

What effect does teaching Engineering Technology have on our workforce and society?

A major consequence of accelerating technological change is a difference in levels of technological ability and understanding. The workforce of the future must have the ability to use, manage, and understand technology. Technological literacy is vital to individual, community, and national economic prosperity. Beyond economic vitality is the realization that how people develop and apply technology has become critical to future generations, society, and even the Earth's continued ability to sustain life.

What is the real challenge pertaining to Engineering Technology teaching?

The challenge is not whether technology should be offered or how it should be taught. The real challenge is how it will be possible for a country to maintain a competitive technological advantage if it continues to ignore teaching about technology and innovation. To maintain its superiority as a technological leader, a country must teach and emphasize the study of technology beyond its use as a delivery system for other subjects. As technology plays an increasingly important role in our society and affects our everyday existence, our ability to understand, use, and manage it in our daily lives requires that it become a significantly supported educational initiative rather than one ignored by legislation. Fortunately, the groundwork has been completed with help from our nation's most prestigious science and technology agencies. The important step in progress is the realization that our technological superiority and affluence as a nation will not continue unless our populace is educated to take advantage of the opportunities that now exist.

Information in this brochure provided in part by the following organizations:



Massachusetts Department of Education

"Engineering is the profession in which a knowledge of the mathematical and natural sciences, gained by study, experience, and practice, is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind."

by The Accreditation Board for
Engineering and Technology (ABET)

Extra course offerings

Triple E - After School Clubs

Students wanting to explore more possibilities in the Engineering and Technology fields can participate in either of the clubs described below. These clubs are open to ALL students, grades 6 through 8. Any skill level is welcome, from the beginner to the experienced, therefore projects can be tailored to a student's specific level of experience. Attendance each week is not mandatory, so if kids can not come one week, they can still come the next. Some students play sports and are only able to participate for part of the school year. Both clubs have a limited number of spots available each week. This is done so kids can get lots of individual attention when attending the club. For this reason, students must sign up for the club each week by writing their name on the sign-up sheet located outside Room 113 (The Engineering Room) the morning the club meets.

Students who have never participated in Woodworking or CAD/CAM, should plan to attend the information meetings to hear a detailed description of the club. The meeting usually only lasts for about 30 minutes, but is not required. Students who have participated in the clubs before, do not need to attend the meeting unless they want to.

Computer Aided Design (CAD) Club is designed for those Students who want to explore the area of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM). Activities could include, but are not limited to word processing, drawing, designing, painting, digital photography, desktop publishing, virtual bridge design, web page design, T-shirt design, and computer aided manufacturing. Space is limited to 14 students each week and you must sign up the day of the club.

Woodworking Club is designed for beginners as well as the more experienced wood workers. Basic woodworking techniques, tool selection, tool utilization, fastening procedures, and finishing processes will be taught, with a strong emphasis on safety. Students are encouraged to design and build their own projects, however pre-drawn plans are available for simple projects. Students can use this time to do personnel projects or to work on school related projects. All building materials are included unless a project requires hardware, or similar items, that are not normally stocked. Space is limited to 12 students each week and you must sign up the day of the club.

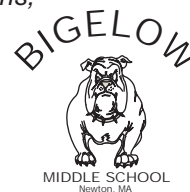
*If you ever have any questions or concerns,
please do not hesitate to contact me.*

Sincerely, Michael Whitman

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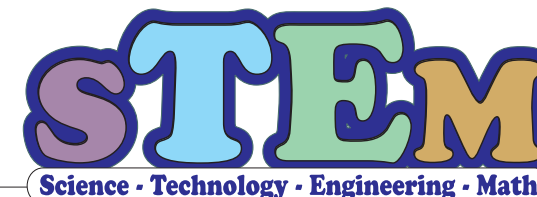


ENGINEERING TECHNOLOGY

*"Your mind is like
a parachute,
it only functions
when open"*

In a word, it is about INNOVATION! It is about how people think and apply technology to solve the problems facing society. The thinking process is closely related to that of an engineer, hi-tech worker, designer, or architect.

Students use their ingenuity with tools, materials, processes, and resources to create solutions and opportunities for themselves and others. It is a new and dynamic subject in our schools that is as fast moving and as up-to-date as the thinking of technology in our society! It is future workforce thinking!!



Introduction to Technology - Grade 6

This course is intended to introduce kids to the world of technology. Students will participate in Technology Learning Activities (TLA's) that explore the areas of transportation, construction, manufacturing, design, communication, energy and more. All units and activities will work to reinforce foundation skills such as teamwork, responsibility, problem solving, critical thinking, creativity, and evaluation skills while striving to make the connection between math, science, physics, social studies and technology. Curriculum units could include, but are not limited to, Lab Safety, Tools and Materials, Principles of Flight, Transportation, Magnetic Levitation, Mass Production, and Design and Fabrication.

