STEM ENRICHMENTS
Enhancing core instruction for elementary and middle school students

Do It Yourself Enrichments
Box Problem Level 1 Grades 5-7 Math
Box Problem Level 2, Grades 8-9 Math
Box Problem Level 3, Grades 10-11
Forces & Motion, Grade 3-5 Science
Magnetic Effects, Grade 3-4 Science
Sherlock Holmes, Grade 3-4 Science
Solid, Liquid, Gas, Grade 3-5 Science

What are STEM Enrichments?
STEM Enrichment sessions enhance core instruction for elementary and middle school students and teachers in hard-to-teach concepts. All instruction is aligned with the competencies and objectives outlined nationally and by the state of North Carolina. North Carolina School of Science and Mathematics offers live interactive programming and do-it-yourself lessons. Live sessions are scheduled interactive opportunities that supplement classroom curriculum with hands-on activities. Do-it-yourself enrichments provide guidances, teaching materials, and videos that allow for flexible, asynchronous learning experiences.

ABOUT NCSSM
North Carolina School of Science and Mathematics is the nation’s first public residential high school specializing in science, technology, engineering, and math. Through a residential and online program for high school juniors and seniors, summer programs, and course offerings to schools across the state, we challenge and inspire North Carolina’s youth.

ncssm.edu/STEMenrichments

Student leaders teaching youth
Student Instructors Developing Enrichments, or SIDE, is a student work service, leadership, and volunteer opportunity. Residential, online, and distance education students at North Carolina School of Science and Mathematics develop and teach STEM enrichment lessons for elementary, middle, and high school students across the state.

Using interactive videoconferencing technologies, the SIDE leaders get first-hand experience with live, on-camera communication. Perhaps most importantly, the SIDE leaders gain valuable experience developing and teaching content that is engaging and accessible.
Available enrichments. See full descriptions and NC essential standards at ncssm.edu/STEMenrichments

Artificial Heart  Gr. 5-9
The heart and circulatory system. Make an artificial heart out of everyday household materials.

Balance & Motion  Gr. 1-3
Gravity and symmetry; explore balanced and unbalanced systems. Discover ways to manipulate the center of mass of an object.

Bits & Binary Code  Gr. 6-9
Binary number systems and how they apply to computers and digital technology. Write numbers and letters in binary code; decode binary numbers.

Body Movements: Bones, Muscles, Joints  Gr. 5-9
Biomechanics and how the human body uses bones and muscles to create movement.

Breathing: The Lungs  Gr. 5-9
How human lungs react to exhalation and inhalation, as well as the relationships between vital capacity, expiratory reserve, and tidal volume.

Dice & Randomness  Gr. 7
Hands-on determination of mathematical “facts,” followed by discussion of theory. Use a die to “compare” short term randomness for obtaining a certain number versus long-term probabilities.

Earth’s Spheres  Gr. 6-9
Earth systems and how biosphere, hydrosphere, geosphere and atmosphere are interconnected.

Earth’s Temperatures  Gr. 5-9
Predict approximate temperatures and compare different temperatures based on location. Understand factors that influence climate and temperature.

ECG Electrodes & Consumables  Gr. 6-9
Learn the roles of a biomedical engineer and the use of ECG electrodes and multimeters; build a low-cost electrode.

Electromagnets  Gr. 5-9
Electromagnets and their application in the real world. Students will have an opportunity to build their own electromagnet.

Engineering Catapults  Gr. 6-9
Engineering design process, the design of catapults, and apply technological design steps to build a catapult that uses allocated materials to launch an object.

Estimation Station  Gr. 3-4
Reasonable estimation using hands-on experiments and refresh addition and subtraction skills.

Exploring Sound  Gr. 2
Sound, vibrations, pitch, frequency, and sound waves. Learn how an object must vibrate to make sound; difference between magnitude and pitch.

Force, Motion, & Air Resistance  Gr. 6-9
Effects of gravity, force, motion, air resistance, and terminal speed on the acceleration of a falling object. Materials for group of 3-4 students.

Forces & Motion  Gr. 3-5
Force, inertia, friction, balanced forces, and unbalanced forces. Build a vehicle that uses the force of air to move.

Force, Motion & Air Resistance  Gr. 6-9
Effects of gravity, force, motion, air resistance, and terminal speed on the acceleration of a falling object. Materials for a group of 3-4 students.

Fractions & M&Ms  Gr. 3-4
Fractions, numerators, denominators, ratios.

Fun With Cells  Gr. 5-9
Create model of a cell using everyday objects. Develop understanding of the cell and its parts.

Genetic Diseases  Gr. 5-9
Genetics and an introduction to three genetic diseases in relation to what they do, how they’re caused, and how they’re treated.

Hydraulic Arm  Gr. 5-9
Physiology and movements of the arm and basic bioengineering principles. Engineer an “arm” to explore and test the concepts they learn.

Hydraulic Hand  Gr. 5-9
Learn function and structure of prosthetics, how hydraulics work in artificial limbs, and why they are used in the prosthetic hand.

Low Cost Stethoscope  Gr. 5-9
Biomedical engineering and how heart rates change under different conditions. Students will then engineer a low-cost stethoscope.

M&M Counting Fun  Gr. K-1
Count and graph and reinforce knowledge of basic colors.

Magnetic Effects  Gr. 3-4
How and why magnetic compasses work. Observe the forces exerted by magnets on each other and by magnets on iron objects. Build a simple electromagnet.

MAKEY MAKEY: Computer Code  Gr. 6-9
Program the Makey Makey to learn which tools work best and how this innovative device functions.

Neuroscience: The Brain  Gr. 5-9
Anatomy and processes behind the nervous system, focusing on the brain.

Phone Bill Problem  Gr. 6-9
How to write an equation of a linear function when given a set of data. Interpret the meaning of the slope and y-intercept and then use the equation to find other values of x and y.

Physics of Flight  Gr. 5-9
Dynamics of flight and the engineering design process. Make an aircraft that will maintain flight for the longest period of time.

Prosthetic Engineers  Gr. 6-9
Engineer a model prosthetic lower leg using various materials.

Sherlock Holmes  Gr. 3-4
Observation, memory, and critical thinking skills. Also learn about hard evidence that detectives use, fingerprint types, and see their own fingerprints.

Simple Circuits  Gr. 2-4
Students will construct parallel and series circuits and explain how each type of circuit works. Students will describe the qualities that define good and poor conductors of electricity and will list at least three of each type of conductor.

Solid, Liquid, Gas  Gr. 3-5
The student will learn about three different states of matter (solids, liquids and gasses) and the concept of mass. The hands-on activities involve bagging matter, saturating solutions and creating and observing a chemical overreaction.

Waiting For Heads  Gr. 3-4
Students will learn about decimals, fractions and percentages. Students will use dice to learn about whole numbers and fractions as well as convert fractions into percentages. They will gain a basic understanding of decimal placement.