

Why engineering?

The world is changing at an unprecedented pace and many of the jobs that our current students will hold throughout their life do not yet exist. With access to the internet on their phones, students literally have a world of factual knowledge in their pocket. Education needs to be more focused on developing 21st Century skills such as communicating, collaborating, critical-thinking and creative problem-solving.

This change in focus requires new ways of teaching in order to foster these skills in our students. Engineering in a K-8 classroom is an excellent tool for the educator. In our current world, there is a shortage of students interested in STEM fields. Studies show that student interest in STEM subject areas peaks between the ages of 9 and 14 making elementary school/middle school the perfect place to fuel their future.

"Education is not the learning of facts, but training the mind to think."

-Albert Einstein

**"Scientists discover the world that exists;
engineers create the world that never was."**
-Theodore Von Karman

What engineering is not. It is not a craft project or a science experiment. It does not necessarily involve science and math. It does not require the teacher to have studied engineering in college or have great technical abilities.

Engineering is a process of solving problems. First, the problem is analyzed and understood, limitations and constraints are considered. Second, possible solutions are brainstormed and discussed among the collaborating partners. Third, a solution is chosen and performed, created or followed. Once the solution is completed, it is tested to see if it truly does solve the problem while meeting all the criteria.

Last, an evaluation is performed to see if improvements can be made and if given time, a new solution is created. This is a process that is not new to teachers; they have been doing it on a yearly basis with their lesson plans. Incorporating engineering in the classroom explicitly teaches this process to the students.

ENGINEERING DESIGN PROCESS



There are many benefits to incorporating the engineering design process into the classroom. First of all, students learn more when they are engaged and having fun.

Children have a great curiosity and they are not afraid to make mistakes. If you are not prepared to be wrong, you'll never come up with anything original. Some inventions that were mistakes include chocolate chip cookies, ice cream cones, potato chips, tea bags, aspirin, penicillin, silly putty, slinky, safety glass, bubble wrap, matches, Frisbees and Post-It notes. The fun aspect complements the fact that students will experience failure as they engineer solutions to problems. They will become more comfortable with failure as they learn to view it as an opportunity to improve their projects and grow their skillsets. This also develops coping skills for the inevitable trials and tribulations of life.

Engineering allows for easy application of math and cross-curricular learning. It can be incorporated in all subjects such as science, ELA, Social studies, math and religion. It fosters collaboration and develops teamwork skills. Engineering easily differentiates for students. It allows all students to be successful no matter what disadvantages they may have been struggling with.

Link for article 3 reasons for engineering k-12 you can't argue with

<http://start-engineering.com/start-engineering-now/2016/11/17/3-reasons-for-k-12-engineering-you-just-cant-argue-with>