



Learning Through Fun Super Summer STEM Camp

Overcoming the mental obstacles for pursuing future careers
in STEM fields

Krista McWilliams July 27th, 2018

Agenda



- Summary and Mission of Super Summer STEM Camp
- KLM Bio
- Program Overview
- How does it work?
- Invisible Barriers – My Story
- Why it matters
- Conclusion



Summary and Mission

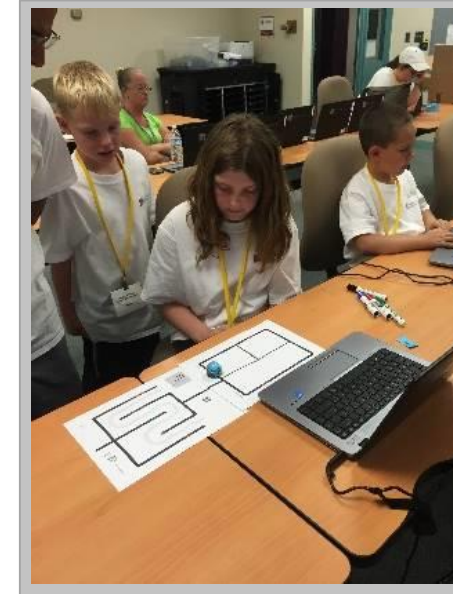


● Summary

- Seven weeks of learning and fun in the summer months for kids from all over the Four Corners.
- Designed for kids ages 6-11.
- Located at San Juan College in Farmington, NM.
- Taught by teachers with science, technology, engineering and mathematics (STEM) core competencies.

● Mission

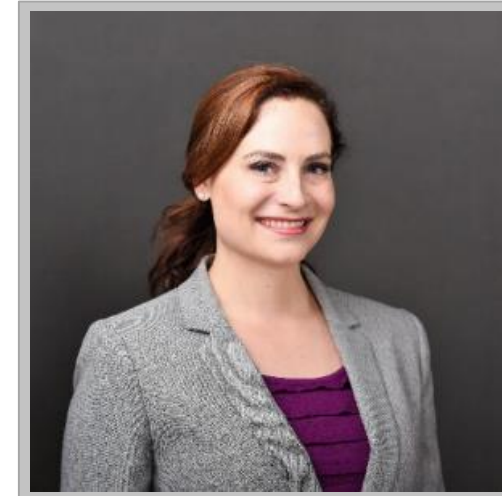
- To provide high quality programming in STEM fields, combining learning and fun.
- STEM Enrichment: Concepts are explored via hands-on creative problem solving activities where children are inspired to be curious about their world and are prepared for the future.
- 21st Century Skills: Working in teams, children are presented with real-world challenges that promote the direct application of critical-thinking and communication skills demanded by colleges, careers and citizenship in the 21st Century.



Krista McWilliams Bio



- Founder of Super Summer STEM Camp
- Engineering Manager – Logos Resources
- Founder and President of Diamond Derrick Consulting
- Senior Petroleum Engineer for Burlington Resources/ConocoPhillips
- Bachelor of Science in Mechanical Engineering with Highest Honors from the New Mexico Institute of Mining and Technology (New Mexico Tech)
 - First generation college graduate
- Other Activities
 - New Mexico Natural History Foundation Board member - current
 - Four Corners Economic Development Center Board member - current
 - Leadership San Juan Graduate - May 2017
 - Created San Juan College High School Leadership Development Curriculum – 2017
 - Mother and wife
 - My children attend Super Summer STEM Camp



