

# **PIONEERS Co-Op**

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## **Overview of STEM I – Drafting with Projects** (Grades 9-12)

Tutor: TBD

**Required Text:** 

Practical Drafting: Applied Engineering Graphics Workbook by Melvin G. Peterman published by Insight Technical Education (ISBN-10: 0972205837)

Additional Requirement: Computer access to internet. (Khan Academy free online class.)

Prerequisite: STEM Jr. and teacher approval

Supplies: Drafting tools handed out in class

Lab Fee: \$5.00 each semester

Student Evaluation:	% of semester grade		90-100%	=A
Homework	50%		80-89%	=B
Group Presentation I	15%		70-79%	=C
Group Presentation II	15%		60-69%	=D
Test/Semester Exam	10%		Less than 6	50% =F
Participation	10%	l		

NOTE: This class fulfills all Michigan Merit graduation requirements for online learning. The details of this are included using nomenclature found in Michigan Merit graduation guidelines. One might want to include the page on one's transcript.

This is a hands-on class designed to represent real-world projects one might find in industry, especially in engineering. Science Technology Engineering Math (STEM) is found intertwined in every aspect of each planned project. Topics from Physics will be the basis for hands-on activities. Most projects will involve working as a team, public presentation of results, iteration of design ideas/achievement of specific goals. Although there is team involvement, each individual will be expected to complete all the work required.

Weekly homework assignments will include lessons (statistics) from Khan Academy, a free on-line learning site. Homework will also include skills practice in basic mechanical drawing and preparation for various group presentations. The semester exam will cover strictly drafting and mathematical concepts as found in the homework.

### Some of the Concepts to be Studied Include:

- Using drafting tools, letter, geometric shapes, sketch models, surface texture, perspective.
- Applied Statistics: Means, variation, histograms, scatter plots, outliers, correlation
- Designing good experiments (NOT necessarily one at a time changing of factors)

#### **Example Projects:**

- Paper Airplane Design 3-4 weeks •
- Egg Protection 2-3 weeks
- Factory Parts 3-4 weeks

## **Michigan Merit Curriculum**

2/15/23 rlj

\*Pioneers Co-op is a cell group of the PIONEERS Home Education Support Services, a 501C-3 non-profit educational ministry



**Grading Scale** 

=A=B=C=D

# **PIONEERS Co-Op**

Lead

The Way

PIONEERS

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### **Online Experience**

While the "Online Experience" Graduation Requirement can by met in many ways in a homeschool curriculum, Pioneers has taken deliberate steps ensuring the classes known as STEM Jr. and STEM I exceed the minimum of 20 hours of experiences across grades 6-12.

- Pioneers Co-op maintains website https://www.homeschool-life.com/mi/pioneerstss/. Students who take STEM Jr., STEM I and STEM II will use this as a mandatory resource for several of the Online Experiences including: using a Learning Management System, accessing Podcast/Videocast files, creating Educational Blogs. In the first semester of STEM Jr, students will write a weekly paragraph on Simple Machines, using word-processing software and uploading to the website. Later, graphs will be uploaded to the website. These graphs will be created with spreadsheet programs (for example, Excel or Google Sheets) using measurement data from hands-on projects in class. Paragraphs and graphs will combine to form an Electronic Portfolio for each student.
- Both STEM Jr. and STEM I have a minimum of two group projects each year which each include a Wiki
  Online Experience where all members collaborate online before presenting together in class using various
  software packages (for example, PowerPoint or Google Slides). All three STEM classes in the series will post
  assignments and grades to the website.
- Specific to the STEM I class, students will have basic statistics learning assignments at <u>www.khanacademy.org</u>. Besides being student-paced and available when students desire, these assignments provide web-based practice test taking and feedback. While it is a good Test Preparation Tool for the student, it also provides the tutor with excellent feedback on the individual student's learning progress. Additionally, in STEM I, students will view a Podcast on relevant topics and participate in an Educational Blog on the same topic along with the class tutor who may also be an expert in the subject matter. Individual students will also complete a project requiring a WebQuest as one aspect of the project. While STEM II will include these same online aspects, the subject matter will be different. The focus will be on Robotics and the learning assignments at <u>www.khanacademy.org</u> will include learning the JAVA computer programming language.

CLASS NAME	ONLINE EXPERIENCE	TIME ESTIMATE	
STEM Jr – Simple Machines	Utilize Learning Management System	1-5 hours	
	Wiki Online Experience	2-10 hours	
	Create Electronic Portfolio	10-20 hours	
	1 CLASS TOTAL	13-35 hours	
STEM I – Drafting with Projects	Utilize Learning Management System	1-5 hours	
	Wiki Online Experience	2-10 hours	
	WebQuest, Educational Blogs	2-10 hours	
	Accessing Podcasts/Videocasts	50-100 hours	
	Test Preparation Tool		
	2 CLASS TOTAL	68-160 hours	
STEM II – Robotics with Mindstorm	Utilize Learning Management System	1-5 hours	
	Wiki Online Experience	2-10 hours	
	WebQuest, Educational Blogs	2-10 hours	
	Accessing Podcasts/Videocasts	50-100 hours	
	Test Preparation Tool		
	3 CLASS TOTAL	123-285 hours	