



Joyce Kilmer School

Grades 6th, 7th, And 8th

Our STEAM Team



Science

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- ☆



Engineering

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- ☆
- ☆
- ☆



Math

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- ☆



Technology

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- ☆



Art

- ☆ Megan Rademacher
- ☆ Rachel Sobota
- ☆
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This years GOALS



Introduce STEAM

What is STEAM? Introduce to staff and students



Investigate STEAM

Review existing curriculum and work to integrate STEAM



Incorporate STEAM

Add elements of STEAM into existing curriculum.



Implement STEAM

Have students complete STEAM projects, one per semester.



STEAM....what is it and why is it important?

While STEM, STEM+C, STEAM, STREAM, STRREAM, TEAMS, and DREAMS all highlight different subject areas and disciplines, they all have the same core goal - Interdisciplinary learning

At its core, a successful STEAM lesson, class, or program should work to provide students with an opportunity to apply skills, understanding, and passions from across these disciplines in a culminating experience

We learn better when we are engaged, and we are more easily engaged when we are interested in what we are doing. STEAM is a powerful tool for catching the different interests and passions of our students, fostering a diverse classroom, and also fueling interests for possible future career: .

General Practices to Integrate into the Classroom

Design Thinking- Provide opportunities for students to create their learning experience through an open-ended environment. Provide “constraints” or requirements for projects, and challenge students to design their work so it meets these constraints. We can also refer to student work as a “prototype”, and provide opportunities to consider how we could improve our designs with the skills and knowledge we gain.

- Example: When participating in a lab, allow students to design some of the questions or criteria that they need to investigate, and/or design a model that meets the constraints of the activity.

Problem-Based Learning- When learning about topics or starting a project, pose a question or connect the concepts you are investigating a real-world problem that is relatable. This often works to answer “Why?” as we teach new concepts and also builds stronger problem solving abilities which aligns with the core concepts of Engineering in STEAM.

- Example: “Imagine we are working at NASA and it's our job to figure out how to reduce the cost of space travel. What materials should we use to construct our rockets so they are both safe and lightweight?”

Empathy- As we learn about topics across the science fields, work to connect the impacts of these topics on a population of individuals, animals, or the environment.

- Example: As we continue to create more forms of renewable energy (wind, solar, hydro, etc), what impacts do these solutions have on local wildlife, and what can be done to reduce negative impacts in specific habitats?

Career Connections- When teaching about new topics, or learning how to utilize certain tools and instruments, connect the activities from our class to careers that utilize similar skills or work through similar concepts. Work to provide career paths across all of the STEAM disciplines when possible.

- Example: Working as an engineer at Tesla, you are challenged to find a replacement material for Cobalt. Determine why this material is currently used, and what replacement may reduce its negative impacts



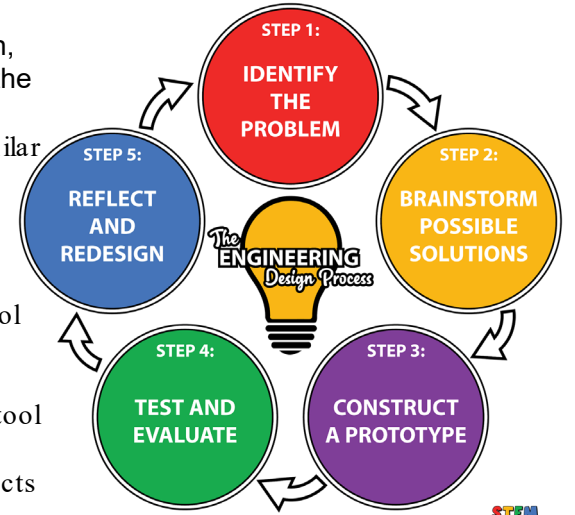
Understanding the Engineering and Technology Component of STEAM

Engineering can be defined as the process in which we solve problem. From this definition, providing opportunities for students to apply what they are learning to solve problems in the classroom would work to meet the goal for integrating Engineering in a STEAM initiative.

