Fall 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 eight consecutive Saturdays (all sites) OR eight non-consecutive Sundays (Evanston only) in the fall. 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: September 28 – November 16; Sundays: September 29 – November 24, 2019 (NO class on October 20)
Locations: Please view the fall course chart on the Saturday and Sunday web page to see what courses are offered near you. We offer courses in Chicago, Evanston, Naperville, Palatine, and Northbrook.
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. - 11:30 a.m.)
Tuition: $430
Application: visit my.ctd.northwestern.edu to begin your application

Age 4
No test scores are required for Age 4 classes.

Deep Water Dive (Age 4)
What makes ocean creatures different from the animals that live on land?
Young marine biologists dive into the wonderful underwater world to learn about animals and habitats from shallow waters to the deep sea. Through hands-on activities, dramatic play, and literature students explore the oceans and make connections between their lives and the aquatic life on our planet.
SUBJECT AREA: Science

PreK - Kindergarten

Story Studio (PreK-K)
How do we transform our ideas into stories?
Students gain experience with story elements, character development, and how to bring their imagination to life through writing and storytelling. Activities may include acting out known and new stories, improvising with prompts, illustrating scenes, building scenes, writing a class play, reading wordless picture books, and digitally animating stories using coding apps. The end-of-session student Expo will showcase original, student-published stories, storyboards, animations, and/or performances.
NOTE: Students do NOT need to be able to write independently to be in this course.
SUBJECT AREAS: English & Language Arts, Humanities

Patterns and Tessellations (PreK-K)
What is a pattern?
Explore patterns, forms and tiling and discover connections between geometry and art. Learn about the work of artists such as M.C. Escher, and explore designs found in nature. Math-minded, creative young learners make their own tessellations with a variety of materials and read and create stories about patterns.
SUBJECT AREA: Math

Biology Blast: Animals and Plants (PreK-K)
How are plants and animals similar and different?
What do animals need to live? How do plants grow? Explore characteristics of plant and animal life through literature, research, hands-on explorations and experiments. Discover what living things have in common and identify how plants and animals differ from each other. Budding biologists conduct research, make observations and design their own unique flowers and animal habitats.
SUBJECT AREA: Science

Kindergarten - Grade 1

Detective Math (K-1)
How can we use math to solve mysteries?
A good detective looks for clues and investigates patterns in order to solve a mystery. Through interactive games, hands-on projects, and story-problem riddles, students sharpen their deductive skills. Identify patterns to break codes, apply problem solving strategies to decipher logic and math problems, and create simple equations based on the clues found in story problems. Students test their new math and deductive reasoning skills on other detectives by creating their own stories, riddles and mysteries!
SUBJECT AREA: Math

Tangible Programming: Coding with Your Hands (K-1)
How do you control a robot without written code?
Students develop coding and spatial reasoning skills while using colorful, interactive block commands and hands-on tools. Gain practice with testing and debugging original programs while engaging with various robots like Primo Cubetto or Botley. Fundamental computer science concepts such as symbols and algorithms are explored through dramatic play, construction, engineering and storytelling.
SUBJECT AREA: Computer Science & Technology

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Digital Animation & Coding Workshop (K-1)
What is an algorithm? How do we use them?
Design and build animated stories, games and more using graphical block-based apps like Scratch Jr® and Hopscotch. Develop the vocabulary, critical thinking and problem-solving skills needed for future graphical programming courses such as Scratch and interact with technology in an active way.
SUBJECT AREAS: Computer Science & Technology, English & Language Arts

Grades 1 – 2

Final Answer: Problem Solving & Calculation (Gr. 1-2)
Why is it important to understand math operations?
When might it be better to use multiplication instead of addition? If there are multiple ways to solve the same math problem, how do you know which one is the most efficient? Enhance problem-solving skills through in-depth exploration of basic mathematical operations—addition, subtraction, multiplication, and division. Use manipulatives, formulas and problem-solving strategies to find answers, interpret results, and present findings to others while acquiring a strong foundation for further mathematical study.
SUBJECT AREA: Math

The Art & Science of Color (Gr. 1-2)
What is color and how do we see it?
Through hands-on science experiments and arts activities, students explore how we experience color, and how and why it has been used in nature and throughout time by humans. By investigating the electromagnetic spectrum, the visible spectrum, and the fundamentals of the color wheel, young artists and scientists learn how color is perceived. Discover the importance of color in the plant and animal world, and create art using both natural and man-made pigments.
SUBJECT AREA: Science

