BUILD

A newsletter highlighting projects by students in Archbishop Rummel High School's Engineering Program

Volume 1.1 August 29, 2016

Outstanding catapult design team from Engineering III: Payload launch distance, first place: Kyle Albaral, Tyler Songy, and Donovan Maher.

ENGINEERING FOR SUCCESS

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Designing for Success:

How to create a climate for student achievement

Students in Engineering II and III completed their first **instant** (one- or two-day) **design challenge** of the year: to design and build a catapult that launches a payload as far as possible. Working with just a limited set of everyday materials, each design team developed a launcher to project a cotton ball.

The winning team of Kyle Albaral '18, Donovan Maher '18, and Tyler Songy '18 (Engineering III) achieved a linear payload distance

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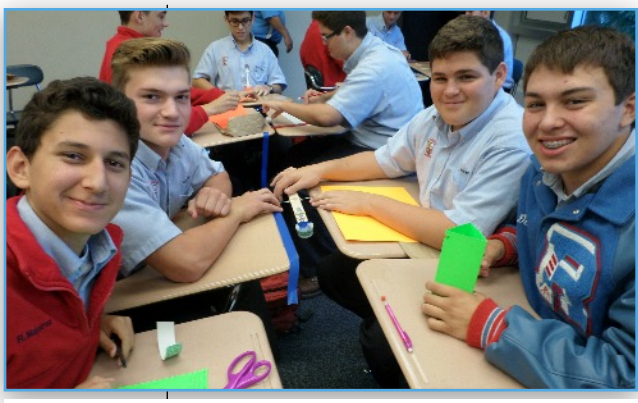
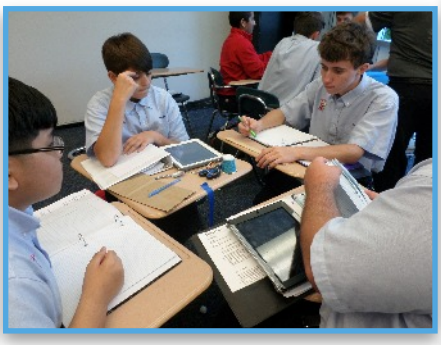
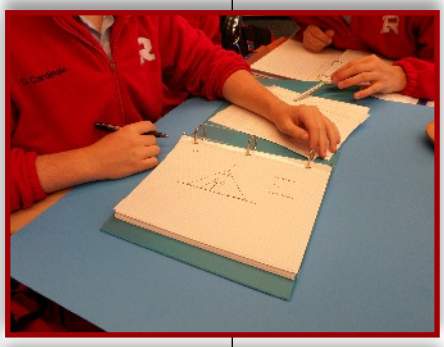
of an amazing 144 inches! The design team of Andreas Denapolis '18, Nathan Heath '18, Reggie Majarrez '18, and Taylor Stradley '18 demonstrated outstanding commitment to brainstorming multiple solutions to the challenge and then selecting the best solution to pursue.

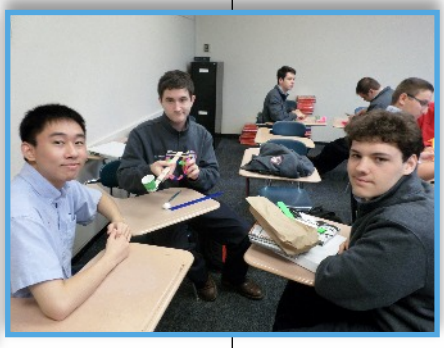


Outstanding catapult design team from Engineering III: Engineering design process, first place: Reggie Majarrez, Taylor Stradley, Nathan Heath, and Andreas Denapolis.

In upcoming lessons, students will investigate the six types of simple machines. They will explore how Leonardo da Vinci incorporated simple machines in his engineering drawings and how Rube Goldberg humorously mocked what we expect from a simple machine. Students will then design an obstacle course in which a toy car moves automatically from one task to another through a series of simple machines. They will conclude the unit by chaining a series of simple machines to perform a complex task.







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Building the Community:

How to develop students to take on the challenges of now and the future

On this 11th anniversary of the storm, let us reflect on what we have learned and what we therefore must do.

Following Hurricane Katrina in 2005, people in the New Orleans area worked together as a community united to rebuild their beloved city. Over the past decade-plus of renewal, displaced residents have largely returned to their previous or other local neighborhoods. Some of those neighborhoods were destroyed and have been rebuilt, while others continue as vital as ever; few places remain desolate, while too many are still blighted. Right now, southeast Louisiana faces unprecedented economic opportunity. To benefit from that opportunity, **all** parts of the greater New Orleans area must work together so that **everyone** can all work well.

From the ruins of the storm, New Orleans has developed into a global leader on coastal management and environmental engineering. From first-hand experience, local professionals have built a new industry for the city: inspiring others around the world to confront both the difficulties and the opportunities brought on by rising sea levels, coastal erosion, and loss of wetland habitats. Recent devastating floods remind us that we all have a lot to lose – and a lot of opportunity to build an even better community.