- The Engineering Design Process (EDP) takes many forms, and in many ways is similar to the scientific method. As methodical step by step process that guides engineers (and students) through solving a problem in small stages.
- Hands-on learning is also a key aspect to Engineering and STEAM integration, providing students with the opportunity to work physically with materials not only offers real-world experiences that relate to potential careers, it is also a powerful tool for engagement and supporting diverse learners.

Technology can be defined as a tool that is man-made, or not found in nature. In today's technologically advanced world, we often think of chromebooks and the internet as a core tool for technology integration. But to dive deeper in this discipline and to create a more successful STEAM initiative, we need to work to incorporate technology into the other aspects of our STEAM program.

- Provide opportunities for students to utilize tools that relate to careers when possible. Using instruments like microscopes or even measuring tools like scales or rulers are all examples of technology integration.
- When possible, challenge students to utilize their chromebooks to design something. For example, utilize google slides to make an engaging presentation, or create video to share and explain an experience, or design a 3D model using software.



*An example 5-step
Engineering Design Process*

Understanding the Art Component of STEAM

Expression and Communication are core Art concepts that can be integrated into the STEAM classroom. As students are challenged to explain their ideas, work to provide different opportunities for students to convey their thoughts.

For example

- Allow students to sketch or create a diagram as a response. You can still require written communication as well, consider a constraint for a sketch to be labeled
- Challenge students to make posters, advertisements, or infographics to explain their idea while incorporating some fundamental skills in color theory and typography
- Allow students to create a song, rap, or video as a form of a presentation for a project rather than a formal slideshow.

Incorporate the opportunity to work hands-on in a visual manner. Challenge students to create models that are sculpted or painted to bring potential passions into the science classroom .

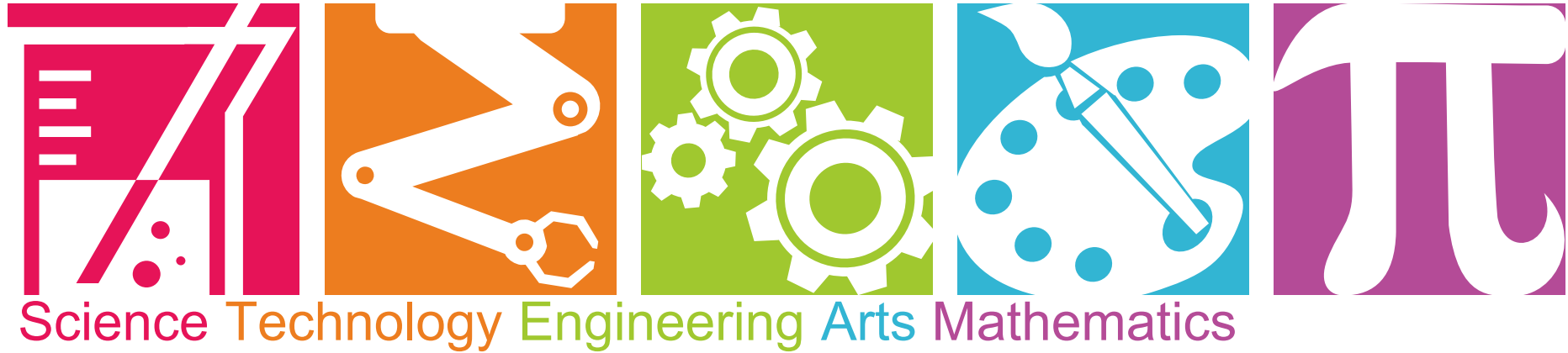
Science and Math have always been influential to artists throughout time. Showcase a famous painting, a mesmerizing sculpture, or another example of how nature, or astronomy, or physics, have been used as an inspiration source for art and design



*Under the Wave off Kanagawa by
Katsushika Hokusai, 1831*



Semester 1



STEAM EDUCATION

6th Grade - Our Solar System



Science

Students will investigate the planets of our solar system



Technology

Students will utilize technology to research our planets and the characteristics, as well as design and fabricate a model of our solar system using technology



Engineering

Astronomers utilize models to help understand the size, motion, and other properties of our solar system to learn more and develop solutions. We are now challenged to utilize these same skills as we work to create our own models of our solar system.



