INSPIRE. DESIGN. CREATE.
CULTIVATING FUTURE INNOVATORS
According to The TIME Education Summit panel on Basic and Applied Research, 20% of undergrads in China graduate in a STEM field. In Europe, it is 11%. In the U.S., it is only 4.4%. The National Science Foundation reports that the current K-12 STEM pipeline is not producing enough STEM professionals to fill the more than 1 million vacant STEM jobs in the US. We’re falling behind the rest of the world in terms of innovation, and the U.S. is losing jobs as companies are being forced to hire overseas workers for STEM projects.

Only 21% of US students pursue a STEM degree. Of those students, 79% do not graduate in a STEM field. Poor scientific literacy among college students is one reason students pursuing science and math are less likely to graduate from those programs. High school graduates aren’t prepared for the strain that these fields require for success. They lack in STEM knowledge and resilience. This is a significant dilemma in our country today and in our schools.
STEM is more than just science and mathematics; it’s a method of learning. We want to teach students to work hard, endure struggle, fail, and try again. This is the definition of STEM resilience and the key to seeing children reach their full potential.

The solution to this growing dilemma is to train kids with 21st century skills using the new model of education.

- Student Centered Learning Approach (as opposed to lecture–teacher in front, reading from a text book)
- Dynamic Learning Environment
- Engaging and Relevant Curriculum

We need to cultivate the next generation of scientists, engineers, and technologists who will solve the challenges and problems of the 21st century.

We can achieve this by an integrated STEM influenced curriculum that employs project/problem-based strategies engaging students in a dynamic learning environment and teaching through identifying problems, building prototypes, and testing solutions. This learning approach develops critical skills in problem-solving, teamwork, time management, communication, and leadership required to thrive in the 21st century.

The Florida Conference is comprised of 30 schools. We will introduce STEM concepts and curriculum into each one.

Our mission is to develop STEM competencies within all of our Adventist schools. By creating the vision and developing these STEM competencies within each student, we give them the tools to successfully pursue an academic STEM career.
Robert Henley and his wife were shocked. It was during their final parent teacher conference that, instead of the good report they were expecting to hear about their lively and cheerful 2nd grader, the teacher explained that their son was disruptive and couldn’t sit still in class. Robert, having earned a Master’s Degree in Education from Andrews University, and his wife, a physician, were both very familiar with ADD. However, they never imagined it was something that would affect their family.

Robert attempted to help his son in many different ways. He taught him strategies and techniques to help him stay focused in school. They eventually resorted to medication to address the issue. Due to the negative side effects of the medicine, they decided to discontinue its use. It was then that Robert saw his son’s self-confidence decline. The young boy doubted his intelligence and began to use his ADHD label as an excuse for his behavior. Robert had reached his limit.

The following year, Robert was introduced to FIRST® and the Adventist Robotics League. “I realized that this could be a solution to my son’s problem. Robotics would provide him with the environment to engage his learning profile.” Robert started a Robotics program at the school, and the impact was immediate.

“He was given the freedom to tinker and learn. His self-confidence soared, and his grades and his behavior improved. He began to feel like he was smart.”

Today, Robert’s son is a senior at Forest Lake Academy with a 4.2 GPA. He plans to attend Oakwood University and pursue a degree in engineering and math. Through the Robotics program Robert’s son was given the opportunity to shine and learned that God has great plans for his life.
Research by the World Economic Forum estimates that 65% of children entering primary school will find themselves in occupations that today do not yet exist.
STEM curriculum is typically not offered until high school, but by that time, it may be too late. STEM concepts should be introduced during the elementary ages to foster an interest in science and build confidence. These young students thrive doing hands-on activities and have a natural interest and curiosity in exploring how things work.

Our goal is to establish a STEM influenced program at each Florida Conference elementary school.

FIRST® LEGO® League Jr. is a non-competitive robotics program designed for children ages six to ten. FIRST® captures young curiosity by allowing children to explore real-world scientific challenges, learn teamwork, and work with motorized LEGO® Elements.

Guided by two or more adult coaches, teams explore a real-world scientific problem such as food safety, recycling and energy. Then they create a "Show Me" poster that illustrates their journey of discovery and introduces their team.

They also construct a motorized model of what they learned using LEGO® Elements. In the process, teams learn about teamwork, the wonders of science and technology, and the FIRST® LEGO® League Jr. Core Values, which include respect, sharing, and critical thinking.
We want to give all children, regardless of gender or background, a chance at excelling in a STEM field.
Robotics is an interdisciplinary branch of engineering and science that includes mechanical engineering, electrical engineering, computer science, industrial design (art), artificial intelligence, biomechatronics, computer aided design, and others.

Our goal is to establish a Robotics and Innovation program at each middle school by introducing the FIRST® LEGO® League Challenge. This program is designed for 4th-8th grade students who research a real world engineering challenge, develop a solution, and compete in a robot game with LEGO® based robots of their own design.

Each year a new theme is introduced, and the teams do extensive research for real-world problems. Some of these themes have included climate control, waste and recycling, energy consumption, and fresh water. Then, they create an innovative solution for that problem, either by creating something that doesn’t exist or building upon something which does exist.