Business and industry development in the New Orleans region now amounts to over $100 billion, and many of the jobs needed for expansions are in Science, Technology, Engineering, and Math (STEM). Louisiana already faces a shortage of skilled workers in many of these key areas; plant expansions and new development only add to the local workforce gap. Even more, the Baby Boomers are graying and industry is "greening" – all generating a critical need to replace both personnel and technological processes. For all that, the southeast Louisiana region needs a new, specialized and motivated workforce ready to step in and lead. Given the region's once-in-a-lifetime economic opportunities, Rummel's Engineering curriculum will:

- Engage students in STEM and lead them to explore various careers in and related to engineering.
- Build students' understanding of fundamental principles in the four main disciplines of engineering (chemical, civil, electrical, and mechanical).
- Build students' literacy in key issues of engineering including identifying a real-world problem and working to develop a solution that meets both the criteria and constraints for that project.
- Build students' literacy in key standards of Science, Engineering Design, Mathematics, and English/Language Arts including both written and oral communication.

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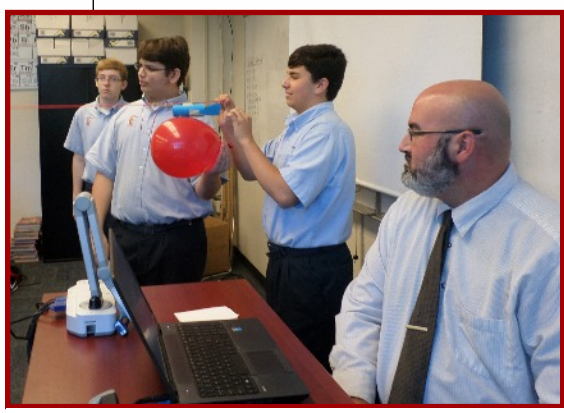
Developing the Skills:

How to identify leaders to guide students to master the standards

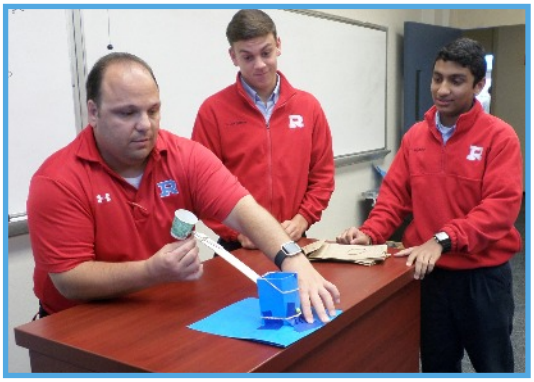
The Engineering program at Rummel - proudly now in its third year - cordially welcomes new faculty to the program. We recognize that motivating students to succeed requires a purposeful curriculum that is implemented and supported by educators committed to holding students accountable to the standards - and creating ways to help them get there.



Coach Sanders verifies the design and performance of the cable car designed by Engineering I students Noah Welch, Harold Ghawaly, and Connor Bologna.

Coach **Bobby Sanders** '97 works with the five Engineering I classes, and Coach **Chris Chetta** focuses on the Engineering II and III students. Dr. Sarah Ross returns to assist with all class levels.

Welcome, new faculty! Both have already made a positive impression on students by setting high expectations and a positive learning environment. All three Engineering teachers coach students into achieving engineering standards in the classroom. Dr. Ross also provides engineering tutoring to individual students and design teams during the daily Academic Period.



Coach Chetta helps Engineering II students Nathan Gurganus '19 and Himantha Wijetunge '19 test-fire their catapult.

