Assalamu Alaikum

Dear Students and Parents,

We are extremely proud of all of our students for working hard on our monthly events and competitions. We have such talented students and we love to showcase their work.

It is time for our next event, **STEAM** Competition! You might be wondering, what is a **STEAM** Competition? This event will not only allow you engineer your own design but also have fun with your favorite subjects; science and math.☺

You will use the following components of **STEAM** to design your projects.

(Science, Technology, Engineering, Art and **Math)**

All projects must be submitted to your science and math teachers. You will be judged based on our rubric. There will be 3 winners from each grade ranging from 1st place – 3rd place. All students are required to make 2-3 minute video of their projects along with a written explanation of their step by step process.

Please see the suggestions below for all grades. Feel free to explore other projects as well.

KG-5th Grade

- **Baking Soda Paint:** Try a simple STEAM activity with everyone's favorite baking soda and vinegar chemical reaction. Instead of making a baking soda volcano, let's make baking soda paint!
- **Coffee Filter Flowers:** Turn simple coffee filters into a gorgeous bouquet of coffee filter flowers. Make sure to learn about solubility in the process!
- **Fizzy Paint Moon Craft:** Let's whip up a batch of fizzing baking soda paint and use the opportunity to learn about the different phases of the moon and what causes us to see only part of the moon! This fun moon craft lets kids get creative and learn some simple astronomy in the process.
- **Lego Sun Prints:** We all love a sunny day and it makes a perfect day to try some outdoor STEAM with these **LEGO construction paper sun prints**. Quick and easy to set up, this is a fun science activity with an added art bonus.
- **Salt Painting:** What is it about the properties of salt that makes it awesome for using with watercolor painting? Find out how to make your own raised salt painting.
- **Melting Crayons:** Find out how to melt crayons in the oven and make these cute and colorful recycled crayons from old bits.

6th-8th Grade

- **DIY DNA:** In this activity, you will create a homemade DNA test to extract DNA material from strawberries.

- **Water Cycle in a Bag:** This is a great activity you can find on From Playdough to Plato. It all takes place in a tiny little Ziploc bag.
- **Squishy Circuits:** This activity from involves conducting electricity using two different types of "dough."
- **Up, Up, and Away:** This activity gets kids working on building their own custom aircraft.
- **Propeller Car:** This one is about designing a propeller-powered car.
- **Miniature Robot:** Want to make your own customizable battery-powered robot?

9th -12th Grade

- **The dirty water project:** Create and test a water filter at home! This hands-on activity allows students to investigate different methods for removing pollutants from water, including aeration and filtration.
- **Out-of-the Box: A Furniture Design + Engineering Challenge:** Design and build architecturally inspired cardboard furniture, cultivate their industrial engineering and design skills, and allow them to explore how to meet functional, aesthetic and financial requirements of a given plan.
- **Visualize Your Heartbeat:** become biomedical engineers who design, create, and test a medical device! This project allows students to explore basic coding, utilize the capabilities of microcontrollers, and understand how sensors gather data about the human body so they can dive into the expanding world of wearable tech.
- **Creative Crash Test Cars:** How does mass affect momentum in a head-on collision? Using a raw egg as a "crash test dummy" students take on the challenge of designing safety features for wooden car kits. By running the prototypes down ramps into walls, collecting distance and time data, and videotaping of their crash, make calculations and look for relationships between car mass, speed, momentum and the amount of crash damage sustained by your vehicles.
- **Simple Snow Load Roof Model Demo:** How do civil engineers design structures that can withstand local weather conditions? Whether you live in a climate with heavy snowfall or not, this engaging activity helps even very young students consider the advantages of different roof shapes under a "snow load" by sprinkling cups of flour onto model houses. What happens to snow when it sits on a curved roof? What are the design advantages to building an A-frame roof versus a flat roof?
- **Test & Improve: Making Tall & Strong Recycled Towers:** Can engineers build soaring towers with reused materials? While reinforced concrete and steel reign supreme as traditional building materials, many engineers are exploring ways to incorporate reused and recycled materials into their designs.

	Exemplary	Proficient	Developing	Beginning
Engineering	Students' collaborative documentation of the design process, including revisions to their designs, incorporates artistic elements and makes use of geometric vocabulary. The documentation of the series of towers shows the intentionality of design changes and reflects on why those changes resulted in a taller tower or not.	Students collaboratively plan and design a series of towers, to investigate the factors that will allow for the tallest possible structure, keeping track of their previous and future design, noting modifications that they make, and noting whether those modifications are successful in achieving their goal.	Students are able to document designs of their towers and modifications to their designs.	Students are able to document designs of their towers.
Geometry	Through the artistic documentation of the designs and construction of the actual towers, students are able to use their geometric vocabulary and knowledge to describe design elements Students discuss angles, lines, and two dimensional figures, the composition and decomposition of those figures, as well as parallel and perpendicular lines as part of their designs.	Using designs or structures they have built, students draw, describe, and classify: 1) angles, 2) lines that are perpendicular, parallel, or neither, 3) two-dimensional figures including quadrilaterals right triangles, compositions, and decompositions of two-dimensional figures.	Students use geometric vocabulary about angles, lines, and two-dimensional figures with some errors.	Students rarely use geometric vocabulary with precision.
Math Practice Standards	As students work to build taller towers, they are able to document their decisions about what they think will enable them to do so. They are able to identify specific strategies and why they chose them. Their evaluation of their progress incorporates observations of other groups' strategies and how they are similar to or different from their own strategies.	Students find ways to approach the problem by analyzing givens, constraints, relationships, and goals. They make conjectures and plan a solution pathway rather than simply jumping into a solution attempt. They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.	Students have strategies for building towers, but their strategies emerge more from jumping into building rather than from implementing preconceived strategies and evaluating the outcomes.	Students build towers, but their use of strategies to make towers taller is not clear.
Speaking and Listening	Students participate in a range of discussions that implement strategies such as turn taking, not interrupting, asking for clarification, and offering evidence to support their statements. They use geometric vocabulary in their discussions.	Student engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) as they design the tallest possible structure, building on others' ideas and expressing their own clearly.	Students engage in discussing strategies to build the tallest possible structure, but there is a sense of competition of ideas rather than hearing and building on the ideas of others.	Students' discussions are mostly focused on telling one another what to do or what they did.
Writing	Students incorporate outside resources into the documentation of their project. They are able to write clearly in well-organized paragraphs making reference to their artistic designs and using geometric vocabulary.	Students conduct a research project that documents and describes their designs, redesign strategies, and results of the redesign, and also uses outside sources. They use paragraphs that are well-developed.	Students document their work on the project using paragraphs, rather than sentences and captions.	Students' documentation of their project is limited to captions and sentences, rather than paragraphs.
Artistic Techniques	Students are able to show increasing refinement of their artistic techniques through the course of the project. They are able to use their artistic creations in combination with their writing to document their work. They are able to lay out and organize their media and narrative so that they easily reference each other.	Students are able to develop and refine artistic techniques to create designs and document their buildings. They are able to use their artistic creations to convey their design changes and the consequences of those changes.	Students' use of artistic techniques to document their designs and building doesn't change much through the project. They refer to their artistic creations as they describe the project.	Students caption their artistic creations, but do not otherwise refer to them.