

*Unit topics, activities, and projects may change without notice.

Unit 1:

Problem Solving Process with the Launch Cycle

- Team Building, classroom environment, expectations
- Good Habits of Mind: Creative, Critical, & Self Regulated Thinking
- Engineering Problem Solving with the Launch Cycle
- Guest Speaker, Nancy Peters- Co-Innovator of the Mag Zip
- Makey Makey Kit
- Makey Me an Instrument DBC
- Hand tools use and safe practice: String puzzle
- Systems and subsystems
- Invention vs Innovation

Unit 2:

Engineering Design

- Form Follows Function
- Intro to design
- Geometric Language & Alphabet of Lines
- Sketching
- Intro to Orthographic Projection & Isometric Drawings
- Accuracy vs Precision
- Measurement

- Gumdrop dome
- Strength in triangles, dissipate and transfer load
- Spaghetti Cantilever DBC
- Forces, Loads, and Materials Science Basics
- Truss, tension & compression
- Prove Mathematically that a shape is stable
- Cantilever DBC
- Draw to scale on 1/8 graph paper, build with balsa
- Gusset plates
- Field Trip: Darwin Martin House and City of Buffalo Architectural Tour

- Guest speaker (CAD & rebar applications)
- Inventor (basics, sketch, extrusion, revolve, assembly, drawing)
- Transformations (Reflection, Rotation, Translation, Dilation)
- Skimmer Car (Physics, forces, flight)
- Design Wall hanging
- Woodworking and machine safety (drill press, band saw, scroll saw, and sanders)
- Finishing (sanding, clear coat, paint, woodburning)

Unit 3:

Computer Programming

- Scratch.mit.edu
- Debugging a program
- Pseudo code, scripts with drag and drop, events, control, sensing, data, operators
- Create animations
- Create games.
- Design controller for one game with makey makey
- Critique groups "THINK"

Unit 4:

Robotics

- Scribble bot: 4 part of a circuit (source, load, conductors, control)
- Moss Robotic kits
- Inputs (data in), Outputs (data out), Power, pass through
- Program with scratch

Unit 6:

Electronics

- Atomic structure and electromagnetic force
- Create a dance pad with 4 parts of a complete circuit
- DC vs AC current
- Reading a resistor
- Mr. Circuit Labs with solderless breadboard: LED, resistor, potentiometer, photocell, capacitor, diode, transistor, speaker, integrated circuit
- Schematic symbols
- Electric toy/flashlight DBC
- Soldering
- Etching circuit board
- Nano Technology and Micro Electronics

20% Genius Hour Project: This project will be introduced during the 2nd half of the school year.

- Master - Practice a skill.
- Create - Use your imagination.
- Learn - Gain knowledge about something.
- Innovate - Solve a problem.
- Produce - Make something.
- Serve - Do any of the above for someone else!