

TRACK 3 STEM ELECTIVE OPTIONS

This document is for Track 3 students only!!!

Have you ever considered a career as an inventor, scientist, architect or astronaut? The foundation of learning for these and other high-tech jobs of tomorrow begin with four letters - **S.T.E.M.** (Science, Technology, Engineering and Mathematics). As a member of the WCPSS STEM Schools Collaborative Network, we are excited about the many STEM learning opportunities that ECMS students will participate in for the 2016-17 academic year.

You have the opportunity to select and participate in a STEM elective this year! STEM electives are sessions that provide project-based, hands-on activities focused on STEM topics. These electives will occur once every three weeks and the ECMS staff will utilize their knowledge and talents to provide a great experience to all students. STEM Electives will be offered per track. You can only sign up for STEM Elective sessions for your track only (for scheduling purposes).

As you read the STEM elective options, please make note of the electives that interest you. Please be prepared to rank your elective choices in order of preference. We will try our best to assign you to one of your top preferences as space is available.

OPTION 1:

Topic: Paper Engineering

Instructors: T. Hackman

Location: Room 328

STEM Focus: Science, Engineering, Mathematics

Learning Goals/Objectives:

Mathematics - Solve real-world and mathematical problems involving area, surface area, and volume; **Science** - Understand conservation and recycling; **Engineering** - Design, create, and build products.

Essential/Driving Question(s):

How can I recycle, reuse, and repurpose every day paper materials into new, creative, and usable products?

Description:

Students who participate in this STEM Elective will: engineer their own paper from scratch using recycled materials, engineer new products from new and recycled papers, measure, fold, and craft products from new and recycled papers, understand the paper-making process and the conservation efforts through recycling, reusing, and repurposing materials, and make paper and various products from new and recycled papers. Products may include origami, envelopes, cubes and boxes, pop-up books, cards, bags and containers, and artwork.



OPTION 2:

Topic: Tessellations, Tangrams, Palindromes & Puzzlers

Instructors: John Laing & Sydelle Snyder

Location : Room 914

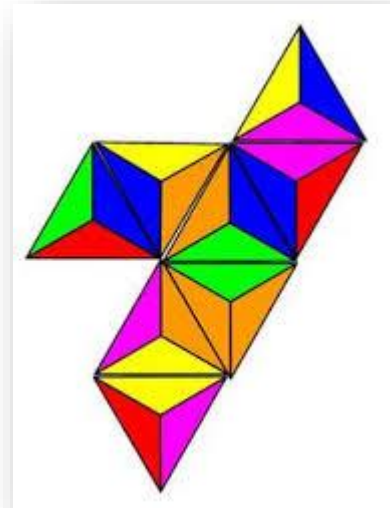
STEM Focus: Engineering, Mathematics

Learning Goals/Objectives:

The objective is to open up the mind to see everyday things in different ways and to use critical thinking to solve problems.

Essential/Driving Question(s):

How are common shapes interconnected? What patterns can you find in common numbers, shapes and words? Which geometric designs are common in nature?



Description:

Students will gain an appreciation for geometric design and an awareness of geometric design in nature and art. With tangrams they will create squares, rectangles, trapezoids and triangles from 7 smaller shapes. Students will learn that in zero to as much as 7 steps they can turn the numbers 1100 into palindromes. The English language can also be manipulated to create words and sentences that read the exact same forward and backwards. Critical thinking skills will be needed to solve a series of challenging puzzlers.

OPTION 3:

Topic: Building a Roller Coaster

Instructors: K. Delamar & J. Ulloa

Location: Room 319

STEM Focus: Science (Physics), Engineering (Design & Creation of Roller Coaster), & Mathematics (Formulas & Calculations)



Learning Goals/Objectives:

In teams, students will:

- use math and physics knowledge in order to design a roller coaster using cardstock, tape, scissors.
- learn how to collaborate with team members using 21st Century Skills.

Essential/Driving Question(s):

How do I build a roller coaster using science, engineering, and mathematics concepts?

How many pieces of track, loops, etc. will you need to build a sturdy coaster so that a marble can coast all the way down?

Description:

Students will gain an understanding of how the Science, Engineering and Math fields work together in the design and creation of a roller coaster. Students will have to apply the engineering design process to build a paper roller coaster. The roller coaster has to have engineering to make it sturdy and math to have the correct dimensions for the bases, tracks, and loops.

OPTION 4:

Topic: Legocy

Instructors: Christina Reynolds & Tamela Cornejo

Location: Room 701

STEM Focus: Science, Technology, Engineering

**Learning Goals/Objectives:**

- To learn terminology and basic skills of engineering and design
- Research engineering and design of buildings
- To further explore engineering applications of the principles and construction methods by inspecting, testing, modifying, and rebuilding. "

Essential/Driving Question(s):

- How can you incorporate the foundations of engineering and design to create your own building?
- What questions can you pose in order to better perfect your original design and/or assist others in their creation?
- What creative thinking skills can you utilize to have the most imaginative yet structurally sound building/structure? "

Description:

The Lego elective will help the students develop problem solving skills in the areas of Science, Technology, and Engineering while focusing on imagination, creative thinking, and 21st century critical thinking skills. They will incorporate Science, Technology, and Engineering as they research architecture and design and recreate their own designs with Legos.

OPTION 5:

Topic: Eco-Art

Instructors: Denise Bunker

Location: Room 810

STEM Focus: Science

**Learning Goals/Objectives:**

- Explain why the use of recycled and reused materials is better for the environment.
- Create at least one piece of art using natural materials.

- Create art pieces using recycled or reused materials.

Essential/Driving Question(s):

How can we reduce our carbon footprint? How can we reuse other people's trash to make something out of it?

Description:

The students will gain an understanding of how humans impact the environment. They will understand how they can reduce their carbon footprint. They will be able to recognize how they can use recycled and natural materials to create something new. They will create many pieces of artwork to display but they will also be able to present to an audience about what they used in their creations and why using those materials is a benefit to the environment.