

# Holy Trinity High School

## STEM Department

Course Title: STEM I

Length of Course: One year

Goal: This course will give students the opportunity to use project-based learning to explore various topics in the STEM field.

Objectives:

1. Students will be challenged to apply engineering design principles and creativity to address real world problems and issues.
2. Students will develop critical thinking skills as well as skills in communication and collaboration.
3. Students will demonstrate their work by competing in a variety of science and math competitions.
4. Students will meet with professionals in each field and be introduced to careers in STEM-related occupations.
5. Students will learn to program in JavaScript, HTML, CSS, and MIT App Inventor
6. Students will learn the necessary skills to write a Math Research Paper.

Course Content:

1. STEM Inventory
  - a. Create a Google Slides presentation on a STEM Career
2. Learn the Engineering Design Process
  - a. Egg Drop Design Challenge
  - b. Solar Oven Design Challenge
3. Robotics Unit
  - a. Assemble Robots
  - b. Complete tasks using Controller
4. Program Apps Unit
  - a. Using MIT App Inventor software, program an App for the cell phone to enter the Congressional App Challenge.
  - b. Create a 2-3 minute video that includes explaining the purpose of your App, how it was created, and a demonstration of how the App works.

5. JavaScript Unit
  - a. Learn how to program in JavaScript (Khan Academy)
  - b. Code a project in JavaScript that sets a scene, uses color and animation
6. 3D Print Unit
  - a. Use the tutorials to learn Tinkercad
  - b. Design a simple object to be printed
7. Bridge Building Unit
  - a. Learn about the engineering and physics involved in bridge building
  - b. Design and build a bridge to enter the Brookhaven Lab Bridge Building Competition
8. HTML/CSS Unit
  - a. Learn the coding languages HTML/CSS (Khan Academy)
  - b. Code a webpage using HTML/CSS
9. Writing a Math Research paper and Math Fair Project
  - a. Initiate the Research process -Brainstorming
  - b. Developing a Topic
  - c. Learn how to do research using online sources, journals, and databases
  - d. Use Noodle Tools to organize research, to create an outline, and to create index cards for sources, Works Cited
  - e. Write the Math Research Paper
  - f. Create a Google Slides presentation about the paper.
  - g. Practice Presenting the paper to peers and teachers.

#### Field Trips

- a. STEM Career Expo
- b. StonyBrook University STEM Institute
- c. Adelphi Women in STEM
- d. Nassau Community Y2M
- e. Cold Spring Harbor DNA Lab
- f. Brookhaven National Lab

#### Guest Speakers

- g. Alumni STEM professionals
- h. Skype A Scientist

#### Competitions

- a. Congressional App Challenge
- b. Nassau Y2M
- c. Long Island Math Fair

