



TEACHER BOOKLET

We hope you had fun at the 8th UMO STEM on the Green! Today you interacted with science, technology, engineering, and mathematics in ways you may not have expected. Here are some reminders of what you did today so you can share your experiences with your family and friends!



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STEM on the Green was made possible by all of our donors!

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Walk on a Liquid

What state of matter is the Oobleck substance?

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This booth links to states of matter and changing states of matter. Other examples that can be used to illustrate these concepts can include cream, tomato sauce, and honey.

Oobleck Recipe: 1.5-2 cups cornstarch mixed with 1 cup water. Start with the cornstarch in a bowl and stir in the water a little bit at a time.

What happens to the Oobleck when you put it on top of a stereo speaker and turn up the volume?

Additional ideas and examples can be found at: <http://sciencelearn.org.nz/Science-Stories/Strange-Liquids/Non-Newtonian-fluids>

Walking on Water Video: <http://sciencelearn.org.nz/Science-Stories/Strange-Liquids/Non-Newtonian-fluids>



Stand In a Bubble

Which mixture will make a stronger bubble?

This booth links to understanding mixtures and solutions, and balanced and unbalanced forces.

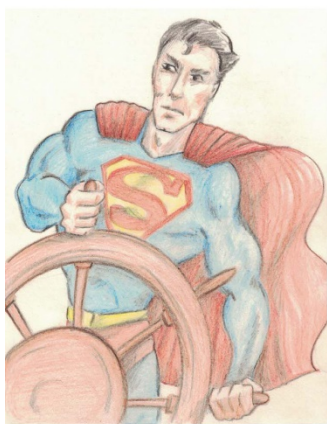
What happened if you pulled the hula hoop up too fast?

What other soaps could possibly make the bubble stronger?

Make your own super bubbles at home by taking a gallon jug and filling it just $\frac{3}{4}$ of the way with water. Add 12-14 ounces of dish soap and 6 ounces of glycerin (available at Walmart in lotions section). See how big you can make the bubbles!

Bubble Science and Making Different Bubble Solutions:

<http://chemistry.about.com/od/bubbles/a/Bubbles-That-Dont-Pop.htm>



Float an Action Figure

What materials will make a boat that will float on top of the water?

This booth links to density of water compared to other materials

Which materials best floated your figure? Which materials did not float very well?

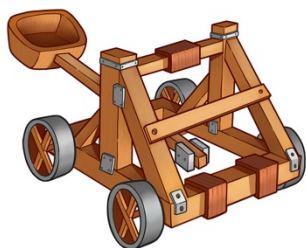
What other materials could you use to float an action figure?

Try some of these materials to float a figure at home in your tub!

Bubble wrap, paper towel, cardboard rolls, ice cube trays, plastic spoons

Exploring Density of Liquids: <http://buggyandbuddy.com/exploring-density-liquids/>

Stacking Liquids: <http://www.mykidsadventures.com/how-to-stack-liquids/>



Pumpkin Catapults

Can you build the catapult that will throw the farthest?

This booth links to energy in action, energy transfer, and balanced and unbalanced forces.

What other materials would make a catapult shoot farther? Faster? Heavier objects? Objects bigger in size?

15 other catapults to make: <https://kidsactivitiesblog.com/55055/15-easy-catapults-to-make>

Reptile-palooza!

What makes reptiles unique?



This booth links to the animal and ecosystem diversity.

What did you learn about the ecological and economical value of reptiles?

Make your own walking lizard!

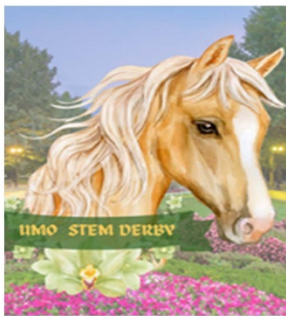
<https://youtu.be/-sWXM42Npjl?si=uVh1xdnUQ6oNVVjl>

Wiggling Snakes Science Experiment:
<https://raisinglifelonglearners.com/wiggling-snakes-science-experiment/>

Amphibian and Reptile Education Resources: <https://parcplace.org/education/herpeducation/>

Hobby Horse Hurdles

Can you navigate the race course to win the UMO STEM Derby?



This activity connects to energy use and understanding body systems (muscles).

How did you decide which obstacles to go over and which to go under? How do you know which to go around?