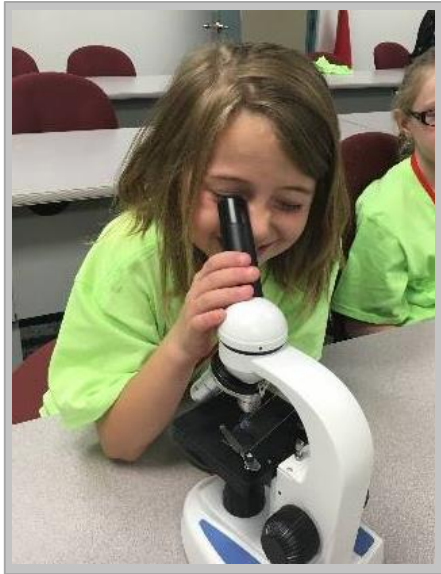
Program Overview



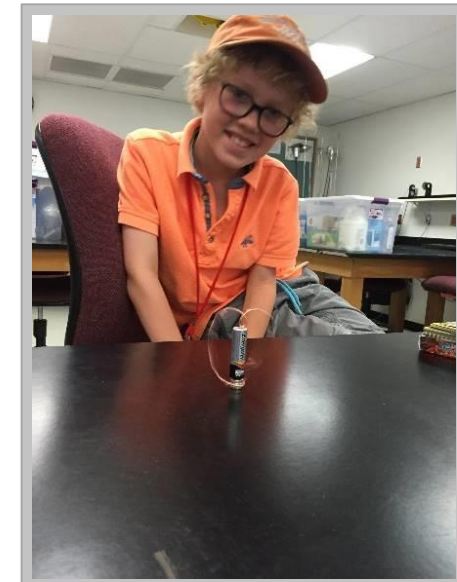
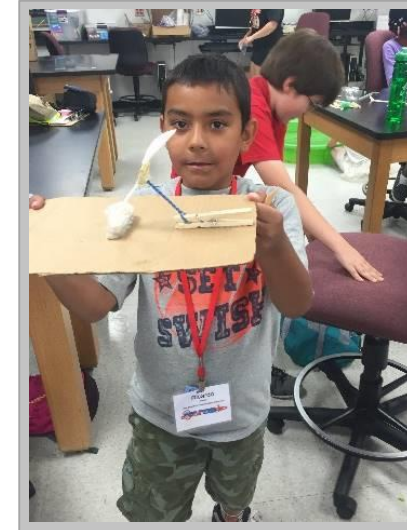
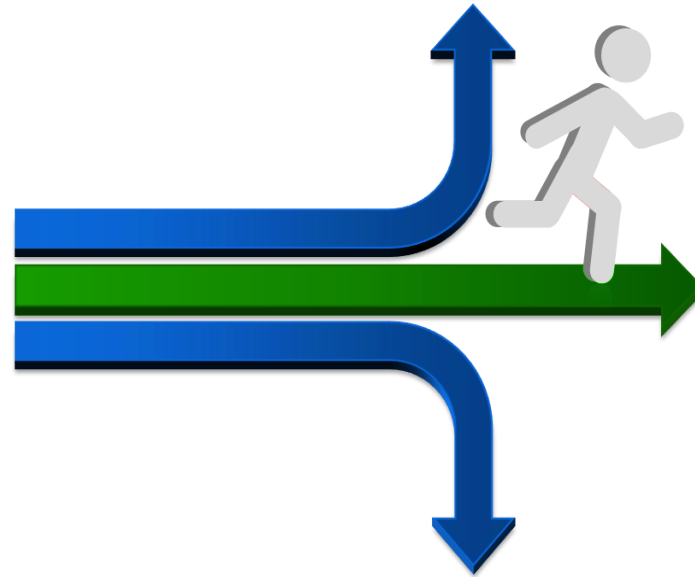
- **Designed for kids ages 6-11 to ignite imaginations in a high-energy, immersive environment that blurs the lines between learning and fun in the fields of STEM.**
- **7 weeks of fun in the summer months**
 - Completely customizable to take all seven weeks or just one
 - Exciting new content material every week
- **Significant growth since starting SSSC in my backyard in 2015**
 - Started with 10 kids and one week in 2015
 - Now we average 30-32 students a week and 171-223 students per summer
 - 40-51% returning campers from previous year
 - Increase from 39% - 53% female from 2016-2018
- **Taught by teachers with STEM core competencies in mind in order to supplement and reinforce school curriculum.**
- **Immersive and engaging environment with team leaders who help each group rotate through modules cheering them on to play, build and learn.**
- **5:1 Adult/student ratio kids love to see their craziest ideas come to life with lasting impact on confidence and creativity.**
- **Convenient for parents with early drop off and extended classes available for working parents.**



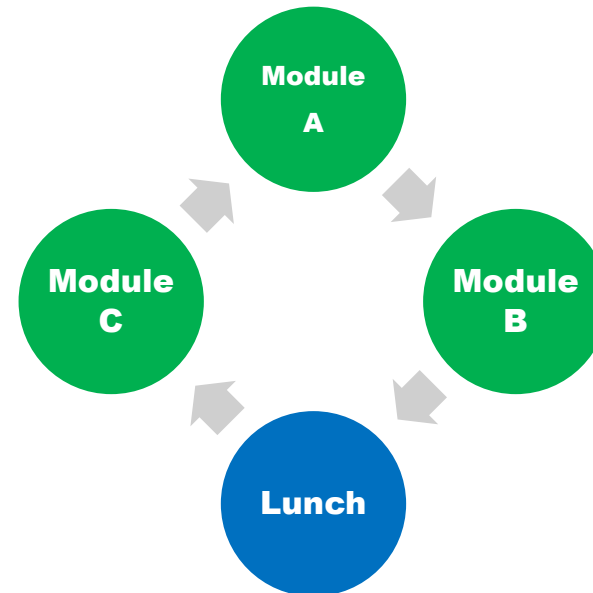
How Does It Work?



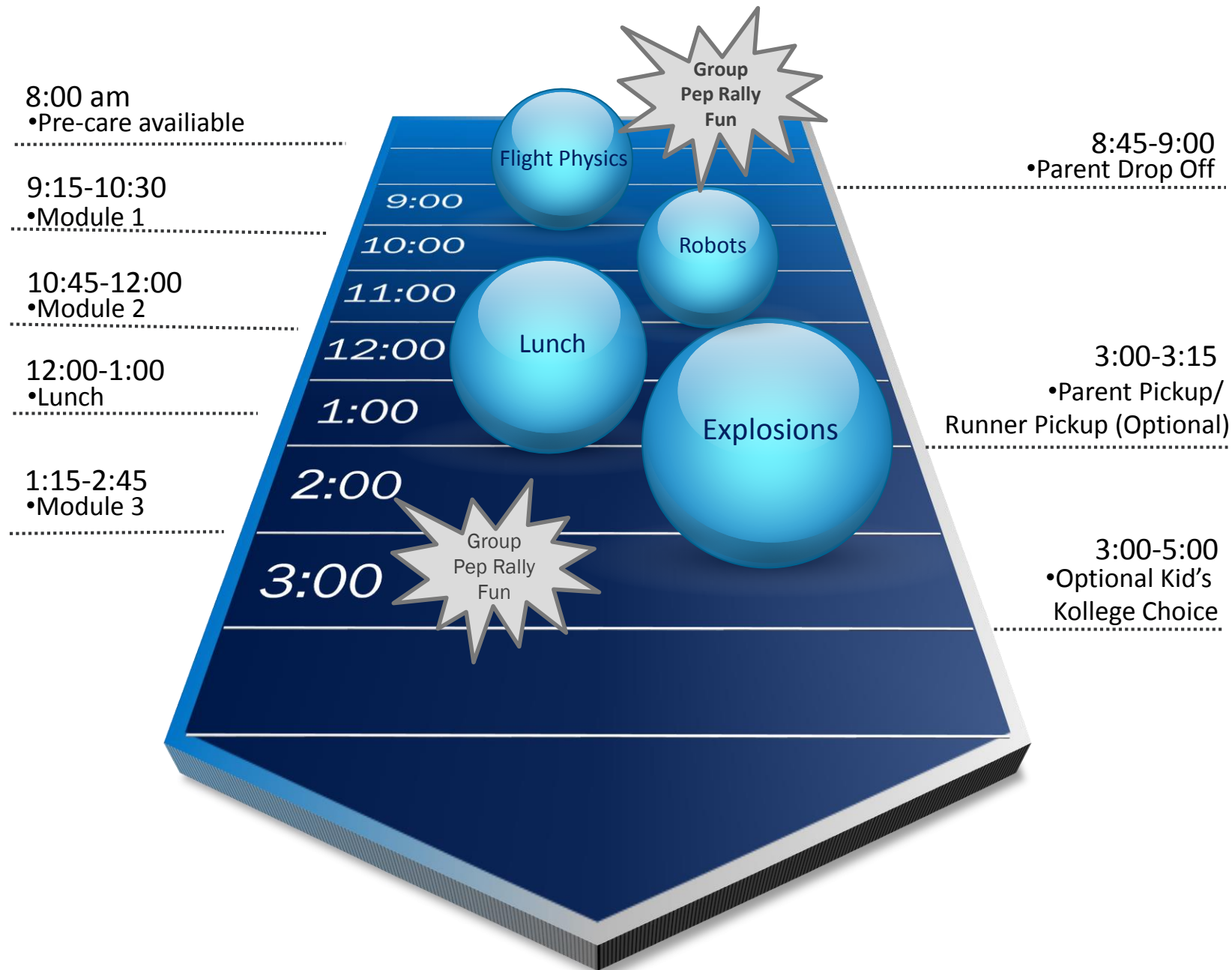
Drop off
8:45-9:00



- Teams are grouped and rotated through 3 themed modules that build on each other every day.
- Every week presents new STEM based modules so the entire summer is filled with exciting new content with hands on fun and learning.



Example Week Timeline



Example Modules



Week 1

•Deserted Island Challenge: Island Architect:

- Construct A Hut
- Crocodile Crossing: Build A Bridge
- Message In A Bottle: Waterproof Container
- Pirate Defense: Coconut Catapult
- Float Your Boat: Raft Design

•Fun with Coding (computers)

- Make a spy decoder
- Coding a sandwich
- Introduction to Scratch – Programming

•Fantastic Flight: Lift, Weight, Drag and Thrust (outdoors)

- Build a Kite
- Build a Parachute
- Airplane Glider

Week 2

•Electricity and Magnetism

- Build Circuit Bugs
- Tiny Dancers (Homopolar Motor)
- Build a Electro-Magnetic Train
- Electric Play Dough

•STEM Carnival Challenge

- Catapult Basketball
- Lid Hockey
- Skee Ball
- Magnet Claw
- Car Race
- Cotton Ball Launch

•Star Wars Science

- Build a Light Saber
- Droid Factory Challenge
- Marshmallow Blaster Challenge
- Jedi Magnet Maze Challenge
- Clone Troopers Challenge