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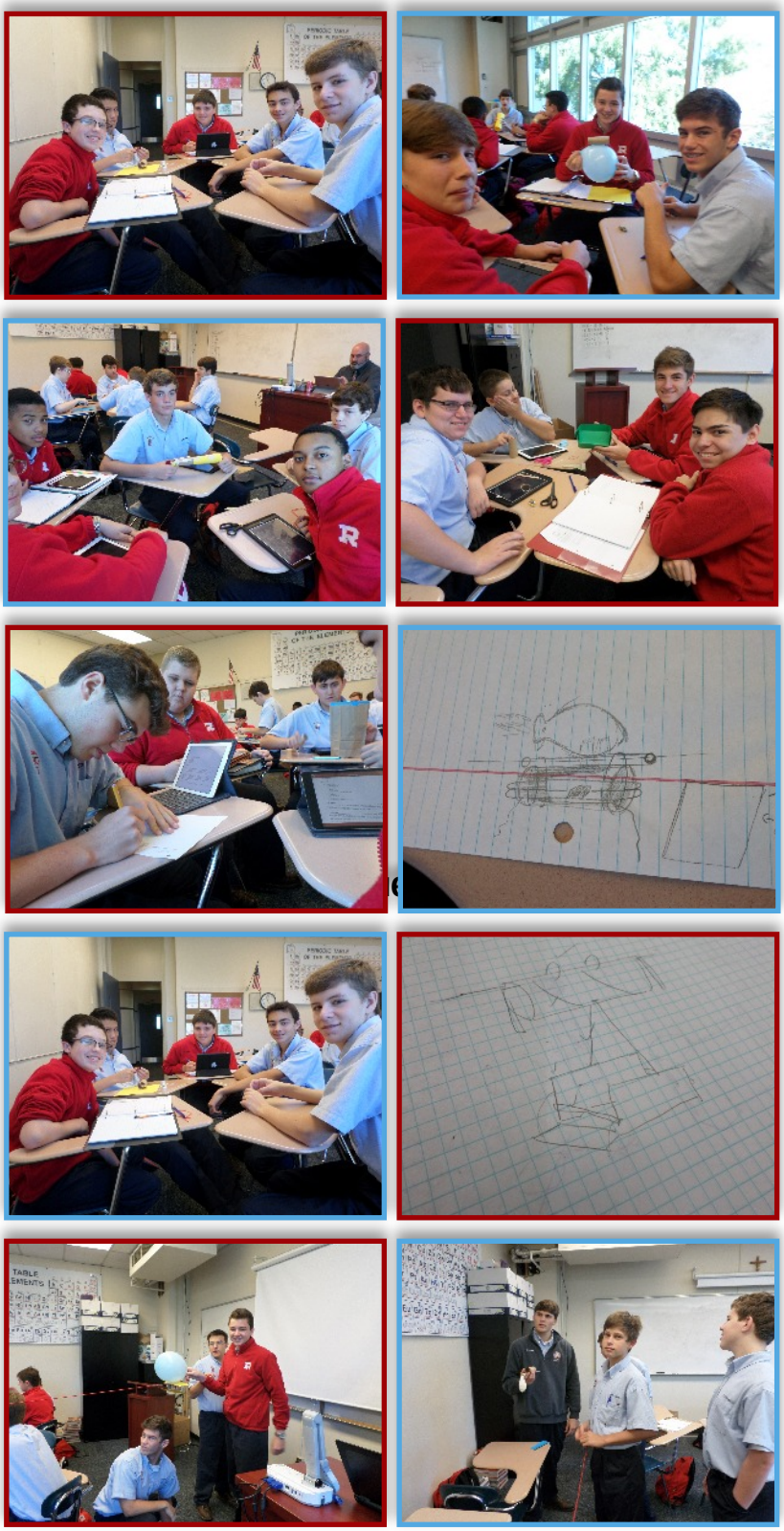
Creating the Community:

How to build teamwork for learning

In their first design challenge of the year, students in Engineering I developed and tested a cable car. Project criteria included creating a self-propelled vehicle to travel as much linear distance as possible on a cable while keeping the toy passenger safe. Students also had to use all of the project materials in a meaningful way - a constraint designed to challenge their creativity in adapting ordinary materials such as cardstock, paper clips, a balloon, and rubber bands to creative purpose.

Several teams successfully prototyped a cable car that traveled 12 feet or more. The winning team across all classes of Engineering I was Jace Allnet '18, Glen Thurmond '18, Dylan Tran '20, and Jake Williams '20, who achieved a linear distance of 11.5 feet traveled by the cable car.

Following the cable car challenge, students learned how to set up an engineering notebook. They then researched career information on mechanical and civil engineering. Students will then work through a set of challenges and learn basic techniques of concept sketching to



Students brainstormed in teams to develop a cable car to prototype, then they assembled a model, tested it, and made any needed adjustments before the final performance test.

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Developing the Community Resources:

How to build partnerships for extended learning

The curriculum for Engineering III is designed so individual students explore in-depth an area of engineering in which they are particularly interested.

Seniors in the program begin with a semester-long investigation of mechanical engineering. Their **capstone project** for the unit is to design and prototype a battle robot using hydraulic power. In semester two, selected students will **job-shadow** local engineers in areas they are particularly interested in pursuing in college and careers, identifying with the engineer a project to participate in during a **mini-internship**. Other seniors will develop engineering projects in their area of interest.

Juniors in Engineering III also start with the first semester in mechanical engineering. In the second semester, most students will explore electrical engineering including alternative energy forms such as solar and hydropower. The capstone challenge for electrical engineering is to design and build a model house with electrical features including a doorbell, chandelier lighting, a ceiling fan, and overhead lights - all powered by a mini-power station using a mixture of energy sources.

Other students may focus instead on a different area such as chemical or civil engineering. They will explore key concepts and then work individually or in project teams to design and test prototypes to meet societal challenges.

BUILD is a periodical publication of the Engineering program at Archbishop Rummel High School. Edited by Sarah Ross, Ph.D., sross@rummelraiders.com.

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