


## Engineering YAG

	Unit of Study	Key Components	Assessment/Task	Notes
<b>1st 9 Weeks</b>	<u>UNIT 1</u> : WHAT IS ENGINEERING?	<p>Engineering defined  Role of engineers  History of Engineering Page  Engineering Design Process  Engineering Notebooks/Google Site  Brainstorming</p> <p>Vent hood demonstration?</p>	Research an engineer and find a more efficient way to do what they did. Tweak it somehow. - more efficient or more variables	<p>No Phones: what would we use to document?</p> <p>Foil Boat? - build a boat keep adding coin - whoever stays afloat the longest with the most coins (small, sturdy boat) bigger doesn't always mean better</p> <p>Paper structures - building one that is 6 in tall and can still hold book (only construction paper and tape)</p> <ul style="list-style-type: none"> <li>- Limit paper - how many?</li> <li>- Do smaller with notecards (no tape) Lvl 2 challenge</li> </ul>
<b>1st 9 Weeks</b>	<u>UNIT 2</u> : RESEARCH, DRAWING AND MODELING	<p>Sketching  Researching ideas  Selecting the best approach  Engineering drawings  Industry guidelines  Modeling, Testing and Final product  Engineering economics  3D Printing  CAD - assembly</p>	<p><b>SITUATION:</b> You are an ancient Greek warrior and you are the head engineer in your village. The village is worried that they are not adequately prepared for the upcoming battles with the Persian army. The villagers have come to you to help design a new catapult that is capable of completely annihilating the Persians.</p> <p><b>PRODUCT:</b> 3D print a catapult. Designs will be tested for structural stability, aesthetics, and height. You will present your completed project in the form of a Google Slides presentation to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebooks. Scholars must fully justify changes made to the chosen design and plan.</p>	<p>3D print a segment of a marble wall</p> <p>Make something to solve an issue</p> <p>Marble accelerates as it goes down - so a piece could work at the top but not the bottom</p> <p>Practice Replicating in CAD - design in CAD - make it into a drawing where it's all on a piece of paper - then tell them to create it in CAD. **must have the dimensions necessary Random dimensions prevent cheating</p>

<b>2nd 9 Weeks</b>	<b>UNIT 3:</b> ELECTRICITY, MATERIALS AND CIVIL ENGINEERING	Electrical engineering principles Flow of Electrons in a battery Principles of Materials Material engineering applications Civil engineering principles Civil engineering applications Understanding the role of engineers	<p><b>SITUATION:</b> In recent news an earthquake has struck Mount Kinabalu in Malaysia, killing several people and destroying major towers in the nearby city. Your team of top civil engineers were hired to set the new world record for the tallest, sturdiest and best-looking earthquake tower. The tower should also be strong enough to withstand the most destructive earthquakes on earth.</p> <p><b>PRODUCT:</b> You will build an earthquake proof tower made entirely of balsa wood and glue. Designs will be tested for structural stability, aesthetics, and height. You will present your completed project in the form of a PowerPoint presentation to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebooks</p>	<p><b>SNAP CIRCUITS!!</b>          Popsicle Stick Truss Bridge - put bricks under it and see how many books it can hold</p>  <p>Cable Bridges -          Why do Bridges have structural problems?          Why did all the water pipes freeze over last year?</p> <p>Cardboard</p>
<b>3rd 9 Weeks</b>	<b>UNIT 4:</b> MECHANICAL ENGINEERING AND ROBOTS	Principles of mechanical engineering Mechanical power systems Mechanical power principles and formulas Mechanical engineering applications Introduction to robotics Building the VEX Clawbot Programming the VEX  <a href="#">VEX SENSORS</a>	<p><b>SITUATION:</b> The Shanghai Maglev Train, also known as the Transrapid, is the fastest commercial train currently in operation and has a top speed of 430 km/h (270 mph). The line was designed to connect Shanghai Pudong International Airport and the outskirts of central Pudong, Shanghai. It covers a distance of 30.5 kilometers in 8 minutes. They have tasked you with developing ideas for a newer faster model.</p> <p><b>PRODUCT:</b> Your challenge is to set the new world record by designing a maglev vehicle that will travel down an inclined track at the fastest rate possible. You will create this vehicle to demonstrate the impact of scientific and technological advances on society and on the environment.</p>	<p><b>Start w simple machines</b></p> <p><b>Mouse Trap Car</b></p> <p><b>Then move to VEX</b></p>

<b>3rd 9 Weeks</b>	<b>UNIT 5:</b> AERODYNAMICS AND MANUFACTURING ENGINEERING	Aerospace engineering principles Aerospace engineering applications Chemical engineering principles Characteristics and measurements Chemical engineering applications Chemical engineering in action  *Another option: Formula 1 cars?	<b>SITUATION:</b> A land developer has purchased 100 acres of land in San Francisco, California and has contracted your engineering team to build a wind farm that can produce the greatest amount of electricity. Your challenge is to brainstorm a turbine blade that will produce the greatest amount of voltage. The developer would like you and your team to come up with a design and working model within 3 days <b>PRODUCT:</b> Using the design cycle and research skills you will find the best design for a wind turbine blade. Your design will be tested for structural stability, aesthetics, and greatest amount of voltage produced. You will present your completed project to include each step of the design process and pictures of the construction and completed project which will be documented each day in your engineering notebook	Set off Rockets either in chemical or in aerospace  <a href="#">Paper Airplanes</a> - <a href="https://www.exploratorium.edu/exploring/paper/airplanes.html">https://www.exploratorium.edu/exploring/paper/airplanes.html</a>
<b>4th 9 Weeks</b>	<b>UNIT 6:</b> CHEMICAL ENGINEERING AND ENGINEERING AS A PROFESSION	Engineering as a profession Functions of engineers Engineering impacts Future of engineering	<b>SITUATION:</b> You are a chemical engineer working with a team of environmental engineers to propose a solution to global recycling. You need to find specific products that can be recycled to create new products that can help and enhance our environment. <b>PRODUCT:</b> Scholars will investigate the specialty of a chemical engineer. From this research, they identify a product that could be recycled and propose a new use for this product. For example, tires are shredded and reused in playgrounds as cushion for children so they are not injured	How do other countries recycle? Taiwan?  Composting!  Worms!