7 S Science
10 T Technology
11 E Engineering
11 M Mathematics

EDUCATION GUIDE

WRITTEN BY KRYSTAL DE VILLE

25 STEM Activities

Science Technology Engineering & Mathematics

STEM EDUCATION GUIDE EXCLUSIVE

CONTENTS

SCIENCE

EIGHT SCIENCE EXPERIMENTS YOUR KIDS WILL LOVE!

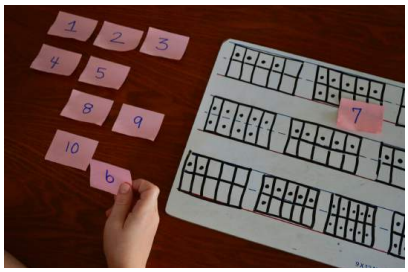
We get into a wide range of activities for all ages. Some of these are outside only, while others will be quick and easy to set up inside.

TECHNOLOGY

IN THIS SECTION, WE HAVE SEVEN EXPERIMENTS THAT WILL DELIGHT EVERYONE.

ENGINEERING

CLASSIC EXPERIMENTS THAT WILL DELIGHT YOUNGER KIDS.



MATHEMATICS

IN THIS SECTION, WE MAKE LEARNING MATH FUN!

HOW TO USE THIS BOOK

The experiments in this book are divided into four sections: Science, Technology, Engineering, and Mathematics. STEM activities can often overlap these fields, but I did my best to separate them into their own categories.

Every activity in this book I did with my children. There's a mix of age-appropriate activities for everyone. If an experiment seems geared towards older kids, this is where a grown-up should oversee it, I advise you to use your best judgment based on your own child's skill set.

Throughout this book, I make references to my blog, www.stemeducationguide.com

You can find more details by clicking links to the blog when available or to find more activities similar to the ones featured in this book. I frequently update the blog with new posts, around twice a week. Also, I added links to Amazon for materials I felt are not as common to speed up gathering items. Most of these items can easily be found in your local grocery store.

I encourage you to find more free downloadable content here, www.stemeducationguide.com/category/free-downloads/

If you have any questions or feedback, feel free to reach out to me at krystal@stemeducationguide.com

Thank you,

Krystal

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EDUCATION GUIDE

WHAT IS STEM?

by Krystal De Ville

STEM learning plays a crucial role in a child's future. With a focus on Science, Technology, Engineering, and Mathematics, we create valuable knowledge which our young children need to be successful and competitive in the years to come.

It's a curriculum that revolves around the idea of educating students in these four particular disciplines. STEM education is the perfect combination of an applied and interdisciplinary approach.

As opposed to teaching these disciplines as discrete and separate subjects, STEM integrates them into a cohesive education paradigm that revolves around real-world applications.

STEM, an acronym for Science, Technology, Engineering, and Mathematics, is an essential component of the educational experience.

"Sometimes it may seem that learning and playing are mutually exclusive, but that doesn't have to be the case."

THE IMPORTANCE OF STEM IN CHILDHOOD EDUCATION

"Instead of rewarding students for getting 100% on a test, it is long overdue to reward students for seeking unique and creative ways to solve real-world problems."

To succeed in this ever-changing society as globalization continues to increase, STEM education provides the foundation to learn and develop skills that will shape our future.

These disciplines pave the way for a healthy environment, productive citizens, and a prosperous future.

This isn't hard, as kids are naturally inquisitive little wonders. They are constantly trying to make sense of the world around them by taking things apart, putting objects in their mouth, or exploring different places.

The next stage for these kids is to get a formal education. However, when they are placed in an assembly-line system of education that forces them to memorize statistics or write words over 21 times, those curiosities tend to wear off.

It comes as no surprise that the push for STEM education in early childhood is essential to their development.

Students and professionals alike are learning that individual comprehension is far more critical than robotic memorization.

STEM ENCOURAGES INDEPENDENCE

STEM enhances individual skills and independence by utilizing real-world scenarios to grow and augment developmental minds.

By teaching young learners the value of real-world problem solving, critical thinking, and creativity, they gain a sense of independence not seen in other subject areas.

With experimentation comes the endless possibilities of what most people view as failure. By embracing STEM education, it isn't simply embracing the fusion of these subjects. Still, we're empowering kids to persevere through failure and to see it as a gift for when they do achieve the outcome they so diligently strived for.

STEM EDUCATION GUIDE

What's STEM?

- Science
- Technology
- Engineering
- Mathematics

Why STEM Matters

Kids love sharing about their discovery and problem solving. They simply need the avenue and a cultivated environment for it to flourish.

STEM Encourages Experimentation

With experimentation comes the endless possibilities of what most people view as failure. By embracing STEM education, it isn't simply embracing the fusion of these subjects. Still, we're empowering kids to persevere through failure and to see it as a gift for when they do achieve the outcome they so diligently strived for.

STEM Encourages Independance

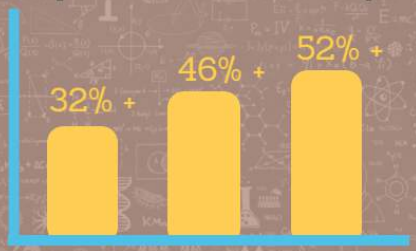
Instead of rewarding students for getting 100% on a test, it is long overdue to reward students for seeking unique and creative ways to solve real-world problems.

The Importance of STEM in Childhood Education

1. Teaches problem-solving
2. Encourages adaption
3. Encourages knowledge application
4. Builds resilience
5. Fosters ingenuity and creativity
6. Encourages teamwork

STEM Degrees Earn More

Compared to Non-STEM majors



32% - STEM major (overall)
46% - Computer Sciences
52% - Engineering Technology

History of STEM

2001 — **U.S. National Science Foundation**

The STEM acronym was introduced in 2001 by scientific administrators at the U.S. National Science Foundation (NSF)

2005 — **Rising Above The Gathering Storm**

U.S. National Academies of Science, Engineering, and Medicine, emphasized the links between prosperity, knowledge-intensive jobs dependent on science and technology, and continued innovation to address societal problems.

2012 — **Implementing STEM**

Educators focused on improving science and mathematics instruction employed several approaches to K-12 STEM education.

LEARNING THROUGH SELF-DISCOVERY

Kids love teaching based on their own experiences of self-discovery. If ever in a classroom and a technology issue occurs, prepare to be amazed.

Suddenly, every student has their own solution on how to solve the problem to the point where you have to select only 1-2 students to fix it or risk having the entire class fidgeting with the wiring.

Even after the problem is solved, they'll continue to tell you the story of how they realized that was a problem for them and how they were able to solve it.

It's not a wonder that all of a sudden, every kid will participate as opposed to when you ask them when the Declaration of Independence was signed. Kids love discovering. They love problem-solving!

"Kids love sharing about their discovery and problem solving. They simply need the avenue and a cultivated environment for it to flourish."

Every kid engages in STEM learning, and it is the job of the people around them to help them realize this.

People may think that kids will get down on themselves if they don't get the result they want, but that is a learned behavior from constant scolding and ridicule.

When children do not get the result they want, they'll naturally find a way to solve it.

If not, children collaborate with others until they do. Self-discovery is innate within our youth, but they need to feel comfortable to let their true selves shine.

HOW SHOULD STEM BE INCORPORATED

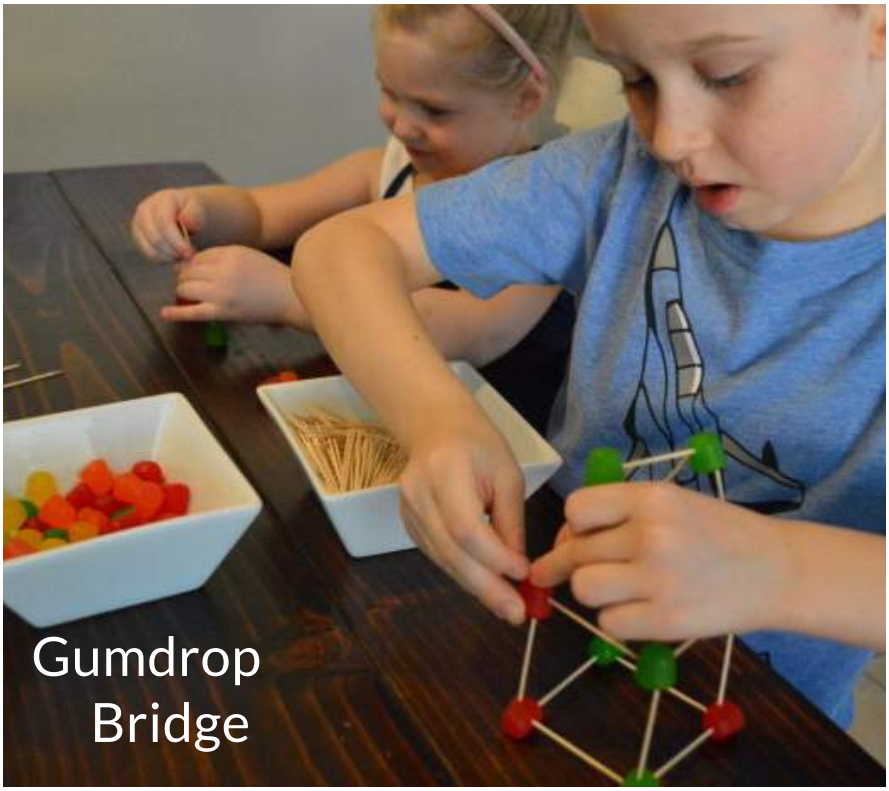
STEM is naturally configured in early childhood education, but people may not have even realized it.