Make a walking paper horse! Try using different types of paper to see how it changes the walk.

<https://frugalfun4boys.com/paper-horse-that-walks/>

Move Your Muscles:

https://www.teachengineering.org/lessons/view/cub_human_lesson02



Programming Games with Python

Learn the basics of programming with PyGame!

How do you make computers do what you want them to do?

Why is it important that you tell the computer exactly what you want it to do?

Play PyGame at home!

<https://www.pygame.org/news>

Think like a computer:

https://omsi.edu/sites/default/files/u2801/ScienceAtHome_426_ComputerProgramming_DIY_OneSheet.pdf

What Happens When You Eat?

What foods help us grow and keep going?



This booth links to understand the human body systems.

Why do you need to eat?

What kinds of foods are important to help you grow and keep going?

Make sure you are eating the correct types and amounts of foods each meal!

<https://www.myplate.gov/eat-healthy/what-is-myplate>

Interactive Sites for Education: Body Systems: <http://interactivesites.weebly.com/body-systems.html>



Sniffing Out Crime

The science behind K-9 scent discrimination

This booth links to understanding the five senses.

Can you identify different flavors of jelly beans when you can't use all of your senses together?

<https://neuroscience.natsci.msu.edu/outreach/at-home-activities/jelly-bean-experiment/>



Mathematical Music

How does math impact the way music sounds?

This booth links to fractions and time measurements.

See Math & Music page at end of booklet.



This booth links to understanding the human body (DNA) and predator prey interactions

<https://waketech.presence.io/organization/biology-club>



Flying Drones

*How do you fly a drone and
what can they do?*

**This booth links to
energy in action, energy
transfer, and balanced
and unbalanced forces.**



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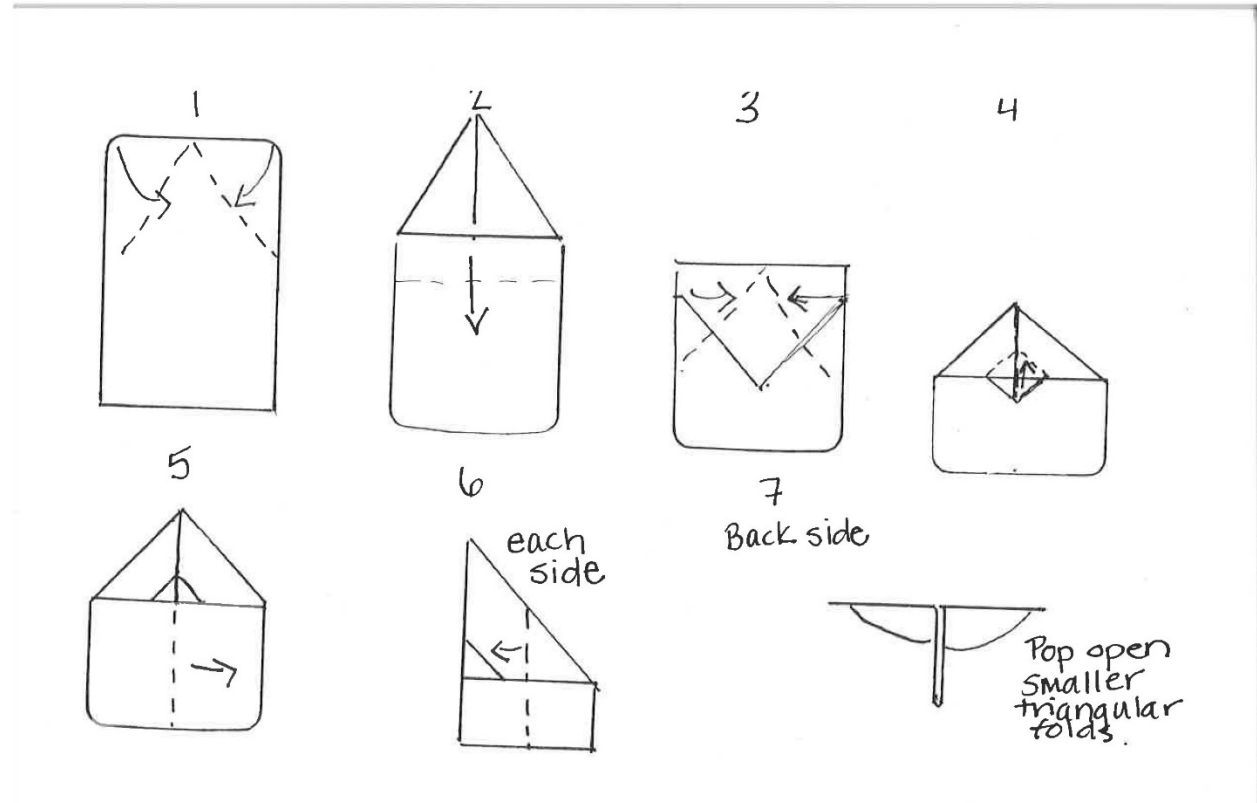
Make a Stomp Rocket at Home!

