



Invent at Home!

Anyone can be an inventor and make inventions! Use some of the suggested materials and follow the process of invention to solve the problem below! Take some time to think about each step of the invention process. Feel free to jump around or go back if you want to! Keep track of your process and ideas and write them down so you can remember what you did and share with others.

Imagine that you and your family live in a desert. You do not have running water in your home, and you live far from a water source.



Can you invent something to help you transport water from the source to your home easily and efficiently?

Suggested Materials:

- Scissors
- Tape/glue
- Craft sticks
- Disposable cups and plates
- Paper clips and binder clips
- Pipe cleaners
- Clothes pins
- Fabric, felt, string
- Recyclable materials, like egg cartons, yogurt cups, and paper towel rolls (make sure they are clean first!)
- Construction paper
- Other craft materials you might have – there is no limit (just make sure to have permission first!)

Invention Process





Invent at Home: Animal Homes

Whether in the wild, in a zoo, or in your family, all animals need a home! Can you invent a home for an animal?

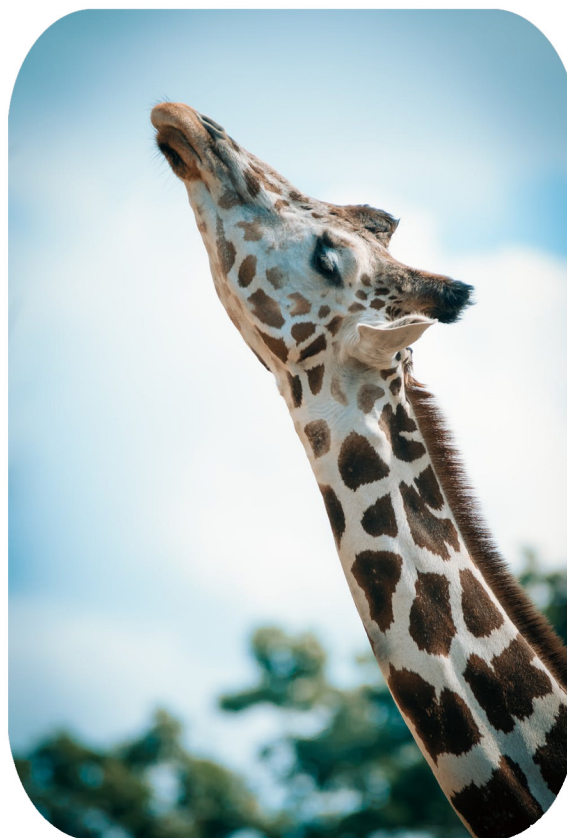


What animal are you inventing for? What special features does the home have?



Suggested Materials:

Cardboard
Craft paper
Tape
Clean recycled materials
Fabric/bedsheets/pillows
Any crafting materials you might have



Do you have a pet at home you can design for? Invent something for them and test it out! What do they like? What can you change?



Invent at Home: Replant an Apple Orchard



Seed dispersal is extremely important for the survival of many different species. Trees are important because they provide homes for animals along with air for all creatures on Earth. In Massachusetts, apple orchards are very common and very popular when apple season comes around in the Fall.

Can you invent something to disperse seeds and help replant apple trees?

Getting Started:

- 1.) Find a tray to act as the field
 - You may cover it with brown or green paper
- 2.) Use craft materials or tinker toys to create an invention to scatter seeds
 - Seeds can be represented with pom poms, beans, beads etc.
- 3.) Test out your invention and see where the seeds end up!



Drone-planting system, photo by MIT Technology

Does your invention disperse seeds throughout the field?

Is your invention easy to transport?

Will your invention be dispersing large or small seeds?

How will your invention affect the trees that have already been planted in the apple orchard?

Who will operate the invention?



Invent at Home: Paper Bridges



Build a bridge using just paper and tape! See how much weight your paper bridge can hold!

What else can you build using this method?



Try looking at different bridges and see how they are made and what shapes they use!



Instructions:

1. Start at one corner of your paper and roll toward the opposite corner to form a tube and tape it closed. Repeat until you have a collection of tubes.
2. Connect the ends of your paper tubes together using tape to make different shapes! Try making shapes with three, four, or even more sides.
3. When you have a collection of shapes, tape them together to create a bridge.



