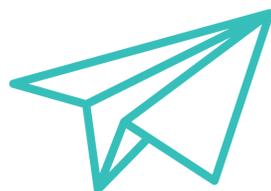
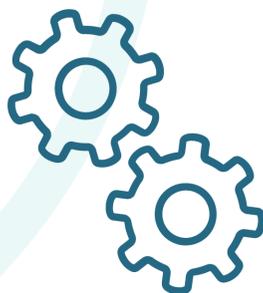




# SPARK SHOP

## ACTIVITY GUIDE

Discover Engineering  
In Your Favorite Things To Do



# WHAT INSPIRES YOU?

Hi! We're **SparkShop**, a team of engineers that teach 4<sup>th</sup> & 5<sup>th</sup> graders. We filled this booklet with activities that can help you build skills that **engineers** use everyday, based on things you do for fun!

We want to provide customized activities that are perfect for you, so let's learn more about **you**:

*How do you like to spend time outside of school?*

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Our suggestions are grouped by **activities** you like and may already be doing.

But don't limit yourself! Now is a great time to explore new things you've never tried before — you never know when you'll **discover** a secret talent or new passion.

Now, reflect on your skills and strengths.

List **3 or more** of your strongest skills

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List **3 or more** skills you want to improve

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Each activity in this booklet has symbols next to it that indicate which **skills** they help you build:



Research



Leadership



Communication



Sketching



Prototyping



Science/Math



Logic



Entrepreneurship



Problem Solving



Creativity



Collaboration



Technology

Let's see how what you love can help you grow!

# IF YOU LIKE BUILDING

You can try:

## PLAYING 3D Pictionary



Look up the rules for Pictionary. Instead of drawing, shape the objects out of Play-doh or clay to help your team successfully guess what you're building.

## TAKING SOMETHING APART



With adult permission and supervision, take something apart using tools. Notice all of the pieces that come together to create something new.

## FOLLOWING CREATOR GUY



Build along with Creator Guy on YouTube as he makes awesome inventions out of cardboard.

## UPCYCLING



Rescue something from the garbage or recycling bin and give it a new life as something useful.

# IF YOU LIKE COMPUTERS

We recommend:

## TINKERCAD



CAD is Computer Aided Design. TinkerCAD lets you design in 3D!

## SWIFT PLAYGROUNDS



Learn and practice coding on a tablet or computer in this game built by Apple.

## SCRATCH



This coding language teaches you to design your own games and stories.

## TYNKER



Use this coding platform to design websites, mod Minecraft, and make your own games.

## MINECRAFT



Minecraft is a great place to practice 3D design, learn material properties, and collaborate with others!

# IF YOU LIKE EXPLORING

If you're stuck at home, have a virtual adventure on these sites:

## MUSEUM OF NATURAL HISTORY



Google “Smithsonian Virtual Tour” and click on the first result. Click on any topic to explore an exhibit about science and nature!

## NATIONAL AIR FORCE MUSEUM



Google “Air Force Museum Exhibits” and click on the first result. You can choose to take the virtual tour (under “Featured Links”) or browse planes (under “Exhibit Areas”). Which plane is the most interesting to you? How might military planes look in the future?

## AQUARIUM LIVE CAMERAS



Google “Monterey Bay aquarium live cam” and click on the first result. Click on any one of the animals or habitats to watch them live. Draw a picture of one of the animals you observe.

## SPACE CENTER HOUSTON



With adult permission, you can download the Space Center Houston app to a smartphone and immerse yourself in life in space!

# IF YOU LIKE FOOD & COOKING

You can try to:

## PERFECT A RECIPE



Challenge yourself to make the perfect sandwich. What ingredients should you use? How much of each ingredient do you need? Record your process!

## EXTRACT FRUIT DNA



On YouTube, search “Banana DNA Experiment” and watch the video posted by AskABiologist. With the help of an adult, conduct the experiment using household equipment to extract DNA from bananas, strawberries, or kiwis. Record your results by taking notes or photos.

## RECREATE YOUR FAVORITE SNACK



Google “Gourmet Makes” and click on the first result. Watch a video that features food you like. Then, try your own Gourmet Make! With adult supervision, do some research online and try to recreate your favorite store-bought snack in your own kitchen.

# IF YOU LIKE MAKING ART

You should try to:

## CREATE A “FOUND OBJECT” SCULPTURE



Find objects around your house that aren't being used. Combine them into a new shape to create something beautiful, then put it on display!

## PRACTICE 3D DRAWING

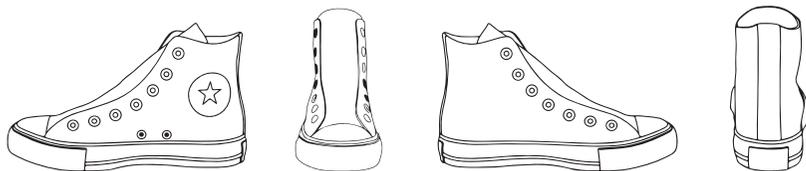


Challenge yourself to sketch increasingly difficult 3D objects. Start with squares, cylinders, and pyramids. Work your way up to sketching objects around you, like a chair or toy.