<https://www.instructables.com/id/Paper-Stomp-Rockets-Easy-and-Fun/>

Make a Paper Airplane:

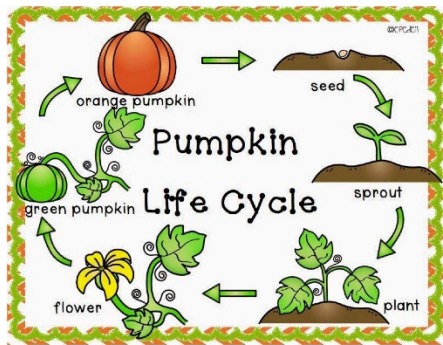
What happens to a paper airplane if you make it out of heavier paper?

What happens when you add a paper clip, staple, or piece of tape to front of a
paper plane? The back?



Let's Grow A Pumpkin!

How does a seed turn into a pumpkin?



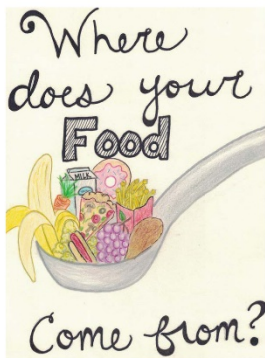
This booth links to plants, photosynthesis, and plant reproduction.

What are the different parts of a pumpkin plant and what does the plant use them for?

What parts of the pumpkin do we use? What parts of other plants do we use?

Item: Jack-o-Lantern Sticker

Unusual Uses for Potatoes: <http://www.hgtv.com/outdoors/flowers-and-plants/vegetables/9-unusual-uses-for-potatoes>



Where Does Your Food Come From?

Can you match the food product to its source?

This booth is linked to competencies 4 and 5 in the curriculum, illustrating how the movement of goods impacts the community and how elements define a region.

You can see more livestock many different places in the area! Use the link below to find a location.

<http://fun4raleighkids.com/Fun-Around-Town/Animal-Encounters/>

Ag In the Classroom: <http://ncagintheclassroom.com/>



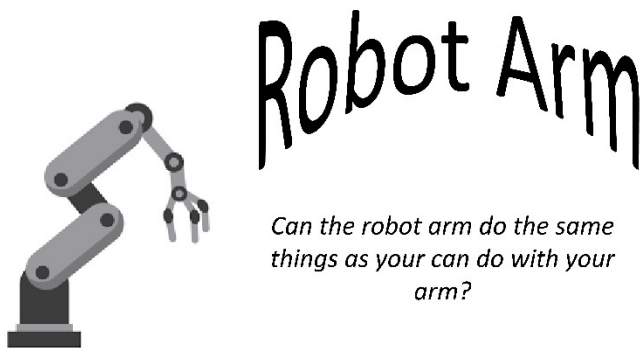
This booth is linked to chemical changes and conservation of mass.

How does a cucumber become a pickle?

What other foods can you pickle?

Make your own pickles! <http://www.pickyourown.org/makingpickles.htm>

Learn to play Pickleball! <http://pickleball.com/pages/rules-how-to-play-the-game>



This booth is linked to investigating the human body and transferring energy.

Build an umbrella that outsmarts the rain!

<https://www.popsoci.com/build-umbrella-stand-outsmarts-rain/>

Make a hovercraft:

<https://pbsnc.pbslearningmedia.org/resource/phy03.sci.phys.matter.zhovr/air-power-making-a-hovercraft/>

Physics is Fun!



This booth links to transferring energy, energy in action, and balanced and unbalanced forces.

How can you transfer energy to launch your own straw rocket?