With your bridge built, you can now try to add weight to the top of the bridge and see how much it can carry. Can your bridge cross a gap between two chairs? What shape could carry the most weight? How far can you build your bridge?



After you have found your most successful shape, try making a whole fort out of your paper tubes! Can you make a tent out of just paper?



Invent at Home: Clean Up the Ocean

Americans throw away more than 30 million tons of plastic every year. A lot of it gets recycled, but much of it ends up in landfills, or finds its way into the ocean and other waterways. In this exercise, you will invent something to remove trash from the ocean.



1. Find a tray to act as your Ocean.
 - a baking sheet or other rimmed dish will do
 - Optional: cover the bottom with blue paper to help keep on theme!
2. Scatter your 'waste' over the tray.
 - suggested materials: bottle caps, beads, or any other small plastic pieces
 - Extra challenge: put something in your 'ocean' to act as sea life.
3. Can you make an invention that can remove waste from the ocean?
 - suggested materials: craft sticks, wooden dowels, fabric, felt, yarn, ribbon, tape, cardboard, or any other materials you have at home!

Here are some inventions being used to remove plastic from the ocean.

What is your invention idea?



Think about this as you design your invention:



Does your invention clean up big pieces of plastic or small?

Do you think your invention will accidentally catch fish or other ocean life?

Is your invention automatic, or will it need people to help it?

What do you do with the waste once you get it out of the ocean?



Invent at Home: Flying Machines

Make a flying vehicle that is powered by your breath! Use a straw as the launcher for your flying vehicle and see how far you can make it fly!



Photo by U.S. Department of Defense

Can you invent a flying machine that can launch like a rocket?

Materials:

Straws

Paper

Tape

Sketching materials to design your flying vehicle

Other crafting materials that might add to your flying vehicle



Method 1: Take a straw (any straw will do, even reusable, except maybe silicon), build your flying vehicle using your materials. Your vehicle can look like anything; the one requirement is that it has to have a way to slip onto the straw with a closed end. If your straw has a wrapper on it, the vehicle can be built right on the wrapper.



Method 2: You will need 2 straws for this method, one wider than the other so they can fit on top of each other. Fold the tip down on the wider straw and tape it down so that no air can escape. Build your flying vehicle on the straw with the closed end.



Invent at Home: Grow Food

Getting food from where it's grown to where people live can cause lots of problems. It can be expensive and harmful to the environment to ship by truck, boat, or plane. Food can go bad before it gets sold.

Can you invent a way to grow food in a small space? It might be an apartment porch or window, in a city, or on an island where a lot of people live.

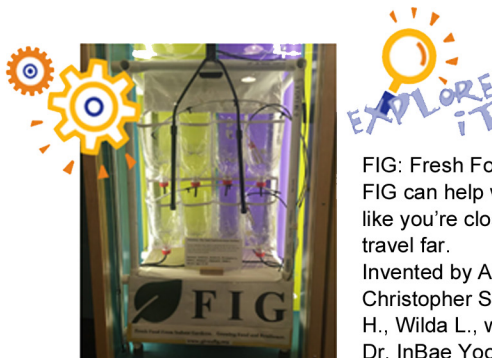


FIG: Fresh Food From Indoor Gardens
FIG can help with food, fresh air, and feeling like you're close to nature without having to travel far.
Invented by Andrew L., Braden G., Christopher S., Eddie L., Madison C., Martael H., Wilda L., winners of the 2019 Spark!Lab Dr. InBae Yoon Invent It Challenge

Suggested materials:

- Scissors
- Tape/glue
- Craft sticks
- Disposable cups and plates
- Paper clips, binder clips, clothes pins
- Pipe cleaners
- Fabric or felt
- String, yarn, or ribbon
- Recyclable materials, like egg cartons, yogurt cups, cardboard, and paper towel rolls (make sure they are clean!)
- Construction paper
- Other craft materials you might have – there is no limit (just make sure to have permission first!)