## PRACTICE MULTI-VIEW DRAWING



Engineers use multi-view drawings to sketch complex 3-dimensional shapes in 2 dimensions. Create your own by making multiple drawings an object from different viewpoints. Here's an example:



## BONUS: TINKERCAD



Design in 3D using a computer at [tinkercad.com](https://tinkercad.com)

# IF YOU LIKE MUSIC

You should try:

## MIXING MUSIC ON INCREDIBOX



Head to [incredibox.com](http://incredibox.com) and try the web version of their interactive sound mixer. Combine different beats and noises to create complex songs, unlocking mini videos along the way.

## INVENTING AN INSTRUMENT



Use objects around your home to create a new type of instrument.

## BUILDING A DIY SPEAKER



Google “Craft Train DIY Speaker” and click on the first result. These speakers work by amplifying sound waves! Use materials around your house to build your own DIY smartphone speaker or make a larger one for a tablet.

# IF YOU LIKE PERFORMING

You should try:

## PITCHING AN INVENTION



Share your invention idea with family or friends and have them give feedback or pitch back to you. Raise the stakes by deciding who to invest in (with pretend money of course).

## CREATING PROPS FOR A PLAY



Set design is an important part of any performance! Create a set out of cardboard, fabric, paper, or any other materials you have laying around your house.

## SCRIPTING A COMMERCIAL



Write and perform a cheesy infomercial for something in your house. If you're really serious, film it on a smartphone or computer.

# IF YOU LIKE PLAYING OUTSIDE

You should try to:

## BUILDING AN OBSTACLE COURSE



Use found materials or things around your home. Enlist the people (or pets!) in your home to see who can complete it the fastest!

## INVENTING A SPORT/GAME



Stuck inside? Tired of your old games? Invent a new activity that works within your constraints, or limits. If you need inspiration, look up how basketball was invented!

## CALCULATING PERSONALIZED STATS



Evaluate yourself as an athlete by running a simple experiment and analyzing the data. For example: How fast can you run down the block? How many free throws can you make in 10 attempts? See if you can improve your statistics over time.

## GARDENING



Find a window-sill, porch, or space in your yard to grow a garden. It could be a houseplant, flowers, or produce! Draw pictures or take notes to track the growth of your plant(s).

# IF YOU LIKE READING

We recommend the books below.

## ABOUT ENTREPRENEURSHIP



*The Lemonade War* By Jacqueline Davies

*The Toothpaste Millionaire* by Jean Merrill

## ABOUT INVENTION & INVENTORS



*Calling All Minds: How to Think and Create Like an Inventor* by Temple Grandin

*Girls Think of Everything: Stories of Ingenious Inventions by Women* by Catherine Thimmesh

*I Wonder Why Zippers Have Teeth (And Other Questions About Inventions)* by Barbara Taylor

*How We Got To Now: Six Innovations that Made the Modern World* by Steven Johnson

## ABOUT ENGINEERING & SCIENCE



*The Popular Clone* by M. E. Castle

*The Way Things Work Now* by David Macaulay

*Rosie Revere's Big Project Book for Bold Engineers* by Andrea Beaty

*Astronaut Aquanaut: How Space Science and Sea Science Interact* by Jennifer Swanson

*How to Code a Sandcastle* by Josh Funk

# IF YOU LIKE TV & MOVIES

Try watching something in these categories:

## ABOUT INVENTION



Shark Tank (abc.com ,YouTube, Hulu)

Cloudy With a Chance of Meatballs (Amazon, YouTube)

## ABOUT SPACE EXPLORATION



Apollo 13 (Hulu, Amazon, YouTube)

Hidden Figures (Amazon, YouTube)

October Sky (Amazon, YouTube)

## ABOUT TECHNOLOGY



Spare Parts (Vudu, Amazon, YouTube)

Big Hero 6 (Disney+, Amazon, YouTube)

WALL-E (Disney+, Amazon, YouTube)

Spy Kids (Netflix, Amazon, YouTube)

## ABOUT BUILDING



Lego Masters (fox.com, Hulu)

The Boy Who Harnessed the Wind (Netflix, Amazon)

# IF YOU LIKE WRITING

You can:

## INTERVIEW AN ENGINEER



Talk to an engineer/inventor in your life or (with adult permission) send your questions to

[AskAnEngineer@sparkshop.org](mailto:AskAnEngineer@sparkshop.org)

## WRITE ON THE TOPICS BELOW



- Think about a problem the main character faces in your favorite book. Re-write the ending with the silliest invention they could have made to fix their problem.
- Write a how-to guide to teach someone else how to make or build something.
- Think of something you use every day that someone once invented. Write a story about what life would be like if this invention didn't exist?
- Write a short story about an inventor who creates something that turns out a little differently than they planned.

# IF YOU LIKE YOUTUBE

We recommend the channels:

## HOW IT'S MADE



Short documentaries showing how everyday objects are manufactured.

## HYDRAULIC PRESS CHANNEL



See stuff getting crushed and learn how objects break.

## CREATOR GUY



Build along and make inventions out of cardboard.

## KIDS INVENT STUFF



Two funny adults build creations invented by kids.

## CHICKADEE ENGINEERING



Chickadee, a little girl, makes things with help from her dad.

## CRASH COURSE KIDS



Watch these videos, especially the engineering ones, to learn about science topics for 5th graders.