<http://simpleplayideas.com/make-straw-rockets>

Grab some marbles for this fun experiment on forces and energy!

<https://frugalfun4boys.com/transfer-of-energy-science-experiment/>



Candy Chemistry

What common household liquids will dissolve candy?

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This booth links to mixture and solutions, changing matter; and conservation of mass.

How long does it take the candy to disappear completely?

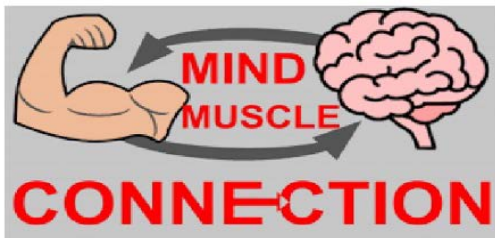
Try different solvents (liquids at home), such as: Orange juice, Hydrogen peroxide, Rubbing alcohol, Tomato juice, Window cleaner, Etc.

You can also try other candies such as lifesavers, candy canes, and Hershey's kisses!

Candy Experiments: <http://lemonlimeadventures.com/awesome-candy-experiments-kids/>

Mind to Muscle

Explore the magical messaging system of the brain!



This booth links to understanding the human body and body systems.

How do your brain and body communicate? How does understanding this communication help in medical fields?

Make a Robot Hand!

https://static1.squarespace.com/static/611e9f67902c95124eaa0d6e/t/614b7415_4a0fa852986b5335/1632334875610/Make-a-Robot-Hand.pdf



SugarBusters!

*How much sugar is in
common foods?*

**This booth links to
understanding the human
body systems and the five
senses (Taste).**

Which food had the most sugar?
Which had the least? How much
sugar is in other foods you eat on
a daily basis?

What does sugar do to your
body?

“The Price is Right” Sugar and Salt version:

https://www.agclassroom.org/nm/matrix/resource_print.cfm?rid=371

Electricity & Magnetism

*How do electricity and
magnets work?*



**This booth links to concepts
regarding energy, electricity,
and magnetism.**

Separate salt from pepper:

<https://frugalfun4boys.com/easy-static-electricity-science-experiments/>

Static Electricity butterfly
experiment:

<https://iheartcraftythings.com/static-electricity-butterfly-experiment.html>

More experiments in static electricity and magnetism:

<https://frugalfun4boys.com/awesome-electricity-projects-for-kids/>

The Monarch Migration Game

This booth links to the relationship between plants and pollinators, ecosystems, and patterns in the features of the earth.

Will you be a butterfly that makes it to Mexico?



Track a monarch as it travels!

<https://www.monarchwatch.org/>

The Monarch Migration Game:

https://mjv.nyc3.cdn.digitaloceanspaces.com/documents/k2_monarch_migration_game.pdf



Soil Layers

How does the soil change as you dig deeper into the ground?

There is a whole world that lives in the soil!

Why do you think you can find different living things in different layers of the soil?

Make your own worm compost at home with your parents!

https://www.nrdc.org/stories/composting-way-easier-you-think?gclid=CjwKEAjwgdS-BRDA7fT68f6s8zMSJADZwHmvQpkk4O6SPBX4jTT4UmeP3iaKWWeJrXzrP4G4kyuLXBoCpj_w_wcB



Abra-Ca-Psych!

How does math create magic?

How was Math used to “trick” your brain into believing the Magic tricks?

Try your Magic Math tricks with your family!

<https://www.youtube.com/watch?v=1m6Z3sDjQXk>

<https://www.youtube.com/watch?v=BsVX0-RAxM>

Mathematics Trick Number One Mathematical Explanation:

Student picks a card from well-shuffled deck and show to class (remove face cards and aces.)

Multiply the value by 2

Add 2

Multiply the sum by 5

Tell me your answer

Subtract 10 from the answer.

Compare with answers on your cards.

Mathematics Trick (Twenty-One Card Trick) Explanation: The magician begins by handing the spectator the packet, and asking him/her to pick a card, but not take it out, and remember it.

The cards are then dealt into three piles one at a time, like when dealing out hands in a card game. Each time they are dealt out, after the spectator indicates which pile contains the thought of card, the magician places that pile between the other two. After the first time, the card will be one of the ones in position 8-14.

When the cards are dealt out the second time, the selection will be the third, fourth, or fifth card in the pile it ends up in. In picking up the piles, the magician places this pile between the other two again. This ensures that the selection will now be one of the ones in position 10-12.