Spring is the perfect time to test your invention! With some seeds, potting soil, and a little patience, you can start growing your own garden at home! As your plants grow, keep note of how your invention is working out.

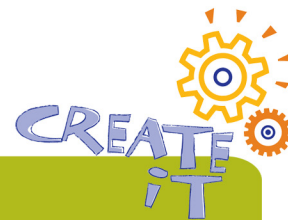


As you are working, think about this:

Where is it getting light from?
How does it get watered?
How many people can your invention help? How many need to take care of it?
Is your invention for growing one thing, or multiple crops?



Invent at Home: Hoop Glider



Create your own Hoop Glider and watch how it flies!

The basic design is just a few pieces, but once you get that, you can continue to tweak it and figure out new designs!

What is the farthest it can fly? How long can it fly in the air?



Materials:

Construction Paper, Straws, Tape

Instructions

1. Cut your paper into three (3) pieces, each piece about 1inx5in
2. Tape one paper piece into a small loop
3. Take the two remaining pieces of paper and tape them with a little overlap so you have one long piece
4. Tape the long piece into a large loop. The loop should be smooth and not jagged, with the taped side on the outside
5. Tape the loops to either end of the straw, with the straw INSIDE the loops. Make sure the loops are both pointed in the same direction
6. Aim away from other people and give your Hoop Glider a test flight!

What would happen if you added another straw to make it longer?

What if you added more loops?

Try adding or taking away from your hoop glider to see how it flies differently!

After each change, give your Hoop Glider one or two tests before changing anything else – a Good Scientist tests after each change, and tests them at least 3 times!





Invent at Home: ISS Module



Get ready for the new International Space Station Exhibit opening soon at the Springfield Museums!

The International Space Station is a joint effort of the world's different space agencies. It is a laboratory and observatory that stays in low-earth orbit and allows us to learn about life in space. Since 2000, it has been continuously occupied by astronauts from all over the world who work on different experiments that help us understand life out in space.



Astronaut Jessica Meir working in the ISS. Photo by NASA

The ISS is made of different modules. A module is single, self-contained piece of a larger structure. Each of these modules has a specific purpose. Some of the pieces are connecting hallways, some are airlocks or docking stations, or laboratories, and one of the modules is where the astronauts all get together to eat meals!



Can you design your own ISS Module? What will the module be used for?
What are the things that your module will need?



Suggested Materials:
cardboard
craft sticks or straws
construction paper
clean recycled materials
string
beads
other crafting materials





Invent at Home: Make an Art Tool



Lots of artists are looking for new tools or methods to create interesting pieces of art. Many artistic movements were started by trying out new ways of applying paint. Try your hand at being an inventive artist and design your own art tool or method!



Grainstack, Claude Jean Monet, 1893,
D'Amour Museum of Fine Arts

Monet used a palette knife to create the many thick layers of paint that give his artwork texture.

What sort of tool are you going to make? How would you use this tool to make your art? What medium will you use with your tool? Is there a trick to creating different textures or effects with your tool?



Suggested Materials:

straws, craft sticks, yarn, paper clips, tape, glue, scissors, disposable flatware, cardboard, paper towels, pompoms, rubber bands, clean recycled materials, clean natural materials (branches, leaves, flowers, etc.)



After you invent your tool, test it out by making some art! Find some paint or clay and use your tool to try and create some new art. Your art piece doesn't have to be of any particular thing, just get a feel for your new tool! Don't be afraid to make adjustments to your tool and try again!