In the robot game, teams design, build, program, and test autonomous robots using LEGO® MINDSTORMS® Technology. The robots are designed and programmed by student team members to perform a series of missions during 2½-minute matches. The robot game playing field reflects the real-world theme for the current season.

Minorities make up less than 5% of the STEM based workforce according to the U.S. Dept of Labor 2012 Statistics. Unlike their more affluent counterparts, students who live in underserved communities typically lack access to what are now considered STEM basics: up-to-date laboratories, laptop or tablet computers, and access to the Internet.
According to the U.S. Department of Education, only 16 percent of high school seniors are proficient in math and science and interested in a STEM career. It is more important than ever to equip our youth to solve problems, research, and become innovators to solve the problems that face our world.

Our goal is to establish a computer science and engineering department at every high school. Our schools would have access to their very own “Innovation Lab”, where they can experience hands-on learning and have the ability to create and design. The Innovation Lab would include:

- Laptop/Computer
- Lazer Cutter
- 3D Printer

They would also have the opportunity to participate in the FIRST® Tech Challenge: to design, build, and program a robot to play a floor game against other teams’ creations. Guided by adult coaches and mentors, students develop STEM skills and practice engineering principles, like keeping an engineering notebook while realizing the value of hard work, innovation, and sharing ideas. Some of the tools and software the students will work with include:

- Java
- Android Studio
- Autodesk Inventor
- Android Phones
- Robot Kit
- Maker Space
SUCCESS STORIES

Forest Lake Academy (FLA) Robotics and Innovation Lab is an impressive example of what a student can accomplish when given the proper environment and equipment.

ROBOTIC HAND PROJECT

The students of FLA have embarked upon an ambitious project to transform lives. They are developing 3D printed hands to provide to children in Central Florida that suffer from congenital amputation, a disorder in which young people are born without an arm or hand. A professionally made prosthetic can cost between $6,000 and $11,000. Many families are not willing to purchase a prosthetic knowing that their child will quickly grow out of it; and, of course, there are thousands of families who are not able to afford it at all.

FLA has partnered with E-Nable, a non-profit organization that designs and 3D prints hands for children that suffer from congenital amputation. As a partner of E-Nable, FLA will 3D print, assemble, and distribute the assistive device to children of need in Central Florida. The cost to 3D print and assemble the device is $35.
Robert Henley has been very successful in implementing extraordinary STEM programs at both Forest Lake Academy and Forest Lake Education Center. These schools will model what our initiative will look like in other Florida Conference schools.

Forest Lake Education Center (FLEC) is a K-8 school that precedes FLA. This school is an example of how introducing STEM concepts at an early age equips students with a love for subjects that have the reputation of being “too hard”. STEM curriculum is provided to students beginning in Kindergarten.

ROBOTICS AND INNOVATION ACADEMY

Robert established the Robotics and Innovation Academy at FLEC in 2012 by introducing the FIRST® LEGO® League curriculum. Since then, FLEC has had tremendous success with their Robotics program and has many achievements in the FIRST® LEGO® League Challenge.

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<tr>
<th>Year</th>
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<td>2012-13</td>
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WE WANT TO BRING THIS TYPE OF LEARNING TO ALL OF OUR FLORIDA CONFERENCE SCHOOLS.
Our purpose is to ensure that all students have access to high-quality learning opportunities in STEM subjects. We want to create critical thinkers, increase math and science literacy, and aid in producing the next generation of innovators. The Florida Conference will support teachers in providing students with these learning opportunities by providing the necessary funding and also the proper teacher training.

THE PLAN

WE WILL RAISE $300,000 TO FUND EACH SCHOOL WITH:

TEACHER TRAINING

Equipping teachers to properly understand and teach STEM concepts is a vital part of this project. We will help teachers understand the foundation of STEM learning and empower them with project-based learning techniques. We will offer a yearly training, along with continuing education, that will include:

- How to get your school started in STEM
- Introducing the FIRST® program and integrating it into multiple subject areas
- Project Based Learning Strategies for STEM
- Technical training in Robot Design and Computer Aided Design (CAD) Software

ROBOTICS PROGRAM

We will equip schools with the items and curriculum needed to teach a Robotics class or afterschool club. Items include:

- Robot equipment starter kit
- Laptop
- Software: LEGO® MINDSTORMS® Technology
- Circuit boards

ROBOTICS AND INNOVATION LAB (HIGH SCHOOL)

We will provide a workspace that enables students to explore and create by providing them with the necessary materials and equipment. These will be available for high schools and middle schools who have grown and advanced their STEM program.

- Laptop/Computer
- Lazer Cutter
- 3D Printer

VIRTUAL STEM SCHOOL

Virtual classes will be offered to students and teachers to incorporate into their science and STEM classes. Classes would include:

- Robotics/Computer Science
- Computer Aided Design (CAD)
- Game Programming and Design
- Web Programming/Development
- Film
- App Development

STEM FESTIVAL

A yearly science fair will give students an opportunity to exhibit their interests and talents in many different fields including:

- App Development
- Computer Science and Engineering
- Computer Aided Design (CAD)
- Game Coding and Simulation
- Film
WILL YOU HELP?

With your partnership and support we can have a profound impact on the lives of many students. We can open a door that leads to new and exciting opportunities some might never have had in this new highly technological society.

YOU CAN BE A PART OF CULTIVATING A FUTURE INNOVATOR

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