

Spring 2019 Advanced Enrichment Programs

Age 4 - Grade 8

Saturday and Sunday courses at Center for Talent Development (CTD) are challenging and enriching opportunities for academically talented students. Our courses in English & Language arts, mathematics, science, design & engineering, and computer science & technology engage students during six consecutive Saturdays (all sites) OR five non-consecutive Sundays (Evanston only) in the spring. Students with demonstrated strengths in verbal/reading and/or math, depending on course, may apply. See www.ctd.northwestern.edu/weekend for eligibility details.

Dates: Saturdays: April 13 – May 18; Sundays: April 14 and April 28 – May 19 (no class on Sunday, 4/21)

Locations: Please view [the spring course chart](#) to see what courses are offered near you. We offer courses in Chicago, Evanston, Naperville, and Palatine.

Times: Saturday morning courses (9 a.m. - 11:30 a.m.); Saturday afternoon courses (noon - 2:30 p.m.); Sunday morning courses (9 a.m. - 12:00 p.m.);

Tuition: \$340

Application: visit my.ctd.northwestern.edu to begin your application

Age 4

No test scores are required for Age 4 classes.

Matter Minds: Solids, Liquids and Gases (Age 4)

How do we use solids, liquids, and gases every day?

Matter is all around us in the form of solids, liquids, and gases. Students take on the role of young scientists who are ready to investigate the world around them. These young scientists get messy in multi-sensory explorations, ask questions, and engage in dramatic play to discover the states of matter and the role matter plays in their everyday lives.

SUBJECT AREA: Science

PreK - Kindergarten

Math All Around Us (PreK-K)

Where do we find math in our daily lives?

Explore how math fits into different parts of our world, from the kitchen, to a walk in the sunshine, to Field Day at school. Develop an understanding of math concepts including measurement, number sense, 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!

SUBJECT AREA: Math

DinoMite Dig (PreK-K)

How does understanding dinosaurs help us understand birds and reptiles?

Young scientists discover how paleontologists unearth answers by digging in the dirt. Work with fossils, bones and other materials, and learn what dinosaurs looked like, how they moved, what they ate, their living conditions and other fascinating facts. Activities span the disciplines, including language arts, geography, math and science.

SUBJECT AREA: Science

Kindergarten - Grade 1

Sequences, Patterns and Puzzles (K-1)

Why is math sometimes called “the science of patterns?”

Students identify patterns in numbers, symbols and codes to solve a variety of problems using both written and hands-on strategies. Individually and in groups, students create their own puzzles, codes and games and develop the logical thinking skills and problem-solving strategies that lay the foundation for future programmers and mathematicians.

SUBJECT AREA: Math

Grades 1 – 2

Physics & Engineering: Planes, Trains & Automobiles (Gr. 1-2)

How do the laws of physics affect vehicles?

Learn how planes, trains and cars are built and examine how they move about our world. This hands-on science course explores introductory principles of physics and their impact on the vehicles humans build and use. Deconstruct toy trains to see their inner workings. Create airplanes and modify them to test different design strategies.

SUBJECT AREA: Science

Grades 2 – 3

The Science of Flight (Gr. 2-3)

How does human flight impact our everyday life?

Aerodynamics describes how air moves around a solid body. Students examine the impact and principles of flight including the math and physics behind it. Using a variety of materials, future engineers and pilots design and build models of their own flying machines.

SUBJECT AREA: Science

Game Design with Scratch (Gr. 2-3)

How can we write programs that both humans and computers can understand?

Do you want to know how the computer games you love are made? Learn how to create original animations and interactive games using Scratch, a graphical programming language designed for students. Apply mathematics and computational concepts as you build integrative problem-solving skills.

SUBJECT AREA: Computer Science & **Technology**

Puzzling Problems: Math & Logic (Gr.2-3)

What strategies can you use to determine if your solution is logical?

How many solutions can you find for a single problem? Use puzzles and games to investigate topics including Fibonacci numbers, combinations, fractions and ancient number systems. Gain an appreciation for numbers and numbering systems in everyday life while working with peers to find solutions to demanding problems. Explore connections among problems in measurement, probability, and geometry using critical thinking and deductive reasoning skills.

SUBJECT AREA: Math

Grades 3 - 4

Human-Centered Design: Engineering for Fictional Characters (Gr. 3-4)

How do we visualize worlds in literature?

Could you draw a Quidditch field? Or, design the home of the shipwrecked Swiss Family Robinson? In this arts-integrated course, read excerpts from stories and novels and then design and engineer an environment for them. Adventure, mystery, fantasy and historical fiction inspire story development and engineering dexterity.