Week 3

•City of Ember Challenge

- Paper Box Challenge
- Pipe-works System Challenge
- Mini-Greenhouse Challenge
- Moveable Light Challenge
- Build a Boat Challenge

•The Science of Speed

- Peppermint Racers: Engineering
- Balloon Powered Car
- Propeller Car

•Exciting Explosions (sink/outdoors)

- Mentos Geyser
- Pop Rocks and Soda – Balloon Gas
- Exploding Paint Bombs
- Exploding Baggies
- The Erupting Volcano

Steve Jobs: “Everybody in this country should learn to program a computer, because it teaches you how to think.”



Every Wednesday is Wacky!

Example Modules (Cont.)



Week 4

- **Rad Robotics**
 - Build your First Robot
 - Wobble-bot
 - Draw-bot
- **Rockets, Rockets, Rockets (outdoors)**
 - Straw Rockets
 - Water Rockets
 - Balloon Rockets
- **Creating Contraptions**
 - Catapult Challenge
 - Simple Pneumatic Machine
 - Tornado Tower
 - Ship Design Challenge

Week 5

- **Molecular Mania**
 - Heat Sensitive Color Changing Slime
 - Lemon Volcano
 - Lava Lamp – Oil and Water Density
 - Acids and Bases Density Column
- **Math Mania or STEM in the Gym (gymnasium)**
 - Exploring Geometric Shapes
 - Balancing Act
 - Measurements
- **Science of Light and Sound**
 - Rainbow Reflection Patterns
 - Exploring Prisms
 - Experiment: How to See Sound