Invent at Home: Mapping



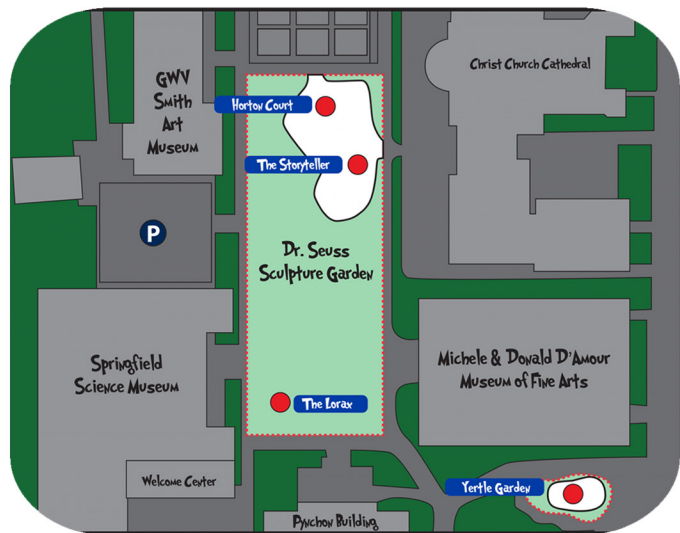
Maps can show many things about a space and about the person who made it. They can tell a story or reflect places that are special to you.

A person who draws a map is called a cartographer!

Try being a cartographer and make a map!



Look around or think about the features that are important in the place you are going to map. How far are you going to go? Start sketching in the important features of your map. These features can be as detailed or as simple as you like.



Map of the Dr. Seuss National Memorial Sculpture Garden,

Suggested Materials:

compass
paper
pencils
coloring tools
clipboard

ruler for measuring distance



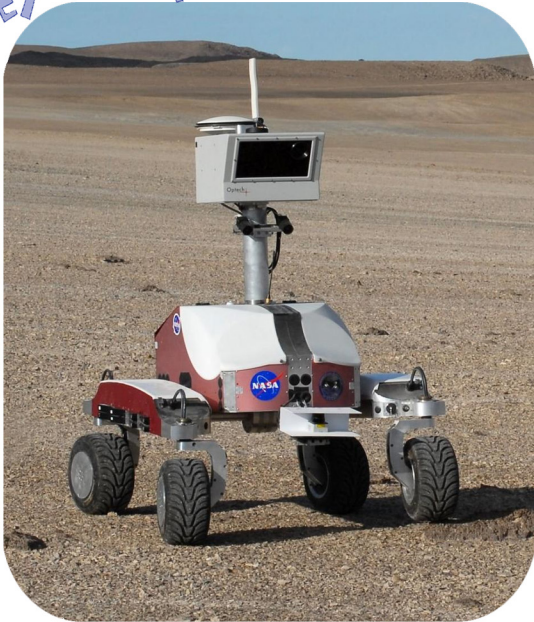
Once you have all of the major features on your map, it is time to add some finishing touches! Is there someplace where you see lots of birds? Make a note of it by drawing a little bird on your map! Is there a garden with lots of plants? Add in some flowers or other plants for others to know! Be sure to add labels to the features on your map so that others can read it as well.



Invent at Home: Mars Rover

The 2020 Perseverance Rover is scheduled to launch later this year and land on Mars in early 2021. One of Perseverance's main missions is to gather rock and soil samples that might one day be returned to earth.

Can you invent a Rover to send to Mars?



NASA Ames K10 Rover, image courtesy of NASA/ARC

What are the features that will help it run scientific experiments?

How will your rover drive differently on Mars than on Earth?

What are the special experiments that it will run?

How will it communicate with people on Earth?



Suggested materials:

Cardboard

Foam

Construction paper

Craft sticks and tooth picks

Disposable cups/bowls/utensils

Tape

String/cord

Clean recycled materials

Other crafting materials you might find!



Invent at Home: Construct a Sci-Fi Character



Can you turn yourself into a Science Fiction Character?

With all of the technology that we have around us, what would it look like to wear or have technology as a part of us?

Can you invent wearable technology that would make everyday tasks easier or better?



Suggested Materials:

Foil

Pipe cleaners

Paper clips

Cardboard

Cookware and flatware (use only with permission, and make sure that you can put it back when you are done)

Clean recycled bottles and containers

Tape

Scissors

Craft paper

Fabric

Straws

Ribbons/elastic/yarn

Markers/colored pencils/crayons



While you are working on your new Sci-Fi character think about:

How are you going to wear these new pieces? What would each piece do for your character? What are the materials the character would be made of if it were real? What special knowledge would you need to make it real? How would the different technologies help people?



Extra thing to try:

Get new textures on your Sci-Fi character by creating rubbings!

Lