

Welcome to the CCA S.T.E.M. Program!

Hi, I'm Mr. Josh, S.T.E.M. instructor at Cornerstone Christian Academy. I am also a recent college graduate with a bachelor's degree in creative writing. Yes, you read that correctly. I am a science fiction writer teaching a S.T.E.M. class. My degree concentration may be in the arts and humanities, but my area of study extends far beyond the creative arts. I have had a passion for science and engineering my whole life and have been working with audio and video hardware/software since the age of twelve. More recently, I tutored in k-12 and college math for almost three years and have been doing IT work at CCA for the past three years. I hope to share my passion for learning and provide students with a creative environment that facilitates curiosity and discovery. You can reach me at classroomtechcca@gmail.com.

But enough about me; here is an overview of what the S.T.E.M. Program has to offer.

The S.T.E.M. Program

Science

My goal for the S.T.E.M. Program at CCA is to create a learning environment where students feel like they are exploring the class material instead of just learning it. For science, I do not focus on memorization of terms or formulas; I encourage the application of the scientific method. Learning to take a scientific approach to problems will benefit students, not only in the S.T.E.M. fields, but in all areas of academic study.

Technology

Technology is increasingly becoming more essential to all other industries. Even education and everyday life rely more and more on technology. Because of this, I incorporate technology into the class as much as possible. I want to give students a head start in becoming familiar with how to interact with technology, how that technology works, and where that technology can be applied to benefit individuals and our communities.

Engineering

An engineer is a person who designs, builds, or maintains something. While that is a very simplified definition, I believe it is a good start to understanding what an engineer does and how to think like an engineer. If the scientific method answers questions, engineering takes the answers and applies them in a useful way. Like with science, my goal is to get students thinking like engineers in all aspects of life and learning.

Math

Many people find math too difficult or confusing, but in my classroom, these are not valid opinions. If almost three years of tutoring math in both k-12 and college levels has taught me anything, it's that anyone can understand the basic principles of mathematics. I will be focusing less on math than the other areas of S.T.E.M. because students enrolled at CCA already have math as a subject. That being said, math is the backbone of science, technology, and engineering, so students will be using math throughout the class whether they realize it or not.

Resources We Will Be Using

1. Robotics
 - Designing, building, and programming robots is a great way to practice all four areas of S.T.E.M. at the same time
 - LEGO Boost is a robotics kit designed especially for children who are new to robotics and will be used for the second grade class
 - LEGO Mindstorms is a more advanced robotics kit that will be used in our third grade class

2. Minecraft
 - Minecraft is one of the most popular games in the world and has several educational applications
 - Minecraft has an in-game logic system that puts binary code into a visual representation making it ideal for demonstrating the basic principles of computer operation, commands, and logic
 - Minecraft also has a built-in programming language that allows players to code games, puzzles, and even functioning computers within the game itself

3. Neocities.org
 - Neocities is an html-based website host that students in the coding class will use to build their own website
 - I have built a website for the S.T.E.M. program (using neocities) that I will be updating with pictures of the projects students are working on as well as helpful resources for students to use both in and out of class

4. Tablets/computers
 - We will be accessing all of the resources listed above with tablets and computers. We do have a limited number of computers and tablets, so I encourage students to bring their own tablets or smart phones if they have them
 - The mobile apps we will be using in the classes are available on the Apple App Store and Google Play Store.
 - Minecraft - \$6.99
 - Lego Mindstorms Robot Inventor - free
 - Kahoot! Play & Create Quizzes

This Year's S.T.E.M. Classes

Grade Levels	First Session – 12 Weeks	Second Session – 12 Weeks
<p>Kindergarten/First Grade <i>\$60 (\$40 for sibling) per session</i></p> <p>The kindergarten and first grade classes are essentially the same class; however, in all of the STEM classes I teach, I ensure that the curriculum and pace is tailored to each individual class. This means that, despite being the same material, the kindergarten class might not keep pace with or cover everything that the first grade class does. It is also possible that we move through the course quicker than I have anticipated, and I have made plans to add extra lessons to fill time if needed.</p> <p>We also review concepts throughout the courses and reserve the final class session for a STEM fun day where we revisit several of the fun activities and experiments from the previous weeks!</p>	<p>STEM Part 1: Learning Science, Engineering, and Technology with Shapes <i>30-45 minutes per week</i></p> <p>Shapes like squares, circles, triangles, and even shapes we've never heard of can be found everywhere in the world around us, but what makes those shapes so important? Why are wheels round? What shapes make planes fly or boats float? And what are these shapes made out of?</p> <p>In this 12 week class, students will discover the answer to all of these questions and more as we explore physics concepts such as gravity, weight, stability, aerodynamics, friction, inertia, and buoyancy. As we learn these concepts, we will look at examples of how scientists and engineers use them to design and build technology and, of course, how we use them in our everyday lives.</p>	<p>STEM Part 2: Learning Robotics, Design, Programming, and the Scientific Method <i>30-45 minutes per week</i></p> <p>When God created us, he gave us all curious and creative minds to explore the world around us and use what we learn to create new technology. Even before words like science and technology were invented, people have been using the scientific method to solve problems just like we do every day.</p> <p>In this 12 week class, we will build on the physics concepts from the previous class and learn how scientists discovered those concepts, how they have been applied to robotics, and how we can use robotics and programming to solve problems. We will also explore ways we can use the scientific method and simple machines in our everyday lives.</p>
<p>Second/Third Grade <i>\$65 (\$45 for sibling) per session</i></p> <p>In all of the STEM classes I teach, I go at the students' pace to ensure that everyone in the classes learns the material. A big component of the Second and Third Grade classes is working in teams to complete activities and projects. In engineering (and many other fields) working on a team and combining different skills and experiences is vital to completing projects with</p>	<p>Engineering Class: <i>45 minutes per week</i></p> <p>Engineering is a broad term that describes many different applications of both science and technology. Engineers are responsible for designing, building, and maintaining everything from machinery and architectural structures to computers and digital devices.</p> <p>In this class, we will explore the engineering process through several projects and activities.</p>	<p>Robotics Class: <i>45 minutes per week</i></p> <p>Many aspects of robotics fall under the umbrella of engineering. The difference between the robotics and engineering classes is automation. In robotics, it is not enough to just build a machine; engineers need to think like robots in order to create the detailed step-by-step instructions a robot needs to function properly.</p>

<p>efficiency and quality. This is why I emphasize teamwork skills in the upper-level classes.</p> <p>We also review concepts throughout the courses and reserve the final class session for a STEM fun day where we revisit several of the fun activities and experiments from the previous weeks!</p>	<p>Students will build strong bridges, design fast cars, troubleshoot the hardware of mobile devices, and more. We will also learn about the scientific method and the physics concepts engineers rely on to complete their projects successfully.</p>	<p>To develop these skills, students will build and program LEGO Boost and LEGO Mindstorms robots while practicing the engineering concepts learned in the previous class and adding to them mechanical advantage, the application of simple machines in robotics, and programming.</p>
<p>Fourth/Fifth Grade: <i>\$75 (\$65 for sibling) per session</i></p> <p>Last year, I wanted to try a new, more advanced class that focused less on science and math concepts the upper grade levels were already learning in their regular classes and instead introduced students to computers, coding, game design, and the ever-increasing concern of parents around the world: online safety. The coding class was a huge success, so we're bringing it back again this year!</p> <p>Instead of individual lessons on different STEM topics each week, the coding class lessons are structured around a single project that students will work on throughout the courses. The final class session of the courses is reserved as an extra day to complete projects and, if this extra time is not needed, will instead be a time to program and play with our LEGO Mindstorms robots.</p>	<p>Coding Class: <i>1 hour per week</i></p> <p>The focus of this class is primarily on computer software. As more and more of our day to day lives has been moving online, computer proficiency is an important skill to begin developing early on and coding a skill that will only increase in demand for the foreseeable future.</p> <p>We will start by covering the basics of computing starting with binary calculations, using web browsers, and online safety, then transition into the basic parts of a website and coding languages. Students will then use this knowledge to begin building their own website about their favorite animal. Each student will be provided with a subdomain from Neocities.org, a website that offers free tools and tutorials for building a website using html (this is also the resource I used to build the CCA Stem website).</p>	<p>Game Design Class: <i>1 hour per week</i></p> <p>The gaming industry is huge, and as video games are becoming more and more mainstream, there will always be a high demand for game designers. Game design requires a collection of several skills including coding, writing, game balancing, and graphic design.</p> <p>This class will focus on the coding, game balancing, and visual design elements of game design as students build their own minigame within another game: Minecraft. Minecraft has an in-game logic system that puts binary code into a visual representation making it ideal for demonstrating the basic principles of computer operation. Minecraft also has a built-in programming language that allows players to code games and puzzles within the game itself</p>
<p>Aftercare STEM STEM Labs <i>6-8 Years \$75 (\$55 for siblings)</i> <i>9+ Years \$85 (65 for siblings)</i> CCA Students also enrolled in STEM Classes \$30</p>	<p>6-8 Year Old STEM Lab: Science, Robotics, and Engineering Part 1 <i>Fridays – 4:30-5:30</i> <i>October 5 – February 1</i></p>	<p>6-8 Year Old STEM Lab: Science, Robotics, and Engineering Part 2 <i>Tuesdays – 4:30-5:30</i> <i>February 8 – May 23</i></p>