Week 6

- **STEM Sports**
 - Archery: Design a bow that will launch an "arrow" as far as possible.
 - Basketball: Design a catapult that will launch a ball into a hula hoop.
 - Sailing: Design a sailboat and record how long it takes to travel through the water.
 - Diving: Design a "diver" that will make the biggest splash.
 - Parachuting: Design a parachute that will take the longest to land.
- **Rockin' Rollercoasters**
 - Build a Roller Coaster Contest
- **Exploring Solar (outdoors)**
 - Build an Oven to Cook S'mores
 - Homemade Solar-Powered Cars

Roger Lewin: "Too often we give children answers to remember rather than problems to solve."






Fantastic Flight:
Lift, Weight, Drag and Thrust
One of Three Amazing Modules
June 6th -10th
9:00 am -3:00 pm

SUPER SUMMER S.T.E.M. CAMP

Do NOT let your kids get bored this summer. Send them to Play and Learn!

- Build a Kite
- Build a Parachute
- Airplane Glider

Fun With Coding
One of Three Amazing Modules
June 6th -10th
9:00 am -3:00 pm

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- Coding with Scratch
- Coding Robots - Ozobot




Deserted Island Challenge:
Island Architect
One of Three Amazing Modules
June 6th -10th
9:00 am -3:00 pm

Construct A Hut
Crocodile Crossing: Build A Bridge
Message In A Bottle: Waterproof Container
Pirate Defense: Coconut Catapult
Float Your Boat: Raft Design

SUPER SUMMER S.T.E.M. CAMP



First Year Wrap Up



- During six weeks and 36 modules, 171 kids ignited imaginations in high-energy, immersive environments that blurred the lines between learning and fun in the fields of science, technology, engineering and mathematics (STEM).
- Utilized 3 teachers and 3 college-age students to assist in the classrooms.
- Mixture of returning kids and new kids every week.
- Broad diversity in race and socio-economic background.
- Sold out camps and waiting lists.
- Overwhelming enjoyment by students.
- Repeated requests to do it again next year.



Proved - Overwhelming Community Support!

Invisible Barriers



- Invisible barriers exist for many children in the State of New Mexico when it comes to entering STEM careers.
- What are those barriers?
 - It didn't occur to me
 - I'm not smart enough
 - I don't belong



Invisible Barriers – My Story



- **Born and Raised in New Mexico**
- **Graduated at Aztec High School #AztecStrong**
- **First Generation College Graduate**
 - Engineering “never occurred to me”
 - I didn’t know any engineers and very few professionals
 - Math teacher encouraged me in math and set the path for higher math classes
 - I was afraid of science. It was for “smart” people. I’m not smart enough for science classes.
 - I didn’t belong in college. I had no one to help me pick courses and a path. A college path seemed beyond my family and why did I think I was better than them.
 - Graduated with Mechanical Engineering Degree with Highest Honors



Why it Matters



- **STEM professionals are needed - JOBS**

- STEM jobs increased by 51% between 1998 and 2008—four times faster than overall job growth.⁽¹⁾
- Less than 15% of all undergraduate degrees in the United States are in STEM fields.⁽¹⁾
- New Mexico is not graduating enough STEM skilled workers to keep up with workforce opportunities.⁽²⁾

- **STEM careers changes family trees and future generations**

- Professionals in STEM careers earn significantly more than non-STEM counterparts, with median wages often double the average national wage.⁽³⁾
- First generation college graduates are 14% less likely to graduate college (68% versus 54%) at a public university.⁽⁴⁾



(1) U.S. Bureau of Labor

(2) ACT Workkeys, 2011

(3) Economics and Statistics Administration

(4) Higher Education Research Institute - UCLA

Conclusion



- **Expose kids to STEM early**
 - “It never occurred to me”
- **Make them feel like they belong**
 - College campus
 - STEM classes
- **Make them feel like they are smart enough**
 - Exposure to the subjects makes them less afraid
 - Fun through learning attached positive emotions to subjects

