11:10 AM - 12:10 PM	60 minute lesson
12:10 PM - 12:20 PM	Break
12:20 PM - 1:00 PM	40 minute lesson
1:00 PM - 1:10 PM	Survey

Table B2. Workshop titles and descriptions in each ALA STEM Track

Track	Saturday STEM Workshops	Sunday “New Thinking” Workshops
Applied Mathematics Track	January 2021	
	<p>Projectile Motion Concepts and Practical Implications</p> <p>Explore how projectile motion is involved in practical scenarios, such as kicking a soccer ball or firing a missile, through interactive activities and discussions.</p>	<p>Correlating Thermodynamics and Calculus in Our Life</p> <p>Inspect the laws of thermodynamics. Solve thermodynamic problems using calculus and uncover practical examples of thermodynamics in daily life</p>
	<p>Mathematical Modeling and Scale</p> <p>How can we see bacteria using microscopes? Could King Kong really exist? Explore how scale helps us understand both the smaller and larger world around us, and whether it is used properly in fantasy-themed movies and shows.</p>	<p>Packing Puzzles</p> <p>Have you ever participated in a contest to guess the number of candies in a jar? Investigate real world scenarios where you need to carefully make estimates without knowing the true value.</p>
	February 2021	
	<p>The Application of Symmetry and Group Theory in Physics and Chemistry</p> <p>Explore how symmetry and group theory is used in interdisciplinary sciences by using molecular shapes as models.</p>	<p>Solar Energy Harvesting: Moving Towards a Greener World</p> <p>Address the global issue of solar energy conversion. Embrace problem solving by investigating different approaches of solar energy conversion with emphasis on design principles of light energy harvesting materials.</p>
	<p>Math and Music</p> <p>What do math and music have in common? Utilize mathematical models and physics to understand problems such as: how does sound travel, and how do different instruments produce their own unique sound?</p>	<p>Mixing and Making Color and Light</p> <p>How do paint manufacturers produce different shades of paint? Inspect the basics of color and explore the phenomena of light reflection and scattering. Apply the physics of waves to understand light and its uses in science and tech.</p>
April 2021		
<p>Mathematics in Analytical Chemistry</p> <p>Learn about various analytical chemistry techniques to uncover how basic arithmetic operations are integral to solving related practical problems.</p>	<p>World Thinking Beyond the Classical World: The Quantum Revolution</p> <p>Discover quantum mechanics using experimental models. Investigate how mathematics is a critical tool to understand various quantum phenomena.</p>	
<p>Visualizing Math and Science</p> <p>Learn how to effectively make graphs and plots for real scientific data sets. Perform your own experiment, make your own visuals, and discuss how visuals can be misleading.</p>	<p>Budget Time and Money</p> <p>Which college is best? How much money should you save/spend? Explore how math is often used to help people budget their time/money and make decisions.</p>	

Note. Two sections of the Applied Mathematics Track were offered, which resulted in two Saturday and two Sunday workshops in January, February and April 2021.

Table B2. (cont.)

Track	Saturday STEM Workshops	Sunday “New Thinking” Workshops
Artificial Intelligence and Technology Track	January 2021	
	<p data-bbox="342 275 743 306">Exploring the Interactive Narrative</p> <p data-bbox="342 310 906 407">Discover the basics of storytelling and how it can be used to help create an engaging video game. Explore storyboarding techniques and begin instruction on C#, the programming language.</p>	<p data-bbox="927 275 1219 306">The Power of Narratives</p> <p data-bbox="927 310 1521 407">Survey the types of stories you see every day and explore how they may influence the books, movies and games you consume. Discover how you can communicate your own stories through these media.</p>
	February 2021	
	<p data-bbox="342 455 526 487">Storytelling 101</p> <p data-bbox="342 491 906 588">Transition your stories into a conceptual design to create prototype games. Create interactive content using Unity, and run tests to evaluate the feasibility of your game designs against development timelines.</p>	<p data-bbox="927 455 1252 487">A Good Idea is Just a Start</p> <p data-bbox="927 491 1521 588">Learn how compelling stories can be used to communicate ideas and sway opinions. Dissect the art of the pitch and how this skill can lead to the next big technology.</p>
April 2021		
<p data-bbox="342 636 581 667">Game Development</p> <p data-bbox="342 672 906 804">Develop a demo that encompasses the value of your game’s concept. Use Unity to create a game with multiple characters, levels, simple game mechanics and/or responsive behavior that will contribute to valuable gameplay.</p>	<p data-bbox="927 636 1203 667">Changing the Narrative</p> <p data-bbox="927 672 1521 804">Explore how stories of minority characters have been shaped by others and why representation matters. Demo your created games and discuss how they can be used to diversify the protagonist narrative.</p>	
Biomedical Engineering and Technology	January 2021	
	<p data-bbox="342 852 906 905">Engineering Mechanics and Fluid Dynamics of the Heart</p> <p data-bbox="342 909 906 1005">Construct physical models of the four heart functions. Discover how mathematical and computer programming software can be used to engineer a heart and model the fluid flow.</p>	<p data-bbox="927 852 1312 884">The Drug Development Process</p> <p data-bbox="927 888 1521 1005">Explore drug development procedures from the process by which drugs are produced in a lab to testing and design methods for Federal Drug Administration approval.</p>
	February 2021	
	<p data-bbox="342 1054 906 1085">Electricity and the Brain’s Neurological Network</p> <p data-bbox="342 1089 906 1186">Learn about the electronics of brain function and the brain’s neural network. Partake in an engineering design challenge to construct your own safety helmets to protect the brain.</p>	<p data-bbox="927 1054 1321 1085">Advanced Personalized Learning</p> <p data-bbox="927 1089 1521 1186">Investigate different ways people learn and how this relates to brain function. Explore engineering mechanics by participating in an intuition-based learning engineering game.</p>
April 2021		
<p data-bbox="342 1234 906 1287">Biomimicry: Neurological Function and the Blood-Brain Barrier</p> <p data-bbox="342 1291 906 1404">Examine the connection between brain function and neuroscience as well as the blood-brain barrier and endothelial cells. Participate in design challenges to assess material permeability and protection of the brain against pathogens!</p>	<p data-bbox="927 1234 1521 1266">Life Cycle Assessment of Products and Services</p> <p data-bbox="927 1270 1521 1404">Learn how to quantify the environmental impact of product production, use and disposal. Collaborate and present your research findings on the life cycle assessment of various products and services.</p>	

Table B2. *(cont.)*

Track	Saturday STEM Workshops	Sunday “New Thinking” Workshops
Medical Science Track	January 2021	
	<p>Genetic Engineering and Gene Therapy I Discover the basic molecular processes of transcription, translation, DNA replication and the mechanisms that lead to mutational repair. Investigate genetic engineering and its role in conjunction with DNA repair mechanisms for gene editing.</p>	<p>Genetic Engineering and Gene Therapy II Design a genetic editing scheme to correct mutations in a gene using CRISPR-Cas9 targeting. Explore the technical and ethical challenges that stem from this technique.</p>
	February 2021	
	<p>The Cell Biology of Cancers Discover the relationships between cellular health, dysfunction and disease. Use computer-based labs and diagnostics to apply your knowledge to the etiology of cancer progression, aging, and the molecular hallmarks of researched conditions.</p>	<p>The Cell Biology of Aging Expand your understanding of aging to the cellular changes that can occur and trigger its onset. Address the social and societal influences that can result in racial/ethnic disparities and different outcomes and prognoses.</p>
	April 2021	
	<p>Medical Biotechnology and Applications I Delve into medical biotechnology of all types. Perform computer-based diagnostic analysis to interpret genomic markers using polymerase chain reaction to identify markers for diseases used in diagnosis.</p>	<p>Medical Biotechnology and Applications II Discover real world applications of biotechnology through the use of case studies, lectures and group discussions</p>

Table B3. *New and returning students who completed the post-weekend workshop surveys.*

	Total Number of Student Respondents	New Student Respondents	Returning Student Respondents
January Post-Weekend Workshop Survey	90	70	20
February Post-Weekend Workshop Survey	81	68	13
April Post-Weekend Workshop Survey	76	64	12