SUBJECT AREAS: English & Language Arts, **Engineering & Design**

Grades 4 - 5

Pre-Algebra: Data, Statistics & Probability (Gr. 4-5)

What skills or tools are needed to effectively compute with numbers?

Linked to the Common Core State Standards, this pre-algebra series incorporates three courses offered sequentially in the fall, winter, and spring. Students may participate in any or all of these courses beginning in any session. Through exploration, practice and application, students develop skills to deepen their understanding of mathematical ideas and apply them to real world settings.

SUBJECT AREA: Math

Anatomy & Scientific Illustration (Gr. 4-5)

How can an illustrator's talents and point of view outshine cutting-edge photography?

How are astronomers able to convey dramatic physical occurrences in the universe if those occurrences cannot be photographed? How can complex anatomy be communicated to veterinary or medical surgeons so they can easily identify

minuscule and hidden parts of animals and humans? In this arts-integrated science course, students study the form and function of a variety of organisms' structures to learn about anatomy and biological processes. Through sketching, drawing and digital techniques, students create visual representations of what is too complex, too small, too hidden, or too extinct to be captured on camera.

SUBJECT AREA: Science

Hardware Hackers: Inventing with Electronics (Gr. 4-5)

How do we understand the role of electronics in the world around us?

Discover your inner inventor and learn the principles of electronics by exploring how components connect to make complete circuits. Using electronic components, students manipulate sound, lights, and motion in a variety of engineering projects. Develop critical thinking skills as you solve real-world design problems using electronics.

NOTE: Additional \$20 materials fee required.

SUBJECT AREA: Computer Science & **Technology**

Grades 5 - 7

STEAM: Where Math Meets Design (Gr. 5-7)

How does math affect design?

How does the Willis Tower withstand high winds? How is the expansive roof of a stadium supported, and what mathematical concepts are used by engineers when they design those roofs? Students engage with the engineering design process by designing, planning and building three-dimensional models. Participants study real-world examples of structures and gain an understanding of the importance of math in engineering. Using mathematical applications, students graph, measure, estimate, and calculate in the construction of their designs.

SUBJECT AREAS: Math, **Engineering & Design**

The Math Behind Data Science (Gr. 5-7)

How can we represent probability in different ways, and how does this help us make sense of big data?

Back in 2013 the New York Times indicated, "Data Science is a hot new field that promises to revolutionize industries from business to government, health care to academia." Six years later, the demand for data scientists continues to grow - 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? 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.

SUBJECT AREA: Math

Grades 6 - 8

Data Detectives: Investigating Patterns in Data (Gr.6-8)

How do we make claims and arguments based on data?

Data is everywhere. Every time we post to social media, search the internet, or even make a phone call, our information is stored by digital devices. And all this data can be analyzed by data scientists to enhance our quality of life such as improving the performance of our computers, offering personalized healthcare, or optimizing traffic signals. In this project-based course, students learn how data scientists are really more like data detectives who investigate datasets to uncover hidden patterns. Using the programming language R students organize, visualize, and make claims about datasets. Students learn basic statistical content and apply their knowledge to analyze a dataset of their own choosing.

SUBJECT AREA: Computer Science & **Technology**

Debate: Ethical Arguments (Gr. 6-8)

What tools are needed to engage in respectful debate around real life ethical issues?

How can you make your voice heard by others when discussing a hot-button topic? Learn principles and practices of communication while wrestling with age-appropriate, ethically complex questions. Apply research, thoughtful analysis and critical thinking to engage peers in systematic, open-minded debate. In a constructive, collaborative setting, students gain confidence in supporting and explaining their beliefs using reliable sources, body language, vocal presentation, active listening skills and civil discourse.

SUBJECT AREAS: English & Language Arts, **Humanities**

Lab Science: Earth Science (Gr. 6-8)

Based on the Next Generation Science Standards, this course engages students in learning about the Earth, its features and resources, and how humans are changing the face of the planet. Study the geologic time scale and consider how much the Earth has changed since its inception. Examine how these changes have allowed life to thrive on our planet, and why other planets in our solar system do not support life. Plan and carry out investigations, analyze and interpret data, construct explanations and design solutions for the Earth's challenges. Develop and use models, support explanations through evidence, and practice communicating scientific information. Develop the understanding necessary to be successful in advanced high school science courses.

NOTE: Additional \$40 materials fee required.

SUBJECT AREA: Science