PCS edventures!™
Experts in Hands-On STEM Education

5 Fun and Easy End-Of-Year STEM Activities

IT'S THAT TIME OF YEAR AGAIN. Summer vacation is right around the corner, and your students are fidgeting in their seats, counting down the seconds until they can finally bask in the sun. It happens every spring semester — can't you remember impatiently waiting for the final bell to ring? The only problem is, it's not summer break, *yet*.

So, how do you keep your students engaged when all they can think about is swimming pools and sleeping in? By using their thirst for action to your advantage! Grab the yolk and steer your classroom towards these fun and active STEMventures, and put the cherry on top of a very successful school year!

HANDS-ON STEM EDUCATION

STEAM ENRICHMENT

For over 30 years, PCS Edventures has inspired students to develop a passion for Science, Technology, Engineering and Mathematics (STEM), focusing our efforts on making learning and discovery a fun and interactive process for grades K-12.

- Classroom
- After-School
- Home Learning

Popsicle Rescue

In this frozen treat challenge, students must devise ways to keep popsicles from melting in the summer heat.

1. Source a variety of potential insulators (cloth, paper towels, newspaper, packing peanuts, aluminum foil, etc.) and pose this question to your class:
2. "Which material do you think will best keep a popsicle from melting?"
3. Then, split your class into groups, and assign each group a material. It's now their time to build a rig as a group that they believe will best insulate the popsicle.
4. For advanced classes, set this challenge up so that participants must follow the scientific method. From developing and testing a hypothesis to making adjustments to their design, upgrade the challenge according to the level of your learners.
5. After each group has built a rig that they are happy with as a group, head outside to see which insulator works best.
6. Place each rig directly in the sun, and add an uninsulated popsicle as a control.
7. Once the control melts, check on the other popsicles and have the class come to a consensus on which material worked best.
8. If one insulator outshines another, use this as a teaching opportunity. Why did that insulator work better? Was it a matter of design or material?

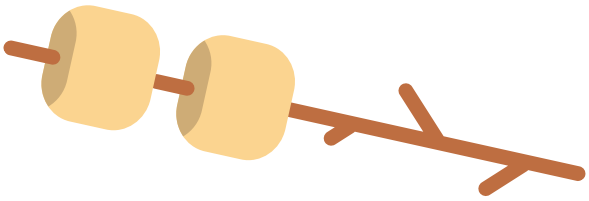
The best part about a popsicle challenge is what happens once the science is over — just make sure you have enough for each student to share in a frozen treat!

Idea adapted from Erin Bittman.

Solar Oven

This cooking activity is all about harnessing the power of the sun! By utilizing common household items like aluminum foil, shoe boxes and paper, is it possible to cook food? For this challenge, we suggest either having students source their own materials for the challenge (if you're looking for them to make large solar ovens), or provide them with just the essentials: aluminum foil and marshmallows.

1. Start by asking the class a question:
2. "Is it possible to cook something by only using the sun?"
3. Then, pose a challenge to the class. Their task is to harness the power of the sun's rays to cook (melt) a marshmallow. They can use whatever materials they brought (or you provided), but they will need to make some sort of an oven to cook their marshmallow.
4. There are many solar oven kits and templates online, but we suggest letting students design their own.
5. Split students into groups, then have them start with a blue print.
6. Once the design is agreed upon, it's time to get building. Have each group construct their oven in a way that focuses the sun's rays towards the marshmallow. There will be many different ideas on how this can be accomplished, so make sure to encourage students to explore every option.
7. As a note, solar ovens are used all over the globe as a sustainable option — this means that if built properly, they can get *hot*. Have gloves on hand for student safety, and for an added data point, use a heat gun or thermometer to give students the hard numbers behind their designs!
8. Once all marshmallows have been melted (or eaten) gather the class back together to discuss designs, what went well, what didn't, what the groups would change if they had a second go, etc.
9. There are many ways to extend or simplify this challenge with added math or scientific method inquires, so depending on your group of learners, do what fits best for them and the time available.



Paper Weights

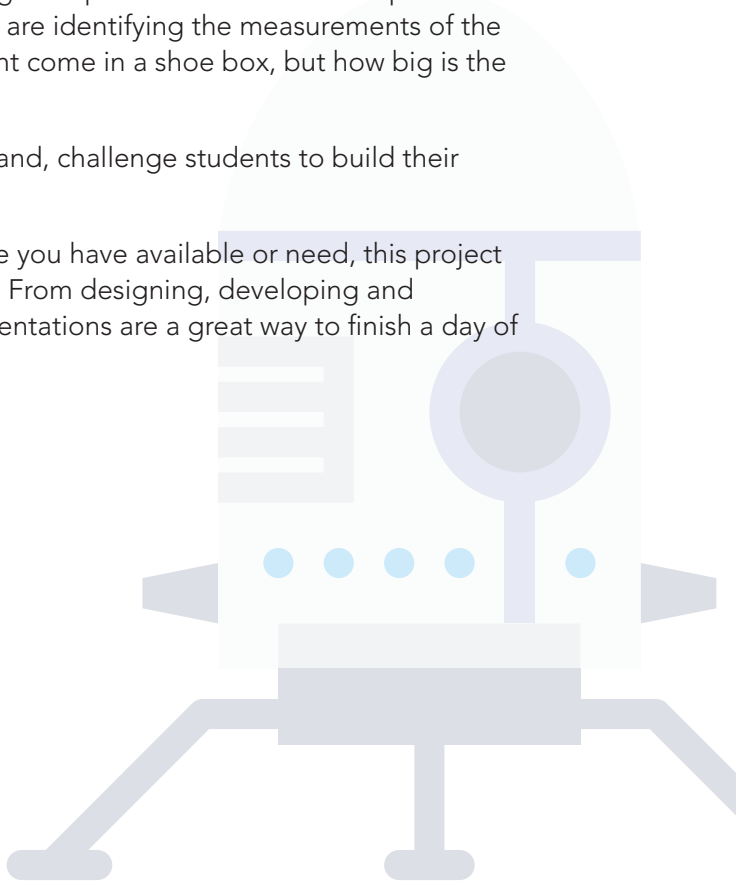
In this architectural and engineering activity, students test how strong paper can be!