Art

Students will be challenged to design and create images and models that accurately reflect the visual properties of our solar system



Math

Students will need to convert any information they find on the planets that are in the customary system into the metric system, as well as develop a model that is proportional



7th Grade - Design Your Own Periodic Table



Science

Students will understand how the periodic table is set up.
Students will be able to determine the patterns between groups and periods.

Technology

Students will utilize their computers to research their topic, collect information, and design a prototype solution.

Engineering

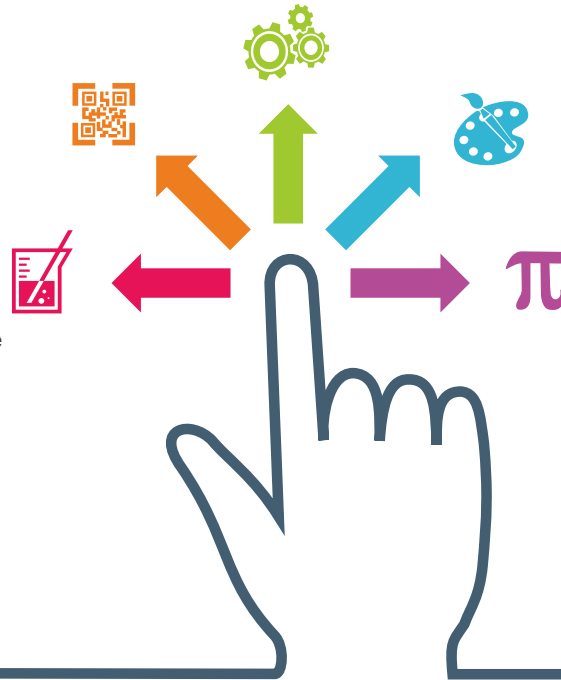
The periodic table is an important tool utilized by scientists to understand the natural elements. You are now challenged to utilize these skills to create a periodic table of your choosing which can be used to solve problems and understand your topic of choice

Art

Students will need to use color and text properties in order to best convey the information presented on their designed periodic tables

Math

Students are challenged to calculate a value to use that is equivalent to the atomic mass of an element.



8th Grade - “Cell Project”

Science

1. Develop and use a model to describe the function of a cell as a whole and the ways parts of cells contribute to the function of a whole cell.
2. Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Technology

Students will utilize their devices to research, design, document the creation of their cells. Software can be used to assist in designing projects and submitting them electronically.

Engineering

In order to better understand how cells, we must create a model that explains and presents the functions of a cell. Utilizing a design process, students will construct and fabricate their models.

Art

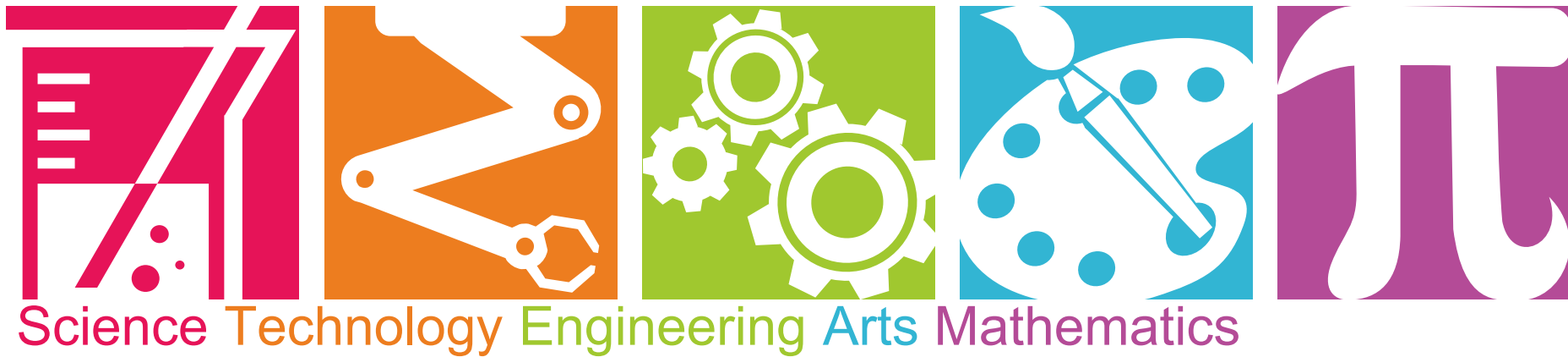
In order to explain the parts of a cell clearly and effectively, students must combine different materials and construction techniques to design and create their 3D models.

Math

Students will need to incorporate the appropriate scale for the cell and its organelles.



Semester 2



STEAM EDUCATION

6th Grade - The Rock Cycle



Science

Students will investigate all parts and properties of the rock cycle and the different types of rocks found within it.



Technology

Students will be challenge to design and construct a model that shows the different types of rocks and processes they go through



Engineering

Rock have been used as a key construction component for centuries, and many ancient rock formations are still in existence today. Why do these rocks last longer than materials used in modern construction?



Art

Students are challenged to illustrate different rocks and create diagrams to communicate their properties.



Math

Students will be challenged to calculate the hal-lives of rocks based on their experimentation.



7th Grade - Electromagnetic Waves



Science

Students will be learning about the different electromagnetic wave forms as they share and present their findings with their peers.

Technology

Students will utilize their devices to make a digital presentation that successfully communicates the properties of their assigned wave.

Engineering

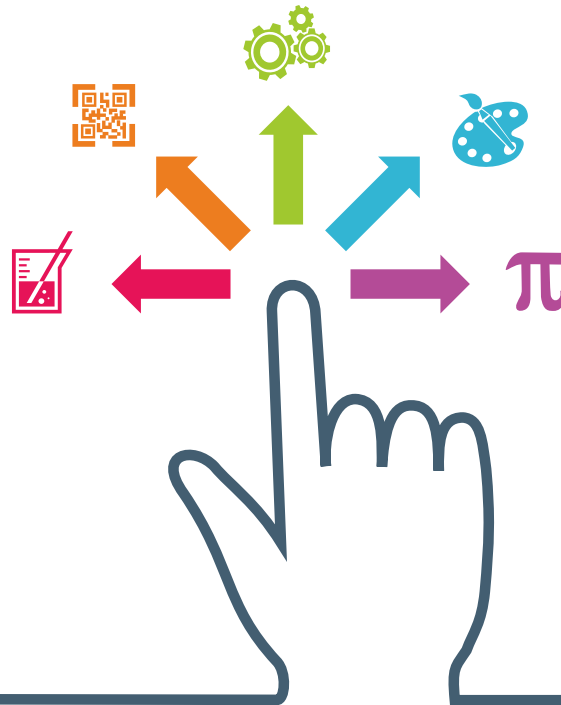
Imagine we are engineers looking to design a new product which communicates through electromagnetic waves. In order to determine which waveform is best, we must first analyze and understand the different characteristics of each wave.

Art

Students are challenged to design a presentation that is engaging and successfully communicates the properties of their waves through visuals, models, and graphics.

Math

Students must calculate and compare the properties of their assigned wave, such as frequency, temperature, and length.



8th Grade - “The Effects of Molecules & Free Fall”



Science

Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects

Design various scenarios displaying the result of wind resistance and how molecules affect a free falling object.



Technology

Students will utilize software to research, compare, and simulate how objects of different materials fall.



Engineering

Image we work for a delivery company that wants to deliver packages from the air. In order to design our packages so they land safely, we must test the properties of different materials to determine which would be best suited for this problem.



Art

Students are challenged to design a graphic that presents their findings clearly and effectively.



Math

Students will need to measure mass and time, then convert and use SI units in their results.



STEM



EDUCATION