If there were Legos or building blocks in a preschool or elementary classroom, they naturally developed this education.

The only fallback may be that there has not been a strong enough focus on STEM learning and communal activities.

Legos and building blocks are used as a break-time activity instead of being infused into their daily learning. With the continued advancement of STEM activities, students' practical reasoning skills will continue to soar.

The importance of STEM is universally known, especially with traditional subjects leading the way, including Science and Mathematics, but how do we expand on this to fully include Technology and Engineering?


Gumdrop Bridge

HOW THE EDUCATIONAL WORLD CAN HELP

How can the academic world provide funding that bolsters the fusion of all of these fields? Most importantly, how will it look in a typical classroom for Kindergarteners? 4th graders? 11th graders?

It may take a complete restructuring of how we categorize classes, learning activities and even assess the students. The daily schedule doesn't have to be an entire shift of thought to a "Mathematics" activity; instead, teachers will understand the importance of lessons that build on each other.

Even exterior subjects such as Social Studies or Language Arts can be infused by developing a catapult from Medieval Times or studying the numerical patterns within poetry.

Assessments should be redesigned to reflect major STEM values, including creativity, perseverance, and discovery.

There needs to be an educational adjustment that values the process more than the product. Incorporating STEM into early childhood education is a gargantuan task, yet very achievable.

By utilizing hands-on experiential learning, students are in a much better position than in years past.

By channeling STEM learning at a preschool and early elementary age, they will be more prepared to take their learning to a completely different level by the time they reach intermediate, middle, and even high school.

Making every student STEM-literate is a necessity in this ever-changing, complex world.

"Even at younger ages, STEM activities can help enhance their motor schools and hand-eye coordination."

SCIENCE ACTIVITIES

These science activities are going to be for a wide range of kids. Not all exercises are suitable for younger children, or they might need to be modified with more adult supervision.

Life is full of wondrous things. Some you can create, some you'll find or come across by chance.

We'll show you how we get our hands dirty, but leave it up to your imagination where they might lead.

In this science activities section, we'll cover some of my kids' favorite. What catches my kids' eye might not work for yours. So, modify what's needed for your household.

SUPPLIES

Most of the supplies you'll need in this area you probably already have at home. If there is something special you'll need, you might be able to find a substitute for it.

HAVE FUN!

There are many ways to make science experiments more exciting. One way is by asking lots of questions! Keep a logbook of questions your kids have before and after completing an activity.

This will help you better understand and build upon your knowledge base so that the next experiment can be even more interesting.

Another thing to do is look at how different variables affect one another, which may lead you down an entirely new path in exploring what's happening with physical phenomena around us every day.

These experiments are just a starting point to a lifetime of learning, asking, and thinking.

Scientific progress does not follow a straight line. If you find that your experiment is going in the wrong direction, don't be discouraged; instead, look for ways to troubleshoot and change variables until it heads back on track.

Scientists often learn more from what doesn't work than they do with successes because as long as scientists are learning something new, then there is hope of striking gold eventually!

So, be prepared to be stunned by the unexpected. Prepare yourself for an experience that will leave you breathless and enthralled at every turn, ensuring your return time and again!

Prepare to get hands-on with some of the funniest science experiments around! Ready? Set... Go!

Soda Geyser Eruption

Time for experiment: 30 mins

MATERIALS

- A few two litter diet soda bottles
- Mentos
- Others candles
- Sand

INSTRUCTIONS

- It goes without saying but, you're going to want to do this outside.
- Carefully open the soda bottle on a steady surface. We don't want the bottle to tip over.
- Now, this is the fun part! Drop a few mentos in the soda at the same time.
- Observe, take pictures of the kids' reactions!

VARIATION

- For a bigger eruption, you can drop more mentos in the soda at the same time. A trick is wrapping a piece of paper in a cylinder, with four mentos in it. Put your finger under the cylinder and drop the mentos in. They make a small toy that will do this as well. You'll get bigger eruptions and more control. It's called Geyser Tube Toy.
- We also experimented with sand to see what worked best.

Note: This doesn't have to be done with diet soda. Regular soda will work just fine, but it's a sticky mess to clean up. Diet soda is made with artificial sweeteners so that it won't be sticky, like sugar.

Exploding Watermelon

Time for experiment: 1 to 2 hours

MATERIALS

- A watermelon
- A ton of Rubber bands

INSTRUCTIONS

- Another outside activity. This is going to get everywhere!
- With your watermelon, find a sturdy bowl or stand to rest the melon.
- Add rubber bands around the center of the watermelon.
- The melon will start to deform and then Explode!

Note: If your kids are small like mine. You're going to end up putting most of the rubber bands on yourself. About halfway through, they started getting a bit tired of it.

Volcano Experiment

Time for experiment: 30 mins once the mold is cured.

MATERIALS

- A Volcano Kit

INSTRUCTIONS

- Your volcano kit will come with instructions. I recommend you fully read the instructions. I've read reviews of some people having problems with the mold-breaking, but I think they didn't give the plaster enough time to cure.
- I do recommend your kids painting the volcano. If your kit didn't come with paints, you could look at the recommended crafting list we have on the blog.

- Add two spoonfuls of baking soda.
- Add about a spoonful of dish soap.
- Add five drops of the red food colorings.
- Add about an ounce of the vinegar into the volcano, and watch what your volcano erupt!

Rainbow Rain

Time for experiment: 10 mins

MATERIALS

- Foamy shaving cream, (no gel)
- Clear cups
- Food dye

INSTRUCTIONS

- Fill clear cup halfway full of water.
- Add foamy shaving cream.
- Add drops of food coloring.
- When the cloud becomes too heavy, gravity will pull the food coloring down, just like when it rains in the sky!

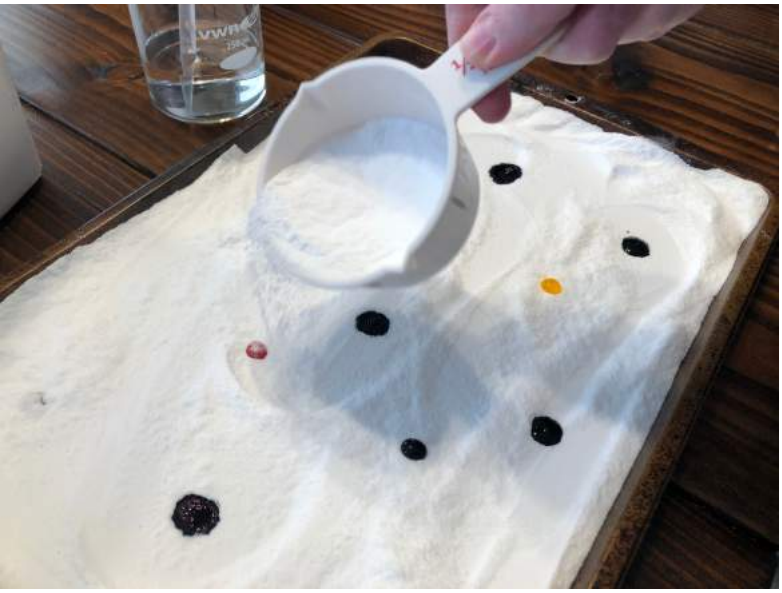
Note: This is a quicker experiment that's not as messy as the ones above.

Hidden Rainbow Tray

Time for experiment: 35 mins

MATERIALS

- Backing soda
- Vinegar
- Food coloring
- baking tray
- Droppers (for the vinegar)



Hide the food coloring droplets.

INSTRUCTIONS

- Fill the baking tray up with baking soda. Make sure to put a smooth layer covering the pan evenly.
- Add droplets of food coloring in different spots. Use different colors to surprise your kids when doing to experiment.
- Use a thin layer of baking soda to cover up the food coloring droplets.
- Take the baking sheet outside or in a safe area, use the dropper with vinegar to find the area with the food coloring. Kids will find it fun to discover where the different colors are on the baking sheet hiding in the baking soda.

Note: This experiment was more for my five-year-old daughter but it turned out my eight-year-old son loved it too!

Easy Reaction

Time for experiment: 20 mins

MATERIALS

- Foamy shaving cream, (no gel)
- Clear cups, or glassware beakers
- Food dye

INSTRUCTIONS

- Fill your container with baking soda.
- Now, you'll need to add vinegar. The more vinegar, the more explosive the reaction (unless you add TOO much).
- A 12 to 1 ratio of vinegar to baking soda is a good place to start. So, if you used one tablespoon of baking soda, add 12 tablespoons of white vinegar.
- Watch your creation fizz and bubble! Try experimenting with different ratios of vinegar and baking soda to add to the learning experience.

Note: I included this after "Hidden Rainbow Tray" because you're going to have most of these items out already.

Rainbow Magic

Time for experiment: 15 mins

MATERIALS

- Skittles (or any other such coated sweets)
- A plate or container (preferably white)
- Warm water

INSTRUCTIONS

- Take a white container or plate and arrange your skillets (or any other coated sweets) over it. Try to arrange them with alternate colors.
- pour the warm water into the container slowly. Push the skittles back into their place if they happen to move due to water.
- Skittles are coated with sugar and food coloring. So, as soon as you pour water over them, the sugar and color will start to dissolve and spread along through the water, giving you a colorful effect!

Lava Lamp Experiment

Time for experiment: 25 mins

MATERIALS

- Vegetable Oil
- Water
- food coloring
- AlkaSeltzer

INSTRUCTIONS

- Fill your container 3/4 full of vegetable.
- Color around 1/2 cup of water with food coloring.
- Take the AlkaSeltzer tablets and break them into 2 or 3 pieces. Place them in a small cup or container.
- Pour the colored water into the larger container, then add the AlkaSeltzer!

VARIATION

- Mixing your food coloring with water beforehand isn't necessary. You can add the food coloring after the last step. We tried it both ways, and the results were the same.

TECHNOLOGY ACTIVITIES

These technology activities are going to be for a wide range of kids. Not all exercises are suitable for younger children, or they might need to be modified with more adult supervision.

We interact with technology every day, even though many aspects go unnoticed.

While you might never know how everything works, you'll get a good base of understanding here in the technology section.

We relied heavily on chemical reactions for the science section, and this area will be filled with circuits, magnets, and other fun stuff!

Many of these experiments could have gone in the engineering section, and just about everything can be related to math.

I decided to have these experiments here because technology is what most people will think of first, with these exciting activities.

WHY YOU WANT TO ENCOURAGE YOUR CHILD LEARNING TECHNOLOGY!

Traditionally, Mathematics and Science have always been taught in schools, so many may believe they are already embedded in STEM learning.

Even if technology is taught in a school, it's typically in a separate classroom where kids sit at a computer for the duration of the class.

STEM in practice is a nuanced discipline that provides values that should be distributed throughout the entire education system.

Integrated STEM education is the legitimate connection between these disciplines in a K-12 educational system.

In my article, The Importance of STEM in Childhood Education. I convey the importance of stem as a unit. Not thinking about the four disciplines as separate, but a greater whole.
That's why many of these activities will overlap or might not fit right in the section they are in.

Overall, we're getting the message across to our kids; learning is fun!

Coding With Scratch

MATERIALS

- Scratch coding book
- Computer

INSTRUCTIONS

- If your kids are into this they will get a lifetime of learning. I can see in a few years, "coding courses" almost being a requirement in school.
- My son is 8, and it only took about 10 minuets for him to really get into it. Scratch is designed especially for ages 8 to 16, but is used by people of all ages.
- I recommend getting a book from your library, but they also have a ton of information in there website.

Note: I have an article dedicated to this topic if you'd like to take a look. You can find it on my blog, What Is Computer Science For Kids?

What is COMPUTER SCIENCE For Kids?

At It's Core

At its core computer science is about learning how computers and programs work. As well as information about computers, computer science is also a whole new way of thinking.

Coding for Kids

Coding is telling a computer what to do. Like any form of communication, it happens in a particular language.

Computer Science and Robotics

A fantastic way to spark interest in computer science is to have kids do something where they can directly see the result in the real world instead of just on a screen.

Finding a Language

Depending on the age of the budding programmer, you might like to start with Scratch or with Python.

S Science T Technology E Engineering M Mathematics

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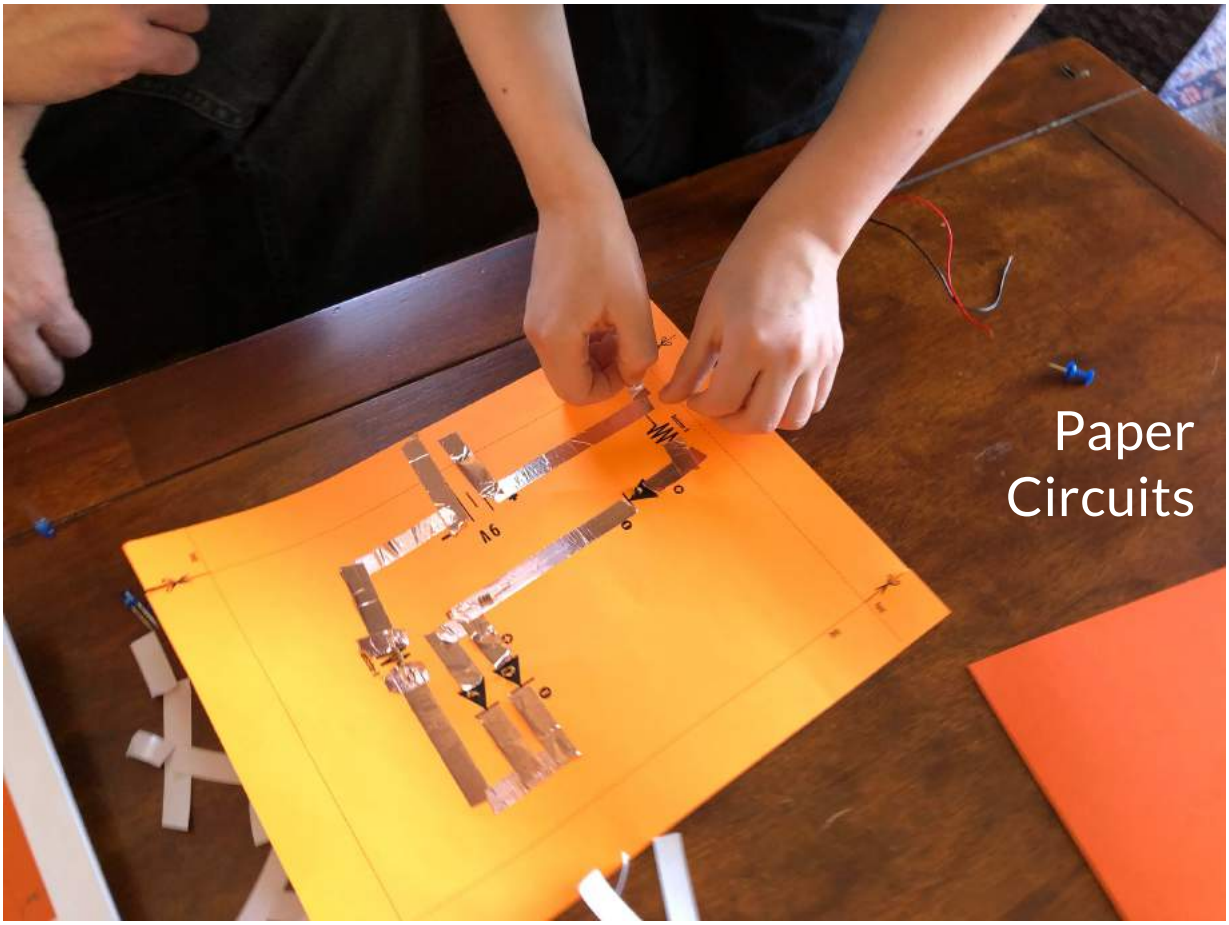
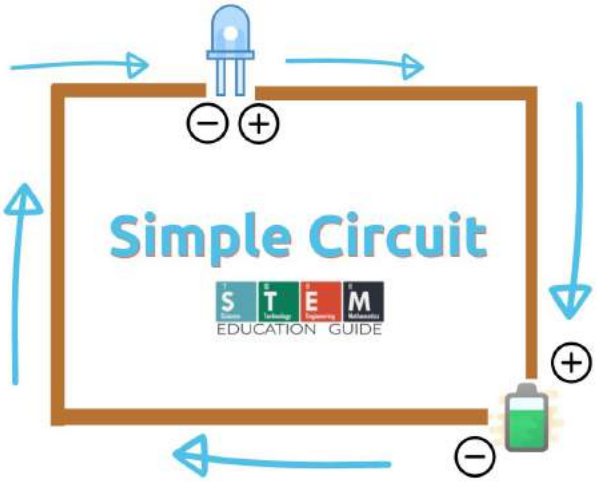
Paper Circuits



Time for experiment: 45 mins

MATERIALS

- Card stock paper
- Copper tape, ¼ inch wide and double-sided conductive
- Scissors
- 3V lithium button battery
- 5mm LEDs of assorted colors



INSTRUCTIONS

- A circuit is easy to make. Remember, for a circuit to work, the direct path from the negative end of the battery, through the light, and back to the positive end of the battery.
- If you look at your 5mm LED, you'll notice on side is longer, this is the positive side.
- Electrons must flow from the negative end of the battery to the negative end of the LED. If the LED is oriented incorrectly it will not light up.

Note: If you're looking for projects, check out my article, 7 Exciting Projects for Teaching Kids about Electric Circuits.

STEM Photo Hunt Activity

Time for experiment: 30 mins

MATERIALS

- A bag
- A list of items you're looking for

INSTRUCTIONS

- Create a scavenger hunt for your Kindergartener to explore and take pictures of! (or use ours down below).
- It could be as simple as finding every color in the rainbow or finding an object with a variety of specific shapes.
- They then are off to explore their surroundings, whether it be a classroom or a playground, to capture their intended target.

Note: The bag is to collect things to look under a microscope in our next activity.

Scavenger Hunt

- [ ] Something Prickly
- [ ] Two Sticks
- [ ] Green & Yellow Leaf
- [ ] A Flower
- [ ] A Weed
- [ ] Something Green
- [ ] Something Smooth
- [ ] A Bug
- [ ] A Dog or Cat
- [ ] Two Birds Together
- [ ] Something Smooth
- [ ] Feather
- [ ] _____
- [ ] _____

STEM EDUCATION GUIDE

Bring some items home to look at under a microscope.

Microscope Activities

Time for experiment: 20 mins

MATERIALS

- Microscope
- Items collect around the house or scavenger hunt
- X-Acto knife (for adults only)

INSTRUCTIONS

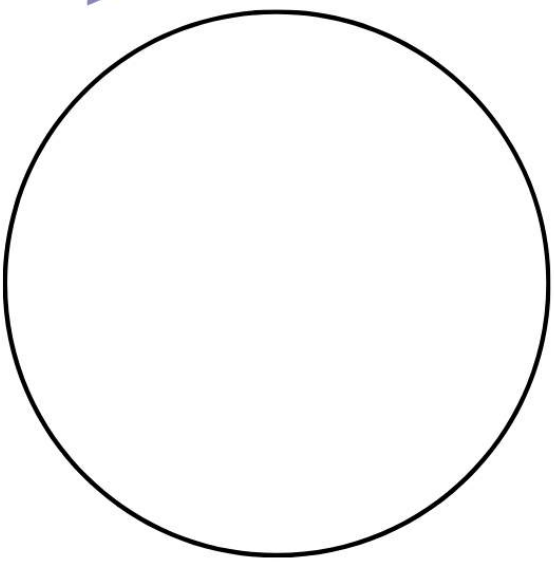
- Find samples from your scavenger hunt or things around the house.
- Open your refrigerator up and create samples with your X-Acto knife from fruits and vegetables.
- Use the observation page to draw what you see!

"Using a microscope can provide a fun learning experience for both the child and the rest of the family alike!"

Note: For more microscope activities, take a look at my article, Microscope Activities for Kids.

Name: _____ Date: _____

Microscope Observations



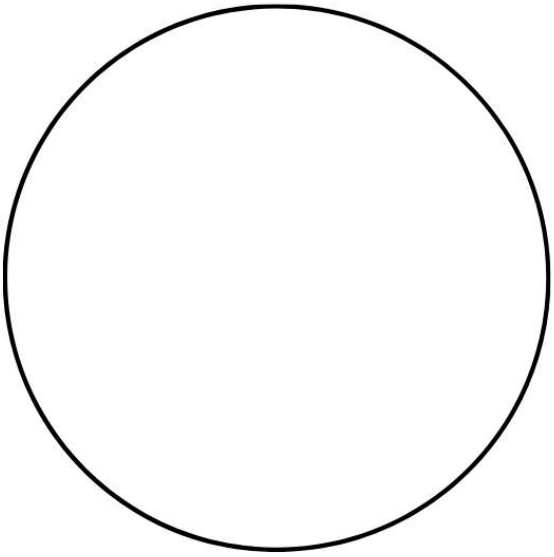
Name of Sample: _____

Collected From: _____

Magnification: _____

Observations: _____

_____



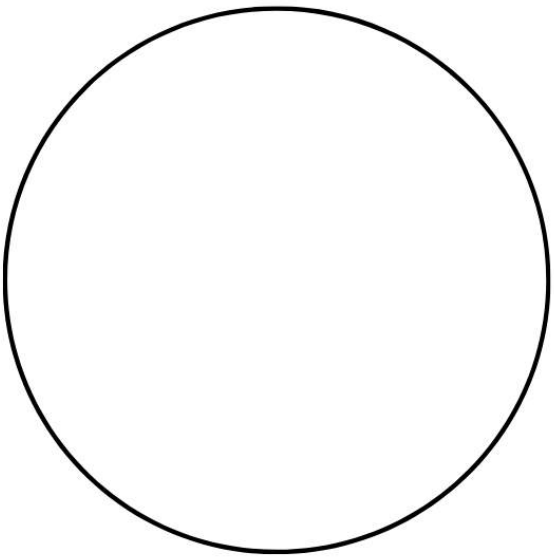
Name of Sample: _____

Collected From: _____

Magnification: _____

Observations: _____

_____



Name of Sample: _____

Collected From: _____

Magnification: _____

Observations: _____

_____

Static Straw

Time for experiment: 5 mins

MATERIALS

- Small packet of pepper, or 1 tsp
- Plastic straw
- Small amount of rice, or salt

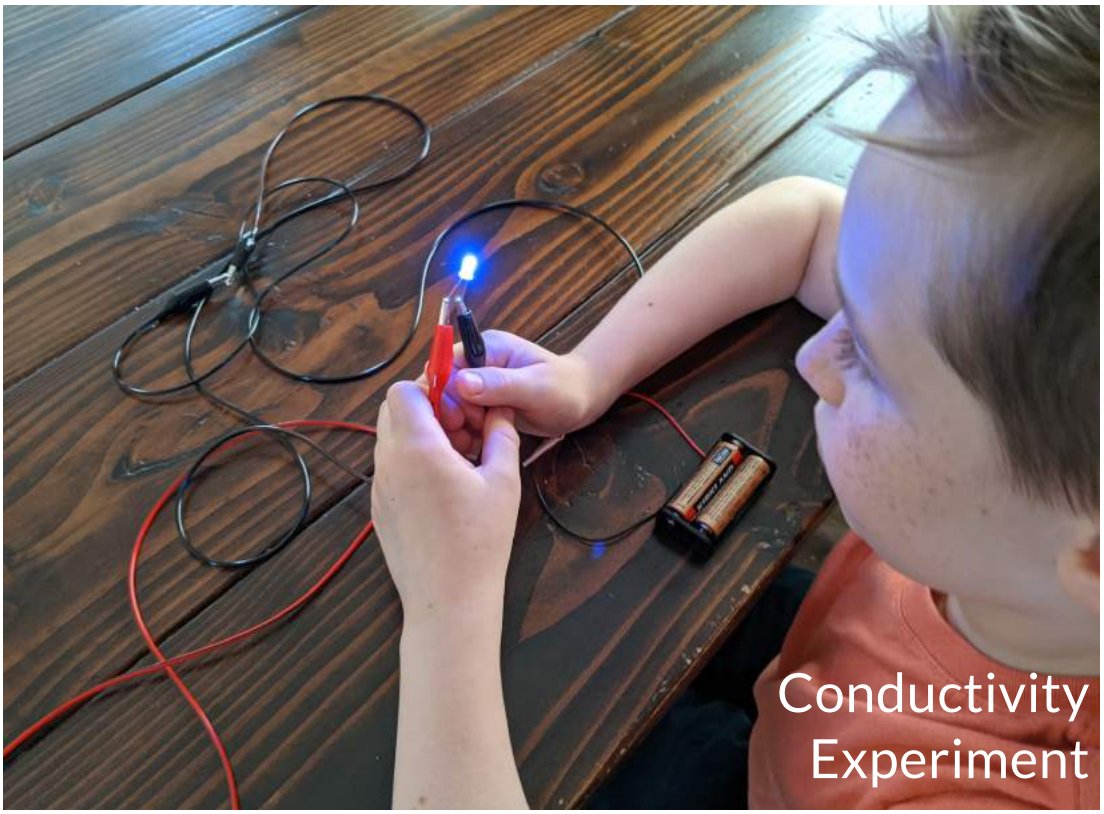
INSTRUCTIONS

- Lay down a piece of construction paper.
- Mix the pepper with the rice.
- Rub your straw on your shirt or your hair.
- Hold the statically charged straw above the rice and pepper.
- The pepper will jump to the straw!

VARIATION

- Use a rubber balloon instead or with the straw.

Conductivity Experiment



Time for experiment: 20 mins

MATERIALS

- Alligator clip leads (wires)
- AA battery holder with wires
- 2 AA batteries
- 5mm LED light bulb

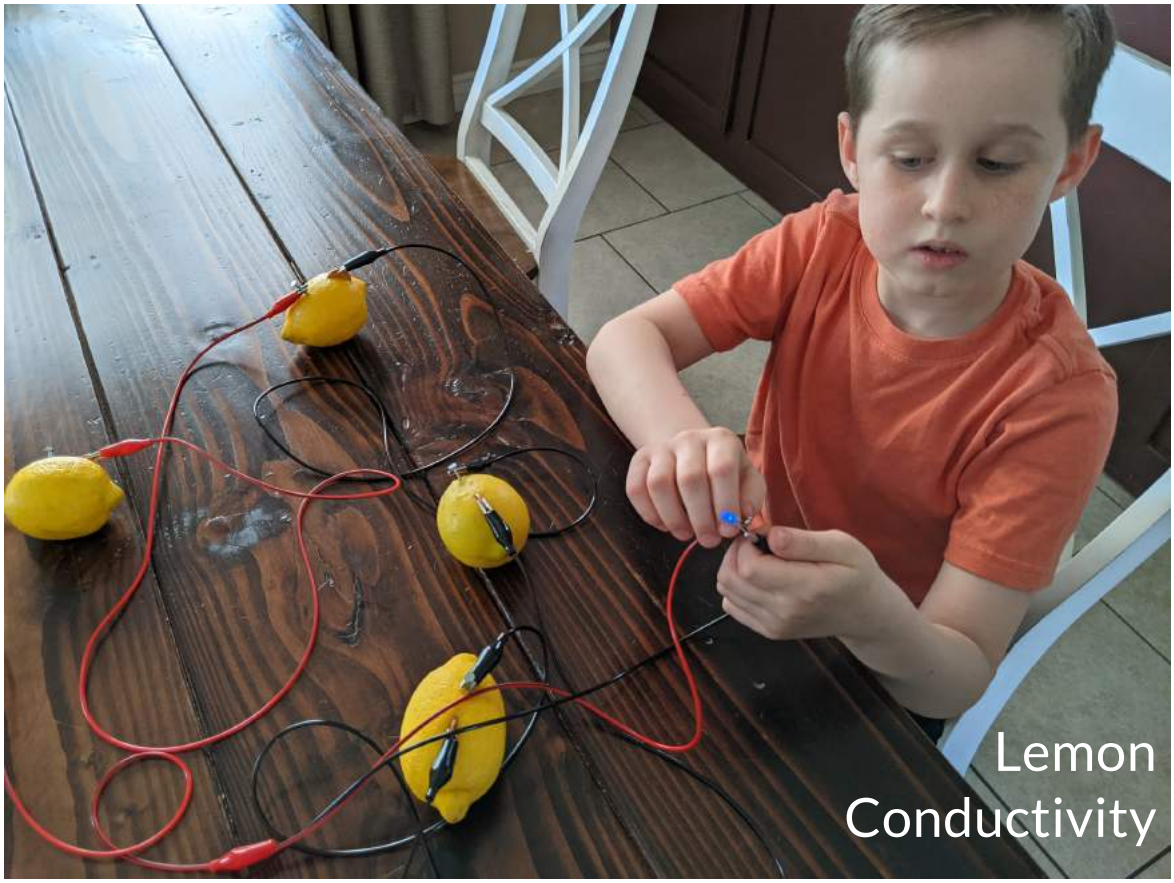
INSTRUCTIONS

- Place the batteries in the battery holder.
- Connect an alligator clip to each of the battery holder wires.
- Attach the third alligator-clip wire to the LED pin. You should have 2 free alligator clips.
- Attach the 2 free alligator clips to each household item, one at a time.

VARIATION

- Once you know your circuit is working, connect different objects around the house to see if they are conductive! (coins, screws, washer, or even a potato, etc.)

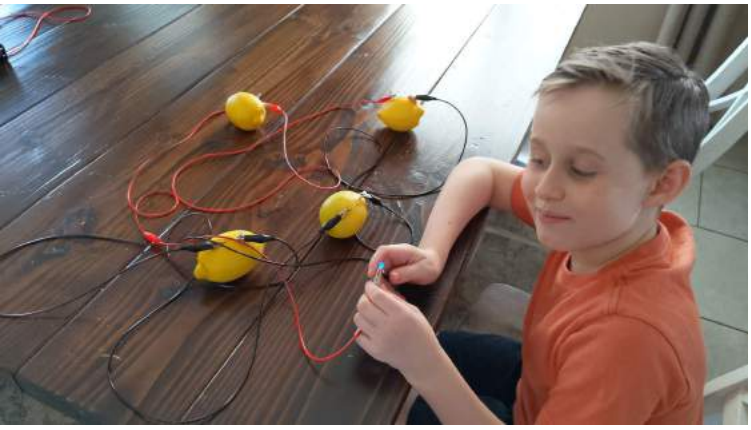
Lemon Conductivity



Time for experiment: 20 mins

MATERIALS

- lemons
- zinc-galvanized nails
- Alligator clip leads (wires)
- 5mm LED light bulb



INSTRUCTIONS

- Push a galvanized nail and a penny into each lemon. You'll have to cut the lemon a little to get the penny in. Make sure they don't touch.
- Use 3 alligator clips to connect the lemons to the nails in a different lemons so that all 4 lemons are connected in a circuit.
- Attach one end of another alligator clip to the last nail and the other end to the LED.
- Attach the last alligator clip to the last penny and connect it to the LED.

Note: The light should turn on when everything is connected correctly! If it doesn't, disconnect the bulb, turn it around, and connect it again so that the two pins are attached to the opposite wires.

ENGINEERING ACTIVITIES

These Engineering activities are going to be for a wide range of kids. Not all exercises are suitable for younger children, or they might need to be modified with more adult supervision. You'll especially have to help them with activities such as the balloon car race.

Look around you. At least 95% percent of the things around you were created by an engineer, or an engineer played a role in its creation.

Engineers and their skills are in high demand across many sectors, and that is why they are one of the most lucrative jobs.

Engineering is, without a doubt, one of the most admired careers in the United States. Most people who are already in the job market but outside engineering will confess that they wanted to venture into engineering at some point in life.

As a young child, it is important to explore STEM subjects. STEM encourages children to experiment, research, and make mistakes as they learn how things work and take their own experiences to reach the right outcomes.

It encourages critical thinking, logical analysis, and project-based learning, which are all key stepping stones in any STEM education.

As a parent, you must immerse your kids into engineering as early as possible, especially if they've shown an interest at a young age. Read on for 5 tips on how to introduce engineering to your child at a young age.