1. Start by giving each student four sheets of regular paper.
2. Have each student fold three of the sheets into three different column shapes: a cylinder, triangle and square.
3. Secure the shapes with tape.
4. Then, have students set the paper on its end, so that, for instance, the cylinder is standing upright.
5. Have students stack books onto each column, recording how many books each shape could hold before collapsing. (The cylinder should hold almost three times as many books.)
6. Then, ask the class the question: "Why does the cylinder work best? What makes it different than the other two shapes?" (The cylinder can support more books because it does not have any edges. This allows the weight to be distributed evenly, instead of in concentrated areas along the folded seams.)
7. With their remaining sheet of paper, challenge students to design a column that can withstand more weight than the cylinder. Using the knowledge they now have, is it possible?
8. Discuss the findings as a class.

Secret Inventions

This activity is all about imagination — can your students come up with a never-before-seen invention?

1. Have students take out paper, and tell them that today, they're putting on their inventing caps.
2. Their job is to come up with a product that doesn't exist today — something they can not find in a store.
3. After coming up with an idea, they need to sketch a product design. If time allows, let them color their designs accordingly.
4. Once the designs have been finalized, they'll need to list the secret invention's features. Do the rocket boots have two speeds? Encourage them to get creative and to really hash out the details of their product.
5. With the details out of the way, have students conceptualize the size of their product, listing the product's measurements along with its features.
6. Now, we all know a product is only as good as its packaging! Have your students design the packaging their product will come in. As part of this challenge, make sure learners are identifying the measurements of the packaging. Rocket boots might come in a shoe box, but how big is the shoe box? What's its volume?
7. If you have the materials on hand, challenge students to build their packaging.
8. Depending on how much time you have available or need, this project could become an all-day task. From designing, developing and conceptualizing, student presentations are a great way to finish a day of inventing!



Hula-Hoop Math

In this action-packed activity, students roll a hula hoop (or ball) and use math to determine the distance traveled and how many revolutions occurred.

1. To begin, split students up into groups.
2. Then, assign each group an object that can roll. We suggest something substantial like a hula-hoop or basketball.
3. Once the groups have their objects, they need to roll them in a straight line, marking the start and finish.
4. Then, each group will need a string long enough to wrap around their object.
5. Have students cut a piece of string the size of their object's circumference, then have them measure the string to find the value of the circumference.
6. After measuring how far the object traveled, have campers divide the distance by the circumference to find out how many revolutions the object made from start to finish.
7. If your students aren't up for division, have them hold the string from end-to-end, and measure from start to finish.

To keep students up and moving for a longer time, extend this activity by adding obstacles or additional math components. Maybe have groups switch their objects, or add the scientific method to the beginning of the task and have students try to make educated guesses on the distance traveled or total revolutions of the object. If you're looking to add a more difficult twist, have students convert their measurements into the Metric or Imperial system.

Idea adapted from Erin Bittman.

Maintaining Student Engagement

- Use the 10:2 method. For every 10 minutes of instruction allow the students 2 minutes to process and respond to the instruction. This can be done in various ways by having them write what they have learned, questions they may have, or by discussing the content with a fellow student.
- Incorporate movement into your lessons. Require students to respond to a question by moving to a certain spot in the room, writing on whiteboards, or standing (or sitting) when they are done thinking about the question, etc.

- Pick up the pace. One misconception is that we must go slow for students to really understand and engage in a lesson. There is a lot of evidence that shows that when teaching is at a brisk instructional pace, students have more opportunities to engage, respond, and move on to the next concept.
- Provide frequent and effective feedback.
- Allow students 5-7 seconds of 'think time' when asking a question. At the end of the time draw a random name to answer the question.
- At the end of a lesson have students use the 3-2-1 method of summarizing by having students record three things they learned, two interesting things, and one question they have about what was taught. Allow time to share their findings with a peer.
- Periodically pause mid-sentence when teaching requiring students to fill in the blanks. (Hurst.)

References:

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Hurst, S. (2013, September 18). Seven Ways to Increase Student Engagement in the Classroom. Retrieved May 5, 2018, from https://www.readinghorizons.com/blog/seven-ways-to-increase-student-engagement-in-the-classroom

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