

**MASCONOMET REGIONAL SCHOOL DISTRICT**  
**COURSE SYLLABUS: STEM YEAR: 2024-2025**

**COURSE NAME: STEM**  
**COURSE NUMBER: 4053401**

**DEPARTMENT: SCIENCE**  
**GRADE LEVEL: 8**

**TEACHER: MR. MALIO**  
**(978) 887 – 2323 extension 21340**  
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**I. COURSE DESCRIPTION:**

STEM is a trimester-long interdisciplinary exploratory for students in Grade 8. This project-based course is where students collaborate with partners to problem-solve the solutions to real-world problems on various design challenges. This project-based exploratory integrates the disciplines of Science, Technology, Engineering, and Math.

**II. CENTRAL OBJECTIVES:**

6<sup>th</sup>-8<sup>th</sup> Grade Technology/Engineering Learning Standards of the Massachusetts Science-Engineering and Technology Curriculum Frameworks covered.

**ETS1. Engineering Design**

- 6.MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution.
- 6.MS-ETS1-5(MA). Create visual representations of solutions to a design problem. Accurately interpret and apply scale and proportion to visual representations.
- 6.MS-ETS1-6(MA). Communicate a design solution to an intended user, including design features and limitations of the solution.
- 7.MS-ETS1-2. Evaluate competing solutions to a given design problem using a decision matrix to determine how well each meets the criteria and constraints of the problem.
- 7.MS-ETS1-4. Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.
- 7.MS-ETS1-7(MA). Construct a prototype of a solution to a given design problem.

**ETS2. Materials, Tools, and Manufacturing**

- 6.MS-ETS2-1(MA). Analyze and compare properties of metals, plastics, wood, and ceramics, including flexibility, ductility, hardness, thermal conductivity, electrical conductivity, and melting point.
- 6.MS-ETS2-2(MA). Given a design task, select appropriate materials based on specific properties needed in the construction of a solution.
- 6.MS-ETS2-3(MA). Choose and safely use appropriate measuring tools, hand tools, fasteners, and common hand-held power tools used to construct a prototype.
- 8.MS-ETS2-4(MA). Use informational text to illustrate that materials maintain their composition under various kinds of physical processing; however, some material properties may change if a process changes the particulate structure of a material.
- 8.MS-ETS2-5(MA). Present information that illustrates how a product can be created using basic processes in manufacturing systems, including forming, separating, conditioning, assembling, finishing, quality control, and safety. Compare the advantages and disadvantages of human vs. computer control of these processes.

### **ETS3. Technological Systems**

- 7.MS-ETS3-1(MA). Explain the function of a communication system and the role of its components, including a source, encoder, transmitter, receiver, decoder, and storage.
- 7.MS-ETS3-2(MA). Compare the benefits and drawbacks of different communication systems.
- 7.MS-ETS3-3(MA). Research and communicate information about how transportation systems are designed to move people and goods using a variety of vehicles and devices. Identify and describe subsystems of a transportation vehicle, including structural, propulsion, guidance, suspension, and control subsystems.
- 7.MS-ETS3-4(MA). Show how the components of a structural system work together to serve a structural function. Provide examples of physical structures and relate their design to their intended use.
- 7.MS-ETS3-5(MA). Use the concept of systems engineering to model inputs, processes, outputs, and feedback among components of a transportation, structural, or communication system.

**Scope and Sequence:** STEM students will participate in some of the following units

1. Flight
2. Building Bridges
3. CAD Drawing & 3D Printing Design Challenge
4. Catapults
5. Electric Cars
6. Communication Systems and Programming with Drones
7. Heat transfer Design Challenge using IR cameras
8. Plastic Waste Challenge

### **III. MAJOR ACTIVITIES:**

Coursework includes project-based design challenges, individual work, group work, discussions, presentations, demonstrations, and lab work. A unit of MCAS review and preparation will take place, in addition to ongoing preparation and practice throughout the school year.

### **IV. EXPECTATIONS:**

Respect yourself, your classmates, your teacher, and your learning environment. Behave appropriately and safely in the classroom and lab. Be on time to class, and prepared daily with the following items: your homework, binder, agenda book, a pen or pencil, and a calculator when needed. No cell phones, headphones, earbuds or data accessed on a smartwatch is allowed. When using classroom technology, students should only be accessing approved websites and online resources.

### **V. GRADING:**

Each assignment will be worth a certain number of points from the following categories:  
Classwork/Homework, Presentations, and Quizzes

Letter grades for the trimester will be earned based on a system of “total points”. Your average is calculated by dividing the number of points earned by the number of points possible and then multiplying that number by 100. Don’t worry, this is all calculated by PowerSchool!

**Classwork/ Homework Policy:**

Students will receive full credit for an assignment passed in during the current unit. Any work passed in after a completed unit can only receive up to ½ credit.

**Test/Quiz Retake Policy:**

Any student can retake any test or quiz by completing a Test/Quiz Correction form after school. Students can earn ½ credit for each corrected item.