Simple Machines: An Introduction to Engineering (Gr. 1-2)
How are machines organized to help us do work?
Young engineers develop an understanding of simple machines, exploring terms like work, energy, force, and effort through hands-on experiments with wheels and axles, wedges, pulleys, screws, inclined planes and levers. Students discover where these machines are used in everyday life, and then apply their knowledge to create their own multi-step machines that perform simple tasks.
SUBJECT AREAS: Science, Engineering & Design

Active Architects: Design & Build (Gr. 1-2)
How do building materials inform design?
Future designers, builders and architects are introduced to architectural vocabulary, architectural tools, and visual/spatial thinking. Design your own original buildings and build 2D and 3D models in various formats and with varied materials. Investigate art, architecture, science, and math in this interdisciplinary course.
SUBJECT AREA: Computer Science & Technology, Engineering & Design

Grades 2 – 3

Fascinating Formulas (Gr. 2-3)
How is chemistry important to everyday life?
Investigate solutions, chemical changes and the characteristics of liquids. Young chemists explore colloids, gels, polymers and suspensions to understand the basics of chemistry. Observe, hypothesize, test, measure, mix, record data and draw conclusions while performing hands-on experiments to analyze the properties of substances.
SUBJECT AREA: Science

Creative Engineering: Design like an Artist (Gr. 2-3)
How have artists from long ago contributed to modern day technology?
Nearly 400 years before the Wright Brothers flew their first successful airplane, the artist Leonardo Da Vinci built a flying machine, an aircraft that was almost completely powered by flapping wings. Modeled after the anatomy of birds and bats, he fashioned the machine from wood and fabric. Famous artists from hundreds of years ago designed many significant inventions that inspired modern innovations like the airplane we know today. Learn how the engineering design process employed by present day engineers was used by 15th century artists. Through the lenses of art, history, engineering and science, build, test and redesign 3D models first developed hundreds of years ago.
SUBJECT AREAS: Science, Engineering & Design

Debate: Fairy Tale Ethics (Gr. 2-3)
How do you successfully argue your stance on an issue?
How can you use literature to understand and frame all sides of ethical issues? Revisit classic fairytales to explore topics of fairness, justice, and human rights. Work individually and in teams to pose, research and answer ethical questions found in well-known children’s stories. Develop preliminary debate skills and practices, and attempt to craft airtight arguments.
SUBJECT AREAS: English & Language Arts, Humanities

Start-Up Challenge: Building a Business (Gr. 2-3)
What are the characteristics of a successful business?
How does a business make money? How does a not-for-profit become sustainable? Young entrepreneurs and innovators are introduced to the fundamentals of designing and running a business. Discover what skills a successful businessperson needs and create an original prototype of a new product or service. Join a simulation where supply and demand, products, services and taxes are all key components.
SUBJECT AREAS: Math, Humanities

Animation & Game Development: Scratch (Gr. 2-3)
How can we write programs that both humans and computers can understand?
Learn how to create original animations and games using Scratch, a graphical programming language designed for students. Join a global community of Scratch programmers for ongoing collaborative learning and skill development. No formal programming experience is necessary. This course helps prepare students for text-based programming languages like Python.
SUBJECT AREA: Computer Science & Technology
Programming & Engineering with WeDo Robotics (Gr. 2-3)
How does the intended function of a robot change how it is designed?
Gain an introduction to robotics using LEGO® software along with the LEGO® WeDo building blocks, sensors and motors. Using a block-based interface, program a simple machine of your original design to follow a sequence, interact with its environment or act out a story. Develop a design thinking project to help solve a real-world problem, such as building a robotic tool to conserve water or make life easier for someone with a disease or disability. Build programming knowledge while utilizing geometric skills, logical reasoning, design technique and creative problem solving.
SUBJECT AREAS: Computer Science & Technology, Engineering & Design

Robotics Design: Programming & Constructing with Hummingbird® (Gr. 3-4)
How does technology across fields influence the development of robotics and their applications in our daily lives?
Using LEDs, motors and sensors, young programmers make machines, interactive robots, and kinetic sculptures out of a variety of materials. Students learn and apply coding skills using micro-controllers as they test and refine mechanical constructions, and command their robotic structures to perform tasks of their choosing. Incorporating design, art, and engineering, students create, test and re-design original moving masterpieces while learning how to program inputs and outputs.
Note: Additional $10 materials fee.
SUBJECT AREAS: Computer Science & Technology, Engineering & Design

Grades 3 - 4

We the Kids: How Change Happens (Gr. 3-4)
What impact can citizens have on their government?
How are new laws developed? How can a group of people get their local government to address concerns in the community? Aspiring lawmakers, activists and concerned citizens answer these and other questions through research, case study, role playing and writing, and collaborative activities such as mock city council meetings. Looking primarily at the practices of local governments, students learn about how laws are made and changed, and determine how they would use that information to act as change agents by petitioning their city government to build new facilities or resolve a community issue.
SUBJECT AREAS: English & Language Arts, Humanities

Competition Math: Speed & Strategy (Gr. 3-4)
How many ways can you solve the same problem?
Mathletes in training can increase the speed of their mental computing and practice their skills during friendly team competitions. Students practice discussing, identifying and explaining the processes and strategies associated with various math problem-solving concepts, focusing on algebra, geometry, number theory, counting and probability.
SUBJECT AREA: Math

In the Lab: The Science of Color (Gr. 3-4)
How is color added to fireworks? How is it that the color white is all colors according to scientists, but you cannot make white by mixing all colors of paint in an art studio? Using the principles of chemistry and physics, explore the world of color that blends the line between art and science. Discover how light produces color and apply topics of color theory to original creations. Through hands-on projects and experiments, delve into how light interacts with matter, the chemistry of paint, and wavelength theory. By studying reflection, refraction, movement, and combinations, observe how color interacts with and influences the world around us.
Note: Additional $10 materials fee required.
SUBJECT AREA: Science

Creative Writing: Contemporary Fairy Tales (Gr. 4-5)
How can you use fairy tales as inspiration to tell your own stories?
Classic fairy tales have enchanted generations of readers with their sense of magic and memorable story arcs. Students investigate the story elements that have made fairy tales a timeless genre in preparation for writing their own original works. Compare and contrast traditional and modern versions of stories from around the world, and analyze the ways in which fairy tales prompt reflection on power, resilience, values and other aspects of humanity. Through a workshop format, students write, receive feedback, and revise original fairy tales.
SUBJECT AREAS: English & Language Arts, Humanities

Pre-Algebra: Numbers & Algebraic Thinking (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

Grades 4 - 5

Hummingbird® Robotics Design: Programming & Constructing with
How does the application of science enhance robots' abilities?
Incorporating design, art, and engineering, students create, test and re-design original moving masterpieces while learning how to program inputs and outputs.
Note: Additional $10 materials fee.
SUBJECT AREAS: Computer Science & Technology, Engineering & Design

Students learn and apply coding skills using micro-controllers as they test and refine mechanical constructions, and command their robotic structures to perform tasks of their choosing. Incorporating design, art, and engineering, students create, test and re-design original moving masterpieces while learning how to program inputs and outputs.
Note: Additional $10 materials fee required.
SUBJECT AREA: Science
Inspired by Nature: Designing with LEGO® Robotics (Gr.4-5)
How can an animal's movement influence the robot designs of tomorrow?
How might the slowest mammal on the planet - the three-toed sloth - inspire engineers to develop an efficient weather monitoring robot? For ages, engineers and designers have found inspiration in the movement and physiology of animals. Using the LEGO® MINDSTORMS® EV3 set, follow the engineering design process from start to finish through a series of robotics projects inspired by nature. Investigate traits that give animals their amazing abilities, such as the speed of a hummingbird's wings, and apply that research to build robots that mimic what we see in nature. Hone programming skills and develop problem-solving prowess while testing your creativity.
SUBJECT AREAS: Computer Science & Technology, Design & Engineering

Intro to Java (Gr.4-5)
What is the value of a common coding language?
Learn about the Java programming language and object orientation through the use of Greenfoot, a complete, interactive Java-based development environment. As you build your own games, explore basic programming concepts and learn to write in real code. Enhance your games with images and sounds.
SUBJECT AREA: Computer Science & Technology

Grades 5 - 7

Medical Science & Engineering (Gr. 5-7)
How do we combine innovation and technology with patient care?
How were the first prosthetic limbs developed by engineers? How can needle-free glucose monitoring systems change the lives of people living with diabetes? Learn how engineering principles and the design process can improve challenges faced by the human body. By researching and analyzing challenges in patient care, students design solutions, build, test and evaluate models, and practice communicating scientific information to their peers. Apply real-world research and scientific inquiry to gain the skills necessary to be successful in higher level science courses.
Note: Additional $15 materials fee required.
SUBJECT AREAS: Science, Engineering & Design

Integrated Math: Quantities, Functions, Equations & Inequalities (Gr. 5-7)
How can we gain a better understanding of everyday situations through reasoning and mathematics?
Where and when do we actually use algebra in the world, and how is it connected to the other strands of math? By balancing and integrating mathematical techniques taken from algebra, geometry, and statistical analysis, learn how to use math as a reasoning tool outside of the classroom. With a problem-based, student-centered approach, apply quantitative thinking to real-world scenarios and engage in collaborative exploration of realistic problems with other math-minded classmates.
SUBJECT AREA: Math

Wearable Technology: Creativity and Innovation in Computer Science (Gr. 5-7)
How does wearable technology incorporate computer programming, electrical engineering and art?
Wearable technology is everywhere from electronic textiles in performance art to diagnostic devices in medical clothing. Learn how this prolific medium combines hardware and software engineering as you build unique items with micro-computers, circuitry and code. Learn Computer Science fundamentals while programming devices in the text-based programming language, Arduino. Discover how the diverse community of wearable technologists solve real-world problems with creative technology and apply those lessons to your own creative projects.
Note: Additional $30 materials fee required.
SUBJECT AREA: Computer Science & Technology

Web Design: HTML, CSS, and JavaScript (Gr. 5-7)
How do web developers design and create the content, structure, and behavior of websites?
Using a code editor, such as Atom or Visual Studio Code, students experiment with design techniques that are the foundation for a fully functional, aesthetically pleasing, and easy to use website. Add to your developer’s toolkit as you use HTML, CSS, and Javascript to build and publish your own website. This project-based course allows for independent and collaborative creativity as students consider the role of the end user and explore ways to enhance their original creations before publishing.
SUBJECT AREA: Computer Science & Technology

Algebra I Honors (Gr. 5-7)
This is a CTD Hybrid in-person and online course which combines in-person instruction with an online academic environment. This “blended” course offers the flexibility to complete a credit-bearing, high school level honors course by meeting face-to-face in addition to engaging with online course work. This is a full-year course; students enroll in the fall and participate in three sessions, fall, winter and spring in order to complete two semesters of Algebra 1 Honors content. Successful completion of this course prepares students for Geometry and Algebra II: 2 semesters of high school credit available. Tuition is $1,395.

How is algebra used in everyday life?
This course is intended for students who have completed Pre-Algebra and are ready to extend their knowledge in an intensive, full-year course. Algebra I Honors covers equations and functions, properties of real numbers, solving and graphing linear equations and functions, solving and graphing linear inequalities, exponents and exponential functions, polynomials and factoring, quadratic equations and functions, radicals and geometry connections, and rational equations and functions.
- Fall 2019 session runs September 15-November 16; meet up dates are 9/26, 10/26 and 11/16
- Winter 2020 session runs January 18-March 7; meet up dates are 1/25, 2/15, and 3/7
- Spring 2020 session runs April 1-May 16; meet up dates are 4/18 and 5/9.
Grades 6 - 8

Design Thinking: Improving the User Experience (Gr.6-8)
How can empathy lead to better prototyping?
Have you ever heard people complain about processes such as boarding an airplane efficiently, choosing a fast-moving checkout line at the store, or getting in and out of a crowded bathroom quickly during passing periods at school? How could you redesign one of those experiences to make it more positive for the user? Engineers and designers use Design Thinking to develop products that address user needs, but that same process can also be used to design and redesign user experiences. Combining empathy, ideation, prototyping and testing, students gain experience with identifying and addressing problems experienced by those around them. Students conduct interviews and research, and apply creative problem solving and determination to develop their own prototype of an improved user experience project of their choosing.
SUBJECT AREAS: English & Language Arts, Humanities

Essay Essentials: Writer's Workshop (Gr. 6-8)
How do accomplished essayists use language and structure to explain their ideas?
Well-penned essays demonstrate how the written word can shed light on an issue, present a point of view, or prompt a reader to take action. In this writer's workshop, learn the fundamental skills employed by exceptional essayists. Analyze and critique a range of texts to further develop critical thinking skills. Write and revise your own essays, focusing on the persuasive, critical, narrative and personal forms, while learning about audience, purpose, point of view and more.
SUBJECT AREAS: English & Language Arts, Humanities

Lab Science: Biology (Gr. 6-8)
What do the structure, function, and behavior of organisms reveal about life on our planet?
Students are introduced to a range of important biological concepts using current best practices, presentations and project-based laboratory experiments. Topics include biochemistry, microbiology, cell structure, cellular reproduction, DNA, genetics, evolution and ecology.
NOTE: Additional $50 materials fee required.
SUBJECT AREA: Science

iOS App Design (Gr. 6-8)
What makes a well-designed mobile app?
You may already be an expert iOS user, but do you want to know how the apps you love are made? Brainstorm, research, design and build your own original apps for iOS devices using Apple’s Swift programming language. Evaluate and workshop your concepts with the principles of user interface design to develop apps that demonstrate clarity and simplicity.
SUBJECT AREA: Computer Science & Technology

Electronics & Programming Maker Workshop (Gr. 6-8)
How do engineering and design come together to create interactive technology projects?
Using micro-controllers, sensors and a variety of “making” 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 that encourage 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 $25 materials fee required.
SUBJECT AREA: Computer Science & Technology