TELL YOUR KIDS WHAT ENGINEERING IS

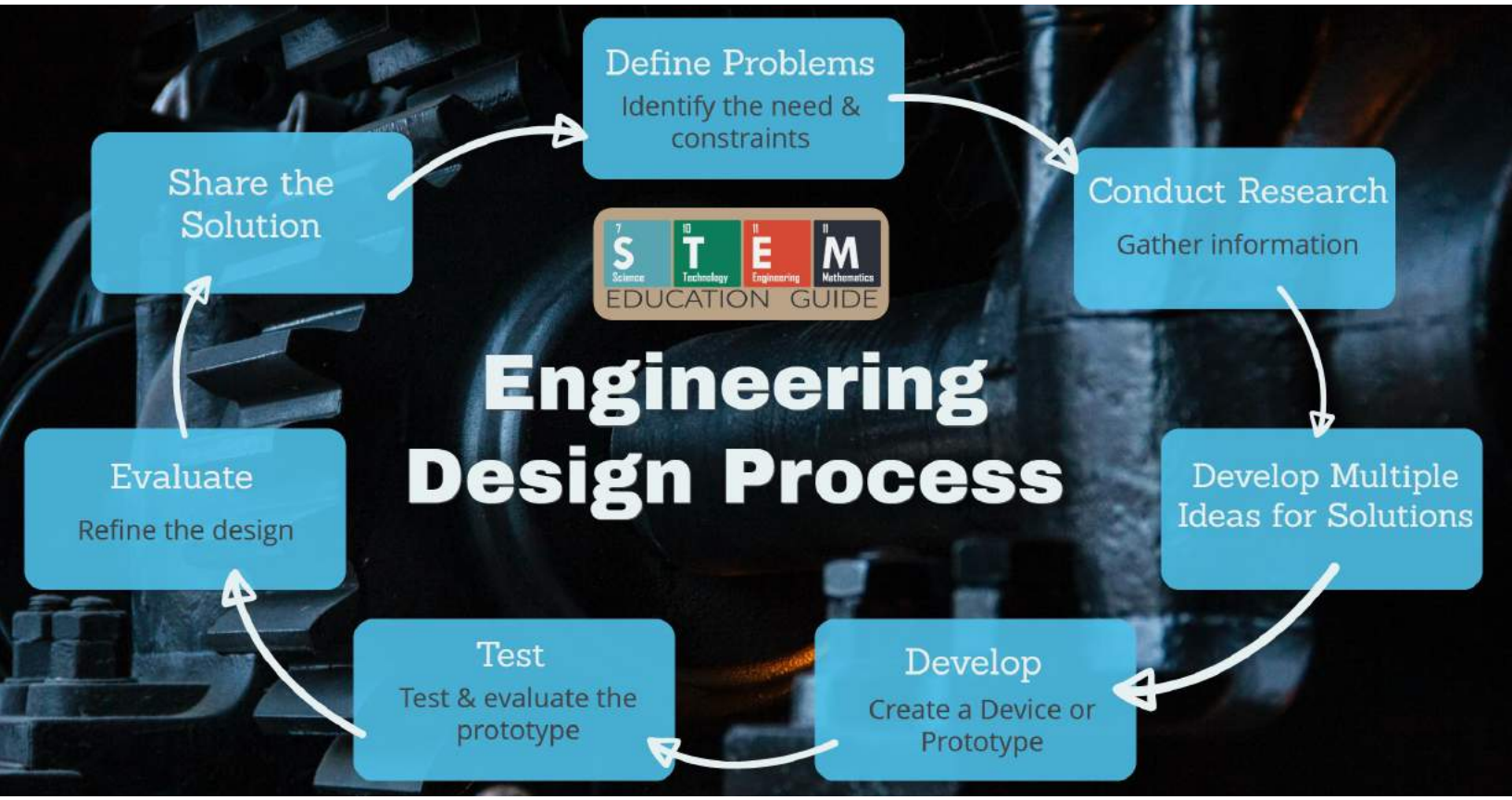
The first thing you should do is explain to them what engineering is and some of the things it entails.

Engineering to kids (or at least most of them) involves building and setting up structures. This couldn't be further from reality.

There are almost a dozen different types of engineers. Some of the well-known ones include electrical engineer, civil engineer, mechanical engineer, software engineer, and chemical engineer. In contrast, the lesser-known ones include aerospace engineer, biomedical engineer, petroleum engineer, marine engineer, and a host of other different classifications.

Each class of engineers has specialized in a completely different thing, and it is crucial that young children understand this. To drive the point home, you can use different things within the house to explain how an engineer played a role in its design.

This process is a step-by-step method used by teams of engineers to solve engineering problems or challenges.



We all run into issues in our everyday lives. These might involve a gadget that's not working correctly and needs improvement or could include something we want to make "from scratch." We consider workable solutions, make plans, and try an idea we think could work using math, engineering, and science concepts.

Sometimes we might see the Engineering Design Process explained in even more stages than listed below. However, when you get right down to it, they can all fit into the seven steps.

Below is a simplified, five-step process worksheet your kids can use to solve problems on the next page!

ENGINEERING DESIGN PROCESS

NAME:
PROJECT:

ASK

IMAGINE

PLAN

CREATE

IMPROVE

STEM EDUCATION GUIDE

Wind-Powered Car

Time for experiment: 45 mins

MATERIALS

- Toy car(s)
- Tape measure
- Fans or a blow-dryer
- Craft supplies (big list on my blog)

INSTRUCTIONS

- Construct a sail for a toy car using scissors and any craft supplies you have available at home.
- Attach the sail to the car with tape or glue.
- Test out the sail by blowing on it or using a fan.
- Set up a race in front of a fan using the measuring tape!

Balloon Powered Racers

Time for experiment: 50 mins

MATERIALS

- Balloons
- Straws
- Craft supplies (big list on my blog)
- Legos or K'nex

INSTRUCTIONS

- Build a vehicle that will hold a balloon with straws hanging out like in the picture. Let your kids get creative as they want to.
- Stick the straws into the balloon, wrap tape around them to secure them in place.
- Blow up the balloon with the vehicle facing the direction you want it to go.
- Let the vehicle take off to see how far it goes!

Cup Tower Challenge

Time for experiment: 15 mins

MATERIALS

- Plastic cups
- Level surface inside

INSTRUCTIONS

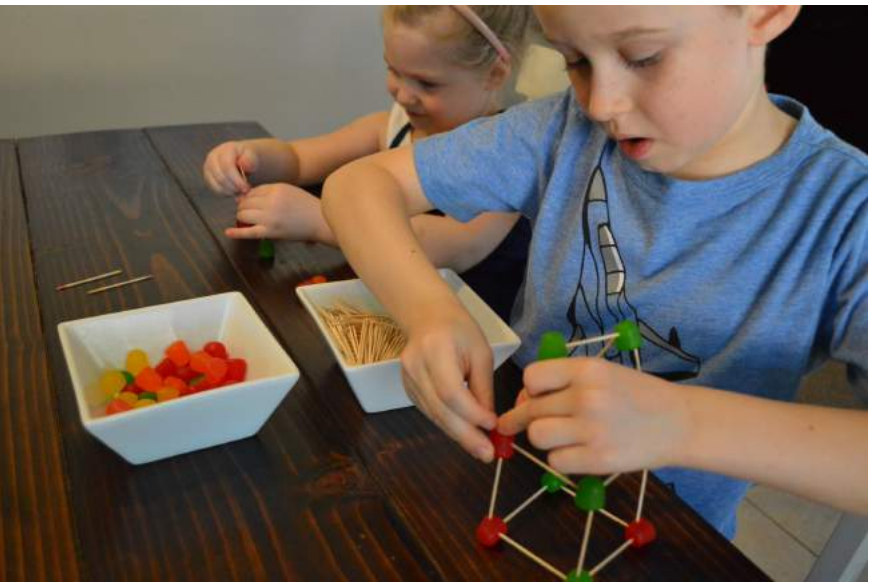
- This is geared towards little kids, and my daughters had a blast building.
- With these cups, give challenges to your little ones on building towers, walls, pyramids, and skyscrapers.
- Challenge them if they can create with only a certain amount of cups.
- Ask them how many cups they will need to build something, see how close they were.

Gum Drop Bridge

Time for experiment: 30 mins

MATERIALS

- Box of tooth picks
- Box of gumdrops (or squishy candy)



INSTRUCTIONS

- Fill a couple of bowls with gumdrops and toothpicks.
- You can either set out a certain amount of gumdrops and toothpicks to see what they can build with limitations or set out a lot.
- Challenge them to build bridges, houses or let them run wild with whatever they can imagine!

Flashcard Lego Landmarks

Time for experiment: 20 mins

MATERIALS

- Landmark card or other landmarks you find
- A large set of Legos or other building toys

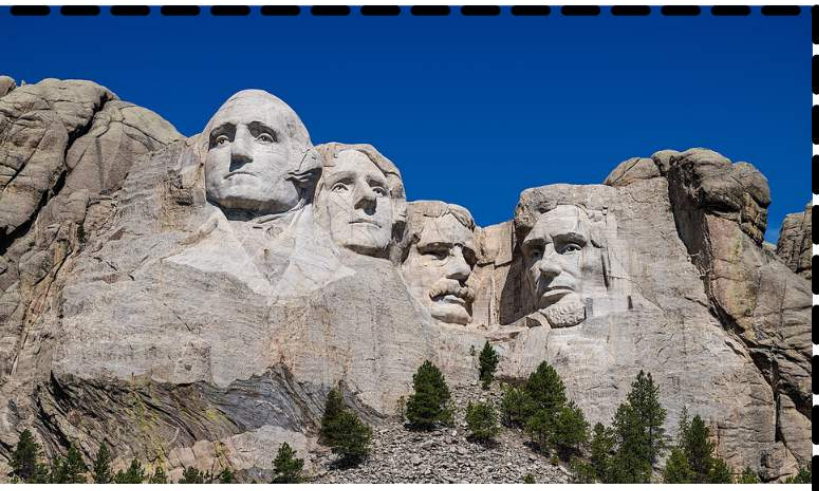
INSTRUCTIONS

- Pick the landmark you'd like to build.
- Build the landmark out of Legos or your favorite building toys.
- When building your landmarks, start a discussion about what makes the landmark special.