The third time the cards are dealt out, the selection will be the fourth card in which ever pile it ends up in. On the third deal, as soon as the spectator indicates which pile contains the selection, the magician knows that it is the fourth, or middle, card in that pile. If the magician gathers up the piles again, as before with the pile containing the selection in the middle, the selection will be the eleventh card in the 21 card packet.



Name That Color

*Does reading the color word
slow down your recognition of
the color displayed?*

This booth links to understanding
the human body and the five
senses.

Have an adult help you go to this website to print your own set of Stroop Test Mini Cards

<https://faculty.washington.edu/chudler/pdf/ministroop.pdf>

Or you can make your own using paper and markers. You'll need to create two different sets. For the first set, use the same color marker for the word. For example, you would write the word "Blue" using a blue marker. For the second set, use a different color marker for the word. For example, you would write the word "Blue" using a green marker. Each set needs at least 20 words.

Find a timer, stopwatch, or a phone with a seconds counter.

To Play:

You'll need to explain the rules. The person reading the cards must say the color of the word. They should not read the word. For example, if the word "Red" was written with a blue marker. The person should say BLUE.

You'll need to record the amount of time it takes someone to read each set of cards. For most people, it will take them longer to read the cards when the color of the marker is different from the word that is written.

Why does the Stroop Effect Happen?

When you are done quizzing your family and friends make sure you explain why this happens. Your brain can read words faster than it can name colors. Think about it, how often do you have to read out loud? How often to you quickly name colors out loud? When the color and the word match it is easier for your brain to quickly tell your mouth to say the color. When the color and the word do not match, your brain has to ignore the word. This causes the brain to slow down for a fraction of a second and it take you longer to say the color.

No Bones About It!

Test your knowledge of the human skeletal system!



This booth is linked to investigating the human body and skeletal system

Can you make a skeleton out of Qtips?

<https://www.crafts-for-all-seasons.com/Q-tip-skeleton.html>

Make a model of the spine:

<https://www.science-sparks.com/learn-about-bones/>

Heart "throb"

Watch your pulse using a marshmallow!



This booth links investigating the human body and transferring energy.

How do you measure your pulse? Where else can you measure your heart rate?

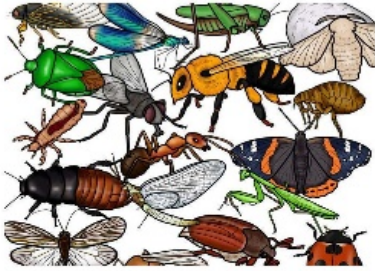
How might your heart rate change as you exercise and then stop to rest?

<https://science.discoveryplace.org/stay-at-home-science/measure-your-heart-rate>

<https://www.konnecthq.com/heart-experiment/>

What's Buggin' You?

Can you identify the insect by the sound it makes?



This booth is linked to animal diversity (producers and consumers).

What role do insects play in nature?

Make a Cicada Harmonica at home!

<https://www.wonderseekers.charity/science-at-home/lets-try-it-cicada-harmonica>

Bug on a Leash Sound Experiment:

https://youtu.be/TjGCK_IWoq4?si=rxNNk8YIkTBlaL6k

Explore how sounds can be made and changed:

<https://cdn.buglife.org.uk/2019/12/B-Lines-Making-a-Buzz.pdf>

Ultimate Angry Birds

Applying math to hit your target!



This booth links to angles and forces. It also illustrates how changes in speed direction result from forces acting on an object.

What kinds of Mathematics were involved in hitting your target?

You can make your own mini marshmallow catapult at home with your parents!

<http://frugalfun4boys.com/2010/08/16/marshmallow-catapult/>

Catapult Game:

https://www.teachengineering.org/activities/view/cub_catapult_lesson01_activity1

Build a Body

*Explore how the human body
is pieced together*



**This booth links to
investigating the human
body.**

Can you piece together a
human body?

More Body Puzzles

https://www.abcya.com/games/skeletal_system

***A special “Thank you” to those who provided
our larger demonstrations!***



Dr. Ivan Danchev
Associate Professor of Physics



Jerry Jackson
Chief Meteorologist



Mount Olive Fire Department



Beekeepers of the Neuse



Steele Memorial Library, Mount Olive