



STEM Science, Technology,
Engineering, Mathematics

Manasquan Elementary School



What is STEM?



- **STEM education** is the re-visioning of science education to enable the next generation of innovators.
- **STEM education** is the preparation of students in competencies and skills in the four disciplines of **s**cience, **t**echnology, **e**ngineering, and **m**athematics.
- **STEM** is a range of instructional strategies that help students apply concepts and skills from the four different disciplines to participate in a “design process” to solve meaningful problems.

STEM is not ...

- A curriculum
- A “packaged program”
- Subject areas taught in isolation
- Activities with step-by-step directions
- Teacher demonstrations
- An “add-on” to the current program



STEM DISCIPLINES



- **SCIENCE:** Study of the physical and natural world through observation and experimentation
- **TECHNOLOGY:** Work involving designing, testing, maintaining, and improving computer software, hardware, systems and networks; connects people through communication; involves making problems easier to solve
- **ENGINEERING:** Work involving developing systems, structures, products, and materials; uses the design process to solve real-world problems
- **MATH:** Uses numerical, spatial, and logical relationships to study and solve problems as the foundation for science, engineering, and technology



The Difference?

- Science, math, and technology naturally relate to one another for subject area integration STEM now adds the **ENGINEERING** component
- Students are encouraged to participate in the *Design Process*:

Identify the problem or challenge – ASK!

Brainstorm for solutions - IMAGINE !

Design and research - PLAN!

Build a model - CREATE!

Test and evaluate – TIME TO REFLECT!

Make adjustments - IMPROVE!





STEM includes enhanced opportunities in:

- **Critical thinking**
- **Hands on inquiry**
- **Problem solving**
- **Real life applications**
- **Creativity**
- **Cooperative learning**
- **Trial and error (There is more than one right answer!)**
- **Integrated subject areas**
- **Open-ended activities**
- **Evidence-based reasoning**
- **Data analysis / measurement / probability**

STEM education

- **Encourages creativity**
- **Creates problem solvers**
- **Supports communication and collaboration**
- **Produces critical thinkers**
- **Offers students challenging and engaging content**
- **Connects classroom learning to the real world**

In a STEM activity, learning often comes from failures

➤ Why didn't it work?

➤ What can you do about it?





Why STEM?

STEM workers are the innovators and inventors!

- Necessary to prepare young Americans to succeed in a global society
- Plays a critical role in our nation's future economic prosperity and competitiveness
- Growing demand across all industries for new products and inventions is fueling the need for STEM workers
- Occupations related to STEM are projected to grow to more than one million by 2022 (U.S. Bureau of Labor Statistics)
- STEM is for ALL students! Early exposure to STEM initiatives can pique student interest in engineering and other STEM career paths

New Jersey's Initiatives

- Raised the bar in mathematics and language arts literacy with the adoption of the updated New Jersey Learning Standards
- Focus to a new vision for science education – with the adoption of the Next Generation Science Standards & STEM Education initiatives



NEXT GENERATION SCIENCE STANDARDS (NGSS)

- ✓ Based on the Framework for K-12 Science Education developed by the National Research Council
- ✓ Collaboratively written by partnering teams from:
 - National Research Council
 - National Science Teachers Association
 - American Association for the Advancement of Science
- ✓ Improves the quality of science teaching
- ✓ Provides essential preparation for success in the modern workforce





Our Goals at MES



Summer 2015:

- Revise K-8 Science Curriculum to align to the Next Generation Science Standards & include STEM initiatives at **EVERY** grade level
- Develop and pilot an Accelerated STEM Program for identified Seventh Grade students during the 2015-2016 school year

Summer 2016:

- Make updates to the new curriculum – and develop an Accelerated STEM Program for Eighth Graders for the 2016-2017 SY

Summer 2017:

- Curriculum planning for STEMto **STE^[+a]M™**
Integrating the Arts!

ACCELERATED GRADE 7 STEM PROGRAM

INITIAL IDENTIFICATION:

Final averages in Mathematics, Science, Language Arts, Social Studies, and Technology
PARCC Scores (Lang Arts & Math)
STEM Placement Test
MAP Scores (Lang Arts & Math)
Cognitive Abilities Test

IDENTIFIED STUDENTS:

Required application with essay



FINAL REVIEW OF APPLICANTS:

STEM Committee will review applications/essays, grades, and Placement Test scores
Final Approval by the Building Administration for acceptance into the program

ACCELERATED GRADE 7&8 STEM PROGRAM

- *Extends* the curriculum in science, mathematics, and technology education to include rigorous enrichment activities and experiences with an engineering approach
- Provides opportunities to participate in lessons that require *increased* critical thinking and problem solving skills
- Exposes students to *more advanced* lessons that encourage them to investigate, model, and explain the natural and designed world through an integrated curriculum



VISION and MISSION STATEMENT

Manasquan Elementary School:
“Preparing Tomorrow’s Innovators”

We believe that encouraging critical and creative thinking through a STEM instructional approach will prepare our students for the future workforce.



STEM where the jobs of tomorrow will be!

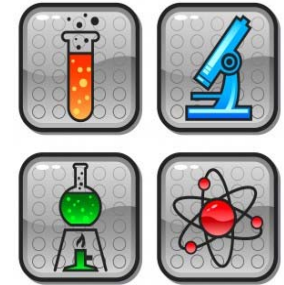
A message from college students about STEM

<https://www.youtube.com/watch?v=zgB-Diy8imo>





STEM Committee



Elyse Boyes, Kindergarten

Kali Mura, First Grade

Donna Mead, Second Grade

Krissy Sliwoski, Third Grade

Brianna O'Hara, Fourth Grade

Amelia Gliddon, Fifth Grade

Oriana Kopec, Media Specialist

Rob Markovitch, Middle School Science

Laura Wahl, Middle School Science

Marc Reid, Middle School Math

Andy Manser, Middle School Math

Kirt Wahl, Technology Education

Mark Levy, Technology Education