

Dear Parents and Guardians of PS205 Students,

It is time to open our engineering minds for the 2019 school year! We are proud to present the PS205 2nd annual STEM Design and Engineering Challenge! For those who may have not participated or do not remember, students completed their grade specific project at home and came back to school the night of the STEM Challenge to test their structures. It was an unbelievable evening of science and engineering!

The 2nd annual STEM Design and Engineering Challenge will take place Friday, March 8th, 2019 at 5:00pm in the cafeteria. Every student from kindergarten through fifth grade will have the opportunity to participate in grade specific challenges.

Projects must be completed at home. This will not be taking place during class time. Students will have the next few weeks to design, engineer and then redesign their projects if necessary. Families are responsible for all materials. All design projects were chosen to keep cost of materials to a minimum. The majority of materials for the projects will be everyday items found around your home. I know you cannot wait to find out what the design and engineering challenges are, so let me introduce to you the STEM challenges for the grades:

Kindergarten and First Grade: PAW PATROL BRIDGE DESIGN AND ENGINEERING CHALLENGE

Second and Third Grade: PAPER TABLE DESIGN AND ENGINEERING CHALLENGE

Fourth and Fifth Grade: ZIPLINE DESIGN AND ENGINEERING CHALLENGE

Please read through the projects and encourage your child to take advantage of this STEMtastic opportunity. Each student that participates will receive an award. Design and engineering awards will be given to those students whose projects are able to succeed in their given challenge. Please detach the slip below and return to Mr. B by Friday, February 1st, 2019.

Thank you families for your support in building up our STEM program and helping to create 21st century designers and engineers!

-----Detach and return to Mr. B by Friday, February 1st, 2019-----

PS 205Q STEM Design and Engineering Challenge

Mr. Berghorn

Winter 2019

Child's name _____ Class _____

___ My child would love to participate in the STEM Design and Engineering Challenge Night

PAW PATROL BRIDGE DESIGN AND ENGINEERING CHALLENGE (K-1)



The Real World Problem: Oh no! The bridge that connects the Lookout Tower to Adventure Bay has collapsed! The Paw Patrol needs your help designing and engineering a new bridge roadway that will support the weight of their Paw Patrol vehicles.

The Task: Students will have to design (draw) and then engineer (build) a roadway that will be able to hold paw patrol toy vehicles. The roadway must be a minimum of a foot long and a minimum of 4 inches in width.

Materials: Students are only allowed to use the materials listed below to engineer their project.

- ¾ inch binder clips (No more than 20)
- Jumbo craft sticks-6 inches long (No more than 20)
- Ruler to measure length and width

Consider: Parents are encouraged to help children. For instance, feel free to help your child(ren) measure the length and width of the roadway. Please remember to guide them, rather than complete the project for them. Completed projects should be flat as they will be elevated by wooden blocks (supplied at school on STEM night). These blocks will be placed 1 inch from either side of the roadway.

Final touches: Students will bring in their projects the night of the STEM DESIGN AND ENGINEERING CHALLENGE. Students will take turns placing their roadways on the two beams with the assistance of a STEM team member. The student will take one paw patrol vehicle at a time and place it on the bridge. We will use the following matrix to determine scoring:

- 1 paw patrol vehicle without collapsing = BRONZE MEDAL
- 2 paw patrol vehicles without collapsing = SILVER MEDAL
- 3 paw patrol vehicles without collapsing = GOLD MEDAL & AN ENGINEERING SUCCESS!

If it did not survive...well there is always next year. Students will have an opportunity to fill out a reflection sheet if they choose to think about what may have went wrong with their design and how they can improve for next year.

PROJECTS ARE TO BE COMPLETED AT HOME PRIOR TO STEM NIGHT

PAPER TABLE



DESIGN AND ENGINEERING CHALLENGE (2-3)

The Real World Problem: Students act as civil and structural engineers as they design and engineer a paper table that will be able to hold textbooks.

The Task: Students will have to design (draw) and then engineer (build) a paper table that will be able to hold textbooks without collapsing. **It must be at least 8 inches off the ground and be able to hold textbooks. (Hint: Manipulating paper and creating shapes are keys to success)**

Materials: Students are only allowed to use the materials listed below to engineer their project.

-1 piece of cardboard or chipboard (No bigger than 8 ½ by 11 inches)

- 1 roll of masking tape

-8 sheets of newspaper.  Both sides=1 sheet of newspaper

-Scissors to cut materials if necessary

-Ruler to measure height

Consider: Parents are encouraged to help children. For instance, feel free to help students cut materials such as the tape, newspaper or cardboard if needed. Also, feel free to help them measure the height. Please remember to guide them, rather than complete the project for them.

Final touches: Students will bring in their projects the night of the STEM DESIGN AND ENGINEERING CHALLENGE. Students will take turns placing one textbook at a time on their paper table.

- 1 textbook without collapsing = BRONZE MEDAL
- 2 textbooks without collapsing = SILVER MEDAL
- 3 textbooks without collapsing = GOLD MEDAL & AN ENGINEERING SUCCESS!

If it did not survive...well there is always next year. Students will have an opportunity to fill out a reflection sheet if they choose to think about what may have went wrong with their design and how they can improve for next year.

PROJECTS ARE TO BE COMPLETED AT HOME PRIOR TO STEM NIGHT



ZIP LINE CHALLENGE 4-5

The Real World Problem: Historical evidence shows that zip lines were used in the Himalayas and Alps for multiple purposes including transportation. People living in these regions would hang zip lines to use for traversing dangerous areas. They also used zip lines to receive or send supplies from one place to another. Zip lines in these areas were used as an alternative transportation form to bridges because they were much quicker to build and use. Your job is to engineer a structure that will move from the top to the bottom of a zip line.

The Task: Students will have to design (draw) and then engineer (build) a structure that will carry a ping pong ball from the top of a zip line string to the bottom in less than 8 seconds without falling off! The zip line material will be fishing line/something comparable of an approximate length of no more than 10ft. The zip line slant will be angled between 30-40 degrees but no less than 30 degrees. Your structure must be able to attach to the zip line without having to detach the zip line.

Materials: Students are only allowed to use the materials listed below to engineer their project.

- 2 to 4 small paper cups (No bigger than 3oz size)
- Ping pong ball
- 4 plastic straws (No jumbo straws and no flex straws)
- single hole punch
- 4 standard, flat steel washers (No bigger than 1-1 ¼ inch outer diameter)
- 4 wooden skewers
- 1 piece of cardboard (No bigger than 8 ½ by 11 inches)
- Scissors
- 10ft of fishing line or something comparable to use as a test zip line at home
- 12 inches of scotch tape
- 1 protractor to measure angle of zip line

Consider: Parents are encouraged to help children. For instance, please feel free to help students cut materials such as the tape or straws. Feel free to assist helping create the zip line at home. Please remember to guide them, rather than complete the project for them.

Final touches: Students will bring in their projects the night of the STEM DESIGN AND ENGINEERING CHALLENGE. Students will place their structure with the assistance of a STEM team member on the zip line and release it.

- Over 10 seconds to reach bottom = BRONZE MEDAL
- Between 8 – 10 seconds = SILVER MEDAL
- 8 seconds or less = GOLD MEDAL & AN ENGINEERING SUCCESS!

If it did not survive...well there is always next year. Students will have an opportunity to fill out a reflection sheet if they choose to think about what may have went wrong with their design and how they can improve for next year.

PROJECTS ARE TO BE COMPLETED AT HOME PRIOR TO STEM NIGHT