<p>The STEM Lab is the perfect place for students to explore STEM topics in a fun engaging, and hands on way that is not possible in a more traditional classroom setting. the learning in the STEM Lab is student centered. I largely leave it up to individual members of the STEM Lab to decide what and how much they want to learn, whether that is choosing the next week's activity or asking questions. If a student wants a more in-depth explanation on friction, I give it to them, but if another student would rather just observe friction by rolling a car on different surfaces, that's fine too. Everyone explores and learns in their own way.</p> <p>The STEM Lab only gives students the basic concepts needed for the weekly activities as opposed to the more comprehensive lessons in the STEM classes we offer CCA students; however, the extra time allows for more projects and activities that are not covered in the STEM classes. This makes the STEM Lab a perfect supplement to the STEM classes for students who want to further apply what they have learned in the STEM classes. Of course, the STEM Lab is also perfect for students with little or no experience in STEM too. I always encourage older or more experienced students to help out the younger or less experienced students, and I make sure to bring students up to speed on topics they haven't yet learned (or just forgot) as needed.</p>	<p>The first session of STEM Labs will primarily cover robotics, programming, and simple machines. Most of the robotics and programming activities will be done in groups of three to four students working collaboratively, but there will be a few solo activities as well. It is encouraged that students bring their tablets or phones with the LEGO Boost app downloaded from their device's app store.</p> <p>The STEM Lab will begin with a brief 15-minute discussion and demonstration of the weekly activity. The next half hour is designated as time to complete the activity and experiment with the concepts discussed at the beginning. The final 15 minutes will be reserved for cleaning up, reviewing what we learned, and asking questions.</p> <p>9+ STEM Lab: Science, Robotics, Engineering, and Design Part 1 <i>Tuesdays – 4:30-5:30</i> <i>October 8 – February 4</i></p> <p>The first session of STEM Labs will primarily cover robotics, programming, and simple machines. Most of the robotics and programming activities will be done in groups of three to four students working collaboratively, but there will be a few solo activities as well. It is encouraged that students bring their tablets, phones, or laptops with the LEGO Mindstorms Robot Inventor app downloaded from their device's app store.</p>	<p>The second session of STEM Labs will cover the scientific method, basic physics, and technology. Several activities will be done in groups of two or three, but a few will be done individually or in larger groups. I have not yet decided if we will use Minecraft in the STEM Lab, but I will have a better idea of the second session's schedule as we get closer to February.</p> <p>The STEM Lab will begin with a brief 15-minute discussion and demonstration of the weekly activity. The next half hour is designated as time to complete the activity and experiment with the concepts discussed at the beginning. The final 15 minutes will be reserved for cleaning up, reviewing what we learned, and asking questions.</p> <p>9+ STEM Lab: Science, Robotics, Engineering, and Design Part 2 <i>Fridays – 4:30-5:30</i> <i>February 8 – May 27</i></p> <p>The second session of STEM Labs will cover the scientific method, basic physics, and technology. Several activities will be done in groups of two or three, but a few will be done individually or in larger groups. I have not yet decided if we will use Minecraft in the STEM Lab, but I will have a better idea of the second session's schedule as we get closer to February.</p> <p>The STEM Lab will begin with a brief 15-minute discussion and demonstration of the weekly activity. The next half hour is designated as time to complete</p>
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