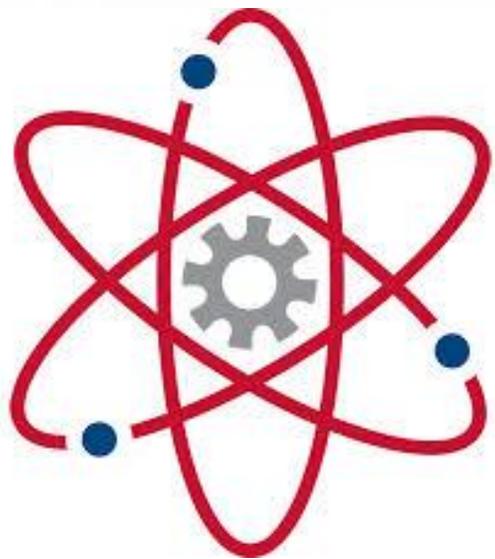


Arroyo Seco Jr. High School



STEM Courses:

Design & Modeling

Automation & Robotics

Flight & Space

Energy & The Environment

Magic of Electrons

Science Olympiad



ESTEME NETWORK

Creating a K-16
STEM
pipeline for our
students

Arroyo Seco joined the ESTEME network in an effort to create a K-16 pipeline for our students in the STEM fields. We worked with Emblem Elementary, West Creek Elementary, Saugus High School, College of the Canyons (COC) and California State University Northridge (CSUN) on our STEM pathways and workforce development strategy. The first year (2014), COC provided Project Lead the Way (PLTW) training for two of our teachers to teach the core curriculum – Automation & Robotics and Design & Modeling. The William S. Hart High School District is supporting three of our teachers to be trained this summer in order to add Flight & Space, Energy & The Environment and Magic of Electrons to Arroyo Seco's STEM pathway in the fall.

Design & Modeling

“Students apply the design process to solve problems and understand influences of creativity and innovation on their lives” (PLTW, 2014). Students work in teams to design things such as a playground, furniture, phone covers, chess pieces and light switch covers. Using Autodesk design software, students create visual images of their designs and then are able to print out multiple products they have created with our 3D printers.

Automation & Robotic

“Students trace the history, development, and influence of automation and robotics as they learn about mechanical systems, energy transfer, machine automation, and computer control systems” (PLTW, 2014). Students use the VEX Robotics platform to design, build and program real-world objects such as traffic lights, robotic arms and vehicles.

Flight & Space

Students explore the science behind aeronautics and use their knowledge to engineer, build and test an airfoil. Students will also be able to experience what space travel is like by using flight simulation software.

Energy & The Environment

“Students are challenged to think big and towards the future as they explore sustainable solutions to our energy needs and investigate the impact of energy on our lives and on the world” (PLTW, 2014). Students will design and model alternative energy sources and will evaluate different options for reducing energy consumption.

Magic of Electrons

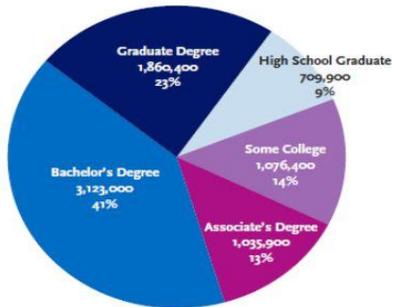
Students will explore electricity, the behavior and parts of an atom, and sensing devices by doing hands-on projects. Students will learn knowledge and skills in basic circuitry design and examine the impact that electricity has in our world.

For more information on the middle school, PLTW, Gateway curriculum and engineering pathway, please visit <https://www.pltw.org/our-programs/pltw-gateway/pltw-gateway-curriculum>.

#STEMJobs

STEM Education can get you one of 8 million jobs by 2018.

80% of the fastest growing occupations require STEM skills.



Employment projections of STEM jobs in 2018: 8 million

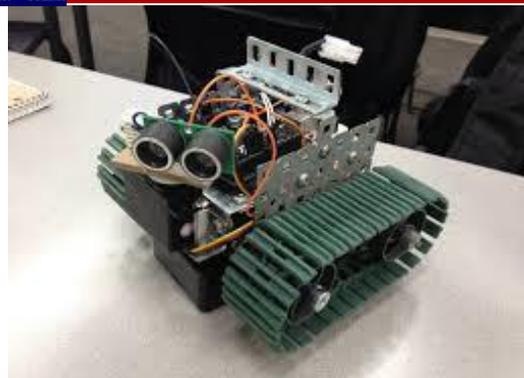
Source: Georgetown University Center on Education and the Workforce forecast of occupational growth through 2018.

“If we teach today as we taught yesterday, then we rob our children of tomorrow”

-John Dewey

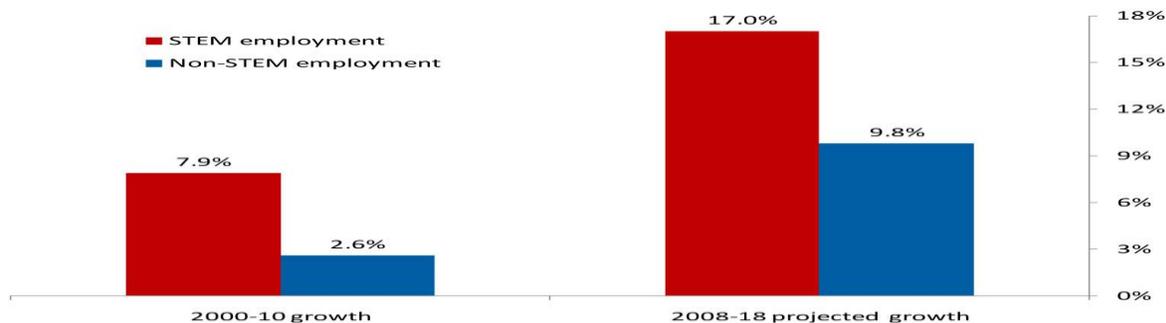
A future in STEM...

- A strong foundation in STEM provides students with the critical thinking skills that cultivate great thinkers and innovators.
- Students who take STEM courses throughout their education are better prepared for college and careers than those who do not (NSTA, 2015).
- Of the 20 fastest growing careers, 15 of them require students have a strong background in math and/or science (NMSI, 2012).
- STEM jobs pay more than non-STEM jobs and students who take STEM courses throughout their education are more college and career ready than those who don't (NSTA, 2015).



one of 8 million jobs by 2018.

Figure 1. Recent and Projected Growth in STEM and Non-STEM Employment



Source: ESA calculations using Current Population Survey public-use microdata and estimates from the Employment Projections Program of the Bureau of Labor Statistics.



Science Olympiad

Arroyo Seco has both an exploratory science Olympiad class and a competitive Science Olympiad Team. The quarter long, Science Olympiad exploratory class allows all students to engage in hands-on science activities. Students design and construct egg drops, roller coasters and wheeled vehicles. In addition, student research an area of interest in science and learn about laboratory processes such as chromatography and experimental design.

Arroyo's Seco's Science Olympiad Team consists of 15 motivated science students who study science topics and build projects throughout the year to prepare for the Los Angeles Regional Science Olympiad competition. Teams of students compete in 23 events. Students engineer, build and test Bottle Rockets, Wheeled Vehicle, Bridges, a Robo-cross and Elastic Launched Gliders. Students also study and prepare to be tested on topics such as Fossils, Solar System, Entomology, Dynamic Planet. Disease Detectives, Anatomy and Physiology and Road Scholar. Please visit the Science Olympiad website for more information at <http://soinc.org/about#>.

The logo features three interlocking curved bands in blue, orange, and green, forming a triangular shape. To the right of the bands, the text "NEXT GENERATION" is in blue, "SCIENCE" is in large black letters, and "STANDARDS" is in orange.

NEXT GENERATION SCIENCE STANDARDS

California, along with 25 other states, adopted the new Next Generation Science Standards (NGSS) to prepare our students for college and tomorrow's workforce. Arroyo Seco is the process of transitioning from our 1998 California State Standards in Science to the NGSS. The science department spends one hour per week, during late-start Wednesdays, developing NGSS lessons related to the Engineering Practices, reading about the NGSS and discussing best practices to use in a NGSS classroom.



“All Standards, All Students”: The NGSS are accessible to all students. NGSS are designed to meet the needs of a diverse group of students. It is expected that all students, from all subgroups, learn the knowledge and skills necessary in science to be scientifically literate and be college and career ready

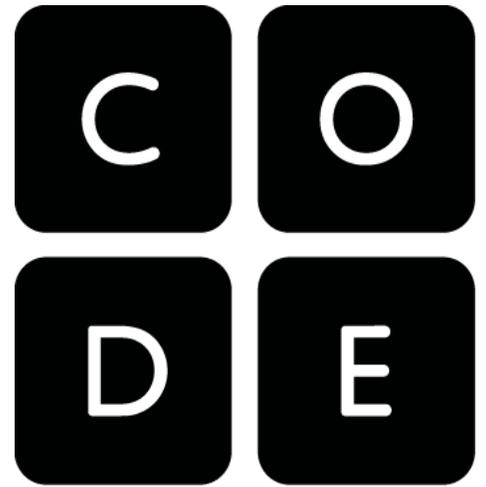
For more information on the NGSS, please visit <http://www.nextgenscience.org/next-generation-science-standards>.

There are three dimensions to the NGSS standards:

- **Practices** – eight practices that describe the behaviors that scientist engage in.
- **Crosscutting Concepts** – seven methods for providing connections and deepen understanding.
- **Disciplinary Core Ideas (Content)** – ideas /content in the four domains: physical science, life science, earth and space science and engineering, technology and applications of science.



“Everybody in this country should learn how to program a computer... because it teaches you how to think.”
- Steve Jobs

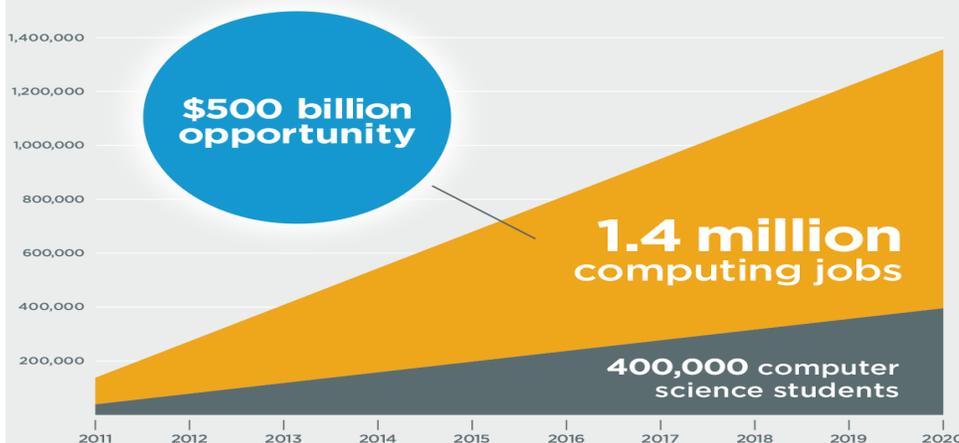


Code.org is a non-profit organization dedicated to making computer science more accessible to students in school. Code.org’s vision is to have every student, in every school, be given the opportunity to learn how to program a computer.

Arroyo Seco participated in the Hour of Code during the week of December 8th, 2014. We had 100% of our students participate. At least one teacher from each interdisciplinary team used either one of our computer labs or laptop carts and had their students do computer coding.

Our teachers took their students through game-based coding exercises. Some worked with games like Code with Anna and Elsa, Flappy and Lightbot. Some had their students write a computer program based on the Angry Birds game, and others introduced their students to JavaScript or Python. For more information about Code.org visit <http://code.org/about>.

1,000,000 more jobs than students by 2020



Computer science is a top paying college degree and computer programming jobs are growing at 2X the national average.