Engineering Technology - Grade 7 Students will have the opportunity to experience first hand how something is designed and then fabricated. The challenge will be to design and build a small CO2 powered vehicle. Focusing on Speed, Show or a combination of both, we will utilize the steps in the Engineering Design Process to work through the design challenge. The design process is a series of steps, that when followed correctly, should lead to a successful solution. Since the design process has many different steps, we will be covering each step individually and in detail. Cooperation, commitment, and safety will be at the forefront of each step in the process. Students will also collect data through research and use that data to make an educated decision about their race vehicle solution. We will also learn the physics behind powering these vehicles with a CO2 cartridge and test each vehicle for aerodynamics. The finally will be at the end of the term when cars are judged for show quality and raced to determine the fastest three cars.

Exploratory Technology - Grade 8 As the course title suggests, 8th graders will be exploring many different disciplines of Engineering Technology this year. Students will be challenged to take on the role of a "learner" vs having subject matter taught to them. Learning will take place at a self-paced level by rotating through Computer Aided Design and Modular Unit assignments. While exploring Modular Units, students will work in teams of 2 to learn about the following technologies: Fiber Optics Communication, Laser Technology, Alternative Energy, Pneumatics Technology, Aerodynamics, Robotics, Bioengineering, and Electronics. The Computer Aided Design assignments will consist of one digital photography and graphic arts design (students choice) and three Virtual bridge design challenges. In addition to the in-class assignments, there will be three homework assignments, one Web Quest research worksheet, and two vocabulary homework assignments, There will also be one mid-term exam and one final exam.

Why is teaching Engineering Technology important for our students?

A central role of an educational institution is to offer a curriculum that gives its students a basic understanding of the society in which they live. While our society is certainly both democratic and technological, not enough emphasis is placed on the technology component through school curriculums. People are losing touch with a fundamental aspect of society due to the fact that educational institutions impart so little understanding of our technological base. We risk underestimating the importance of the assessment of technological change or assuming that the assessment of technological change is entirely a scientific process. With our current zeal to improve schools, now is the time to examine how technology should be taught.

What should students know, and be able to do, to be technologically literate?

The state standards identify content related to the nature of technology, technology and society, design, abilities for a technological world, and the designed world. Knowledge has been identified for grade levels K-2, 3-5, 6-8, and 9-12. Content is integrated into thematic units at the elementary levels, while course titles at the middle and high school levels may include Introduction to Technology, Exploring Technology, Innovation and Engineering Design, Communications Technology, Technological Systems, Engineering Design Fundamentals, and more. The standards also address medical, agricultural and related biotechnologies, energy and power, information and communication, transportation, manufacturing, and construction topics.

Is Engineering Technology being taught in our schools?

ABSOLUTELY. Engineering / Technology education is an elective in most locations, but here at Bigelow Middle School, it is a required course for all students. Throughout the three years at Bigelow, students will participate in the following courses; Introduction to Technology, Engineering Technology, and Exploratory Technology. Other courses will be offered as electives such as Girls in Engineering, Inventions/Innovations, Manufacturing, Communication Technology, Design and Fabrication, and more. Unfortunately engineering / technology teaching does not enjoy the same time in the school schedule as the other core subject areas. Students are only required to take 9 weeks of any given FAA (Fine & Applied Arts) subject each year. If a student wishes to participate in any additional time in Engineering Technology he/she can participate in after-school clubs.

What is the origin of Engineering Technology education?

Engineering Technology education has evolved as technology has advanced. During the industrial era of the 20th century, it was taught in the schools as Industrial Arts, reflecting the industrial society. As advancements have catapulted us into a faster moving, more highly sophisticated technological society, Engineering Technology education has made content adjustments that reflect these changes. The new Science and Engineering Standards we revised in 2016. Engineering Technology is now being taught to every middle school student and is assessed through the state mandated MCAS test in grade 8. It also makes up 2 of the 4 major parts of STEM (Science, Technology, Engineering, and Mathematics).

What do students learn in Engineering Technology class?

The aim is to engage students in the problem solving process to solve problems and create opportunities within a realistic context. Examples of technology problems and learning situations could be the creation and fabrication of an invention to solve a household problem, designing and building of a habitat for a unique situation, designing and building a vehicle that will travel over a set distance in the shortest amount of time, or even designing the most efficient bridge. The thinking process is closely related to that of an engineer, hi-tech worker, designer, or architect. We will use the Engineering Design Process as a means to pinpoint a solution that best solves the problem. Students will use their ingenuity with tools, materials, processes, and resources to create their solutions. The goal is for students to move from the very early years of just "knowing" to more developed applications that relate to the medical, agricultural, energy and power, information and communication, transportation, manufacturing, and construction technologies.

What does the Engineering Technology facility look like?

The Engineering Technology facility at Bigelow MS consists of 2 classrooms, each designed for a specific purpose. The Classroom Laboratory ("The Clean Room") serves as a research and design hub for planning the stages of invention, innovation, and construction. This room is equipped with 16 computers and one CNC Milling Machine used for research, design, and fabrication. There is also 6 Modular Unit Learning Stations designed to engage students in exploratory learning in fields such as Laser Communication, Alternative Energy, Fiber Optics Communication, Computer Aided Manufacturing, Power and Fluid Systems and more. The facility also has a Fabrication Lab ("The Dirty Room"), where students can construct, build, test, and evaluate prototypes and projects that relate to their designs and ideas. This room is full of power tools, hand tools, materials and resources to aid students in the fabrication of their projects.