Build Lego Landmarks

Stonehenge, England

- Stonehenge was built over several stages spanning centuries.
- Transporting the stones remains a mystery.
- Roman artifacts have been found at the site.
- It was built by people who left no written records.
- It draws more than 1 million visitors a year.



Build Lego Landmarks

Mount Rushmore, South Dakota

- It started in 1927 and finished in 1941
- The presidents were chosen for their significant contribution to the country's founding, expansion, preservation, and unification.
- A team of over 400 men did the actual carving.
- Each president’s face is 60 feet high.

Baking Soda Rocket

Time for experiment: 30 mins

MATERIALS

- Baking soda rocket kit
- Flat surface outside with plenty of room

Filling the rocket with citric acid.

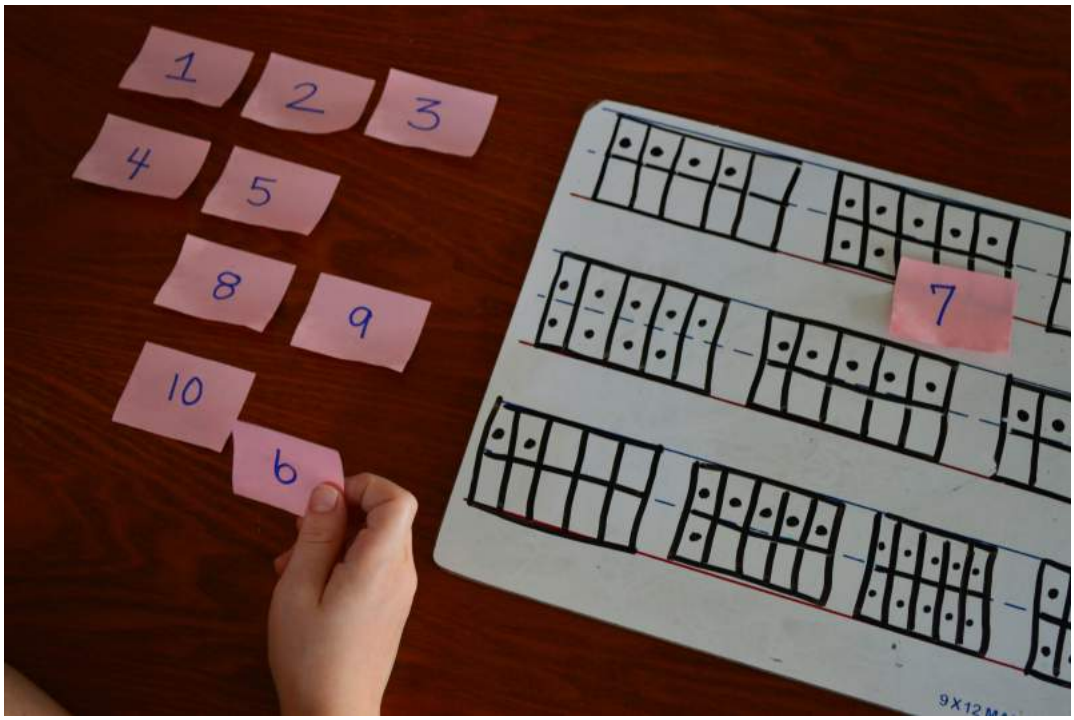
INSTRUCTIONS

- If you decided on purchasing a kit, it would come with instructions. I recommend you fully read the instructions.
- You're going to set your base on solid grown, away from anything you don't want messy.
- Put vinegar in the bottle.
- Then add the baking soda.
- Quickly push the cork down into the opening.
- Set the rocket down, and a few seconds later, the rocket will take off.

Note: If you're having a problem with the chemicals reacting too quickly, you can wrap the baking soda in a paper towel to slow the reaction time down.

MATHEMATICS ACTIVITIES

These mathematics activities are going to be for a wide range of kids. Most exercises are suitable for younger children, but they can easily be modified for older kids.



As with the other STEM disciplines, mathematics is taught as a singular subject in most school settings.

As you've seen throughout this eBook and on the STEM education guide blog, I've done my best to blend science, technology, engineering, and mathematics.

When coming up with and finding creative activities to get children involved in STEM, I find myself not making math as enjoyable as the other three stables of STEM.

Mathematics activities are at the end of this book, but it is the cornerstone that holds the rest together. If you can encourage your children to embrace math, the other pieces fall into place.

The complex and sometimes frustrating part of math activities I've found with my kids is, math can feel like a chore, not a fun, exciting activity to be enjoyed.

EMBRACING MATHAMATICS

I've done my best to make these activities fun for all ages. Some of them will need to be modified for age group as well as "knowing when your kids are getting frustrated."

Since mathematics is a cornerstone to learning, it's important not to push too hard or force learning on them.

After all, this is the point of taking the time and resources to put together educational activities in the first place.

Mathematics is, in its own way, the poetry of logical ideas!

Target Toss

Time for experiment: 40 mins

MATERIALS

- Beans bags
- Large construction paper
- Crayons or markers
- Target Toss Sheet (on the next page)

INSTRUCTIONS

- This game can be played with one player or more.
- With the large construction paper, draw a tarter with three zones.
- Color in the target with different colors.
- Follow the Target Toss sheet instructions.

Name:_____ Date:_____

Target Toss

STEM EDUCATION GUIDE

Color / Point Value		
Color / Point Value		
Color / Point Value		
How many times did you land on _____ ?	How many times did you land on _____ ?	How many times did you land on _____ ?
Which color did you land on the most?	Which color did you land on the least?	How many times did you and on _____ and _____ ?
How many times did you land on _____ and _____ together?	How many times did you toss the ball?	How far away from the target were you?

Numbers on the Wall

Time for experiment: 10 mins

MATERIALS

- Water squirt gun
- Chalk for the wall

INSTRUCTIONS

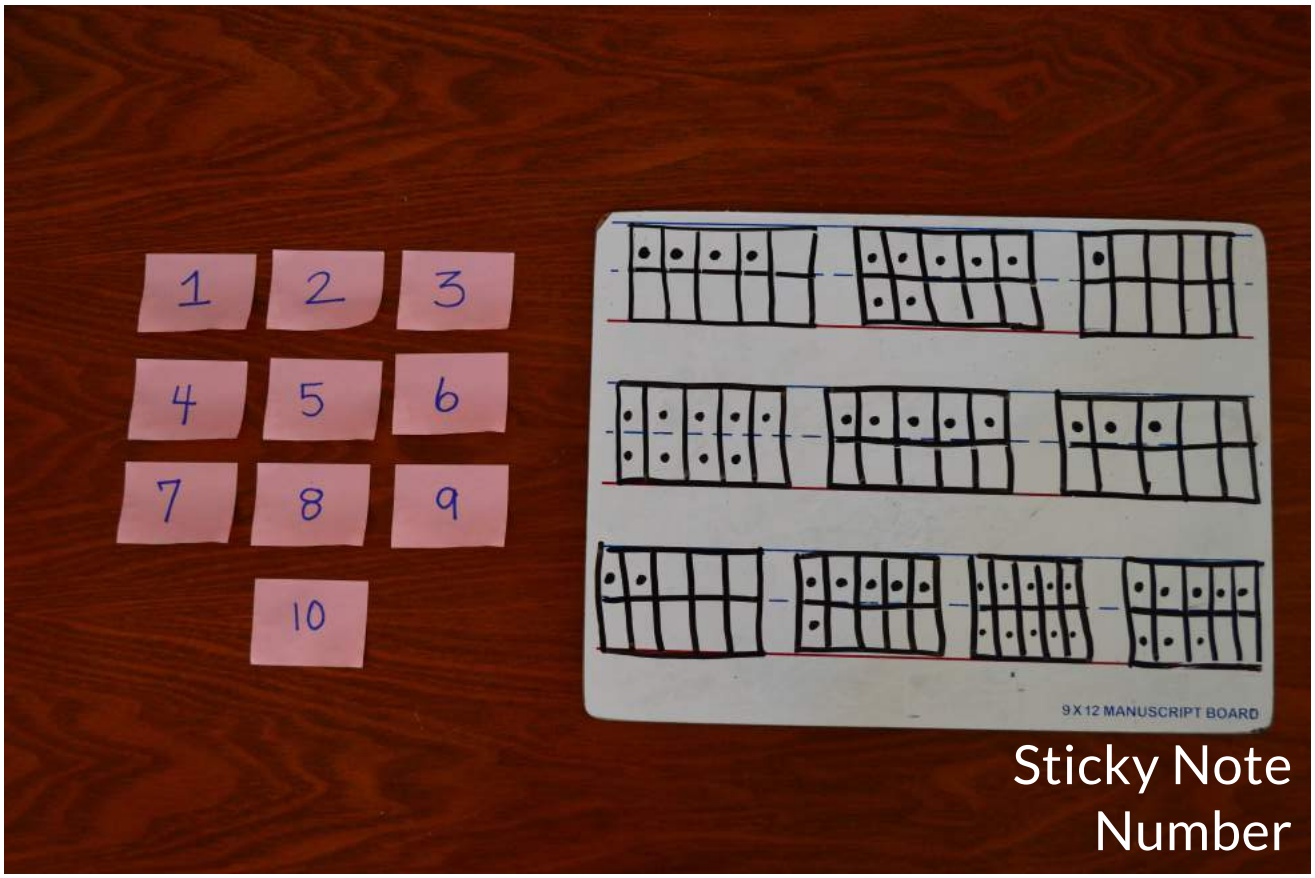
- Write numbers on the wall. For smaller kids, these can be single-digit numbers. For older kids, use math equations.
- Quickly shout out a number.
- Shoot the number with the water gun.

VARIATION

- I originally did this a few years ago with letters my daughter was struggling with. I wrote the alphabet on the wall and shouted out letters for her to shoot.

Note: iio88oyb7yby7b7b

Sticky Note Number Match



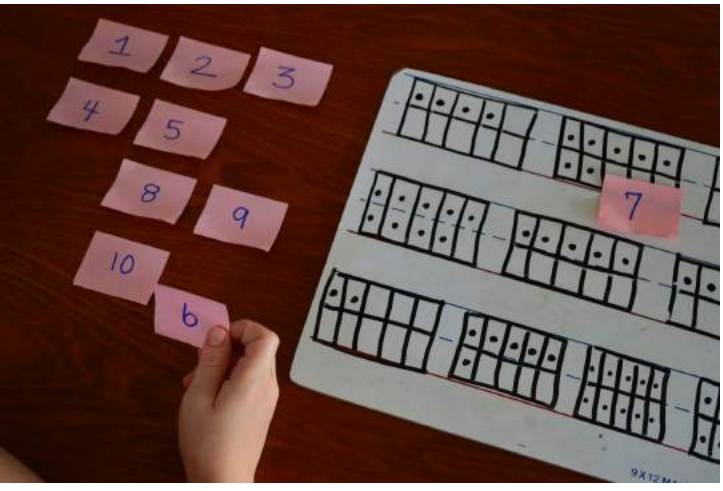
Time for experiment: 20 mins

MATERIALS

- Whiteboard
- Dry erase markers
- Sticky notes

INSTRUCTIONS

- Draw multiple ten frames on a whiteboard.
- Write numbers on sticky notes.
- Then, match the number on the sticky note to the correct number in the ten frames.



Number Tower

Time for experiment: 20 mins

MATERIALS

- 20 Cups or more
- Deck of cards

INSTRUCTIONS

- This is a fun activity for little kids to practice adding and subtracting.
- Pull two random cards out of the deck. Add them together.
- Use that many cups to make a tower or wall.
- When running out of cups or the tower is getting too big, start using subtraction.

Note: This goes well with the cup tower challenge, as you'll have cups out already, on page 34.

Play Subtraction "War"

Time for experiment: 30 mins

MATERIALS

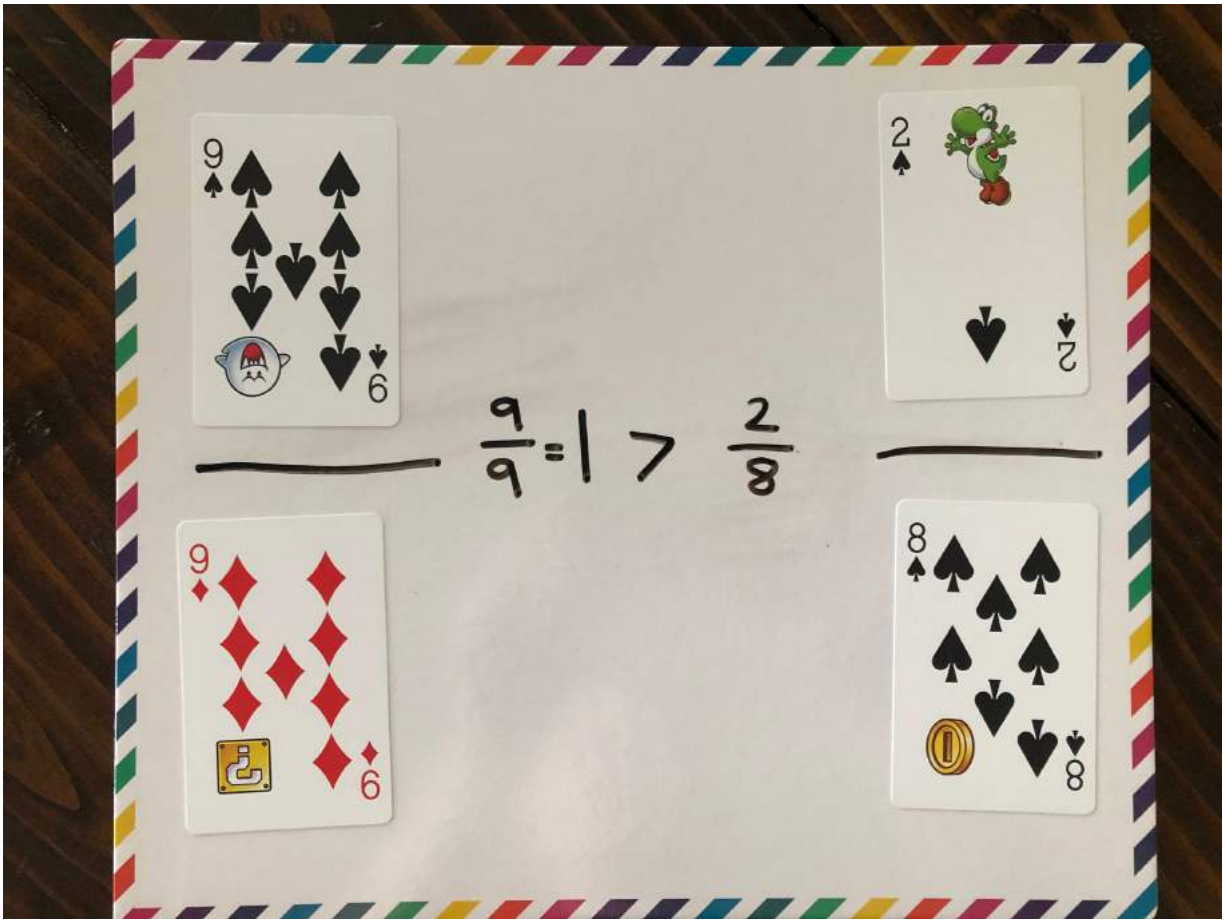
- Deck of cards
- Two players

INSTRUCTIONS

- With a complete set of cards, remove the King, Queen, and Jack of every suit.
- Aces will represent the number "one."
- Divide your card equally among two players. This is only a two-player game.
- Both players flip over two cards. Whoever has the smaller answer wins! The winner receives the cards from the other player (like regular war).
- In the event of a tie, war is declared. Each player will put three cards facedown, and then two cards face up. The player with the smaller answer wins!

Note: For more math card games, head on over to, 10 Fun Math Games You Can Play With Cards.

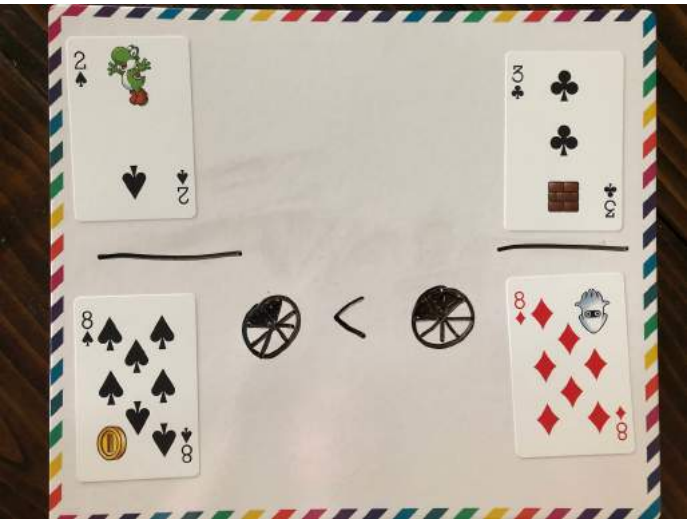
Fraction War



Time for experiment: 30 mins

MATERIALS

- Deck of cards
- Two or more players
- Whiteboard



INSTRUCTIONS

- Divide your cards equally among the players.
- Each player puts one card down, numerator first, then denominator.
- The player with the bigger fraction gets the other player's cards from that round.

Note: It might help to have a whiteboard so your kids can visual see what fraction is larger.