

# Winter 2024 Weekend Programs Course Catalog

## PreK - Grade 8

Northwestern University's Center for Talent Development (CTD) has an array of high-quality, captivating online and in-person enrichment courses available for students on Saturdays. Our courses focus on high-interest topics, include both collaborative group work and individual hands-on projects, and are led by expert instructors who demonstrate the joy in learning. Courses in mathematics, science, design & engineering, and computer science & technology engage students during six Saturdays. Students with demonstrated strengths in verbal/reading and/or math, depending on course, may apply. See <https://www.ctd.northwestern.edu/eligibility> for eligibility details. Visit our [application page](#) to begin your application.

| Weekend Enrichment Program Details   |
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| <b>Dates:</b> Saturdays, January 20, 27, February 3, 10, 17, 24, 2024<br>(If needed, inclement weather day: March 2) |
| <b>Times:</b> 9:00 a.m. - 11:30 a.m.; select afternoon courses (12:00 p.m. - 2:30 p.m.)                              |
| <b>Locations:</b> Evanston - view the <a href="#">Weekend Enrichment Program web page</a> for details.               |
| <b>Tuition:</b> \$375  |

## PreK - Kindergarten

### Math All Around Us

Explore how math fits into different parts of our world, from cooking in the kitchen to walking in the park. Develop an understanding of foundational math concepts, including measurement, number sense, patterns, time, and temperature. Investigate how numbers and units explain the world around us and help us make predictions. Through role-playing, hands-on activities, and interactive games, learn just how many ways math impacts our lives each day!

*Open Enrollment: no eligibility requirements*

*SUBJECT: Mathematics*

### Physics Fun

Why doesn't a ball or frisbee keep flying after we throw it? Why does water change when it gets hotter or colder? This introductory physics course helps students connect basic laws of physics to their everyday life. Discover the principles of motion, heat, thermal energy, moving electrons and their charges. Engage in an exciting array of activities, experiments and discussions that relate directly to the world students know.

*Open Enrollment: no eligibility requirements*

*SUBJECT: Science*

## Kindergarten - Grade 1

### Involving Dissolving

How do physical changes occur? Are melting and dissolving the same thing? Dissolve, crystallize, and evaporate solutions in this introduction to the world of chemistry. Develop a foundation in physical properties in a safe and engaging environment. Cool projects include turning common chemical substances into intricate crystals.

*Open Enrollment: no eligibility requirements*

*SUBJECT: Science*

## Grades 1 – 2

### Electronics: Circuits & More

Aspiring engineers investigate how components connect to make working electronics as they learn to power motors, make LEDs shine, move wheels, and activate buttons. Combining hands-on introductory electronics tools with everyday objects, students develop their own moving and blinking creations. Class projects develop the building blocks needed for future coding, robotics, and engineering courses.

*Open Enrollment: no eligibility requirements*

*SUBJECT: Technology and Engineering*

### **Brain Busters**

Collaborate with other mathematicians to solve brainteasers and puzzles. Create original optical illusions and fractal images. Solve math and logic-based riddles. Invent new brain busters for family and friends to solve. Apply critical thinking strategies, logical thinking skills, and multiplication and division as you navigate the world of brain busters!

*Open Enrollment: no eligibility requirements*

*SUBJECT: Math*

### **Magic or Science**

Magic or science? Or both? Students explore the science of magic, learning tricks and discovering the scientific principles behind these amazing effects. Performing scientific sleights of hand, students experiment with magnets, polymers, static electricity, optical illusions and more to reveal the surprise and awe of science.

*Open Enrollment: no eligibility requirements*

*SUBJECT: Science*

## **Grades 3 – 4**

### **Aircraft Engineering**

What major engineering and design principles make flight possible? From hot air balloons to space launching systems, how do we create structures that are light, durable, and safe? This course introduces aerospace engineering concepts as students investigate tools, terminology and design principles of flying machines. Design, build, test, and analyze results in hands-on physics and engineering experiments related to airplanes and spacecrafts. Explore how engineering influences the development of new materials and designs for flight.

*Qualifying Area: Reading OR Math*

*SUBJECT: Technology & Engineering*

### **Coding & Composition with TunePad**

Using coding skills to create melodies, students apply creativity and critical thinking to make music in this unique course. Students will learn how to use *Python*, which is a powerful, flexible, yet simple object-oriented programming language with applications across fields, from gaming to Google. In a collaborative workshop setting, budding computer engineers will develop foundational text-based coding skills while making original music using TunePad, a tool created by the Tangible Interaction Design and Learning (TIDAL) Lab at Northwestern University.

*Qualifying Area: Reading OR Math*

*SUBJECT: Technology & Engineering*

### **Critical Mathematics: From Googol to Infinity**

Examine the infinitely large and the incredibly small, and increase your understanding of ratios, integers, fractions, and exponents. Problem-based coursework, discourse and mathematical debate lead the learning in this course. Focusing on the Common Core Standards of Numbers and Operations and middle school goals of Ratios & Proportional Relationships and the Number System allows students to build their skills in these areas.

*Qualifying Area: Math*

*SUBJECT: Mathematics*

## **Grades 5 – 6**

### **Crafting an Argument: The Art of Public Speaking**

Practice and apply elements of public speaking, including research processes, verbal and nonverbal communication strategies, data visualization, and presentation skills. Learn to form strong research-based arguments about real-world issues through comparison of argument strengths and weaknesses. Participate in a series of in-class presentations and debates about a variety of topics to make your argument irrefutable! Course will culminate in a group debate.

*Qualifying Area: Reading*

*SUBJECT: Arts & Humanities*

### **The Math Behind Data Science**

Businesses, non-profit organizations, government agencies, and other analytical fields are dependent upon data science to effectively use and present information, as well as to best meet the needs of their clients. But what is math's role in data science, and how can understanding some key math concepts help us navigate big data? While exploring concepts such as theoretical and experimental probability, probability models, and expected value, students apply a problem-based learning approach, using data to solve extended application scenarios.

*Qualifying Area: Math*

*SUBJECT: Mathematics*

### **The Physics and Engineering of Roller Coaster Design**

How does an amusement park ride make you feel lighter than air one moment and press you down into your seat the next, all while keeping you safely inside the ride? Strap yourself in for a fast-paced adventure in physics and investigate topics such as the law of inertia, centripetal acceleration, and centrifugal force as you design and build a variety of amusement park thrills.

*Qualifying Area: Reading OR Math*

*SUBJECT: Science*

### **Electronics & Programming Maker Workshop**

How do engineering and design come together to create interactive technology projects? Using micro-controllers, sensors and a variety of components, students create products that fuse programming and electronics. Combine foundational coding skills with the engineering design process to engage in open-ended and student-driven projects through independent and collaborative problem solving. Research and explore how tech and electronics products are impacting society presently, and produce a capstone project that addresses a student-identified need.

*NOTE: Additional \$30 materials fee is required.*

*Qualifying Area: Reading OR Math*

*SUBJECT: Technology & Engineering*

## **Grades 7 – 8**

### **Chemistry: From Reaction to Application**

Chemistry impacts - and explains - both the world around us and the reactions within us. Discover the way chemistry provides important information to scientists in diverse areas such as nutrition, food science, neurochemistry, genetic engineering and energy. Through interactive experiments and activities, investigate what causes or prevents chemical reactions, and learn how important the miniscule atom is to global issues.

*Qualifying Area: Reading OR Math*

*SUBJECT: Science*

### **Leadership for Today**

Begin your leadership exploration here! Engage in interactive workshops on leadership topics, learn from business and nonprofit leaders, and develop critical thinking and public speaking skills. Learn how to communicate effectively, use creative problem solving, and lead meaningful change. Students expand their leadership capacity through hands-on and reflective learning opportunities and build community in a supportive and fun learning environment.

*Qualifying Area: Reading*

*SUBJECT: Leadership & Service*

### **Graphic Design Studio**

Explore how the fundamental elements of graphic design increase value and captivate audiences. Investigate past and present design principles – and the challenges faced by designers – to develop foundational skills in visual communication. Using robust applications, engage in a series of collaborative, real-world exercises and hands-on studio sessions to create an original logo and a unique product identity.

*Qualifying Area: Reading OR Math*

*SUBJECT: Technology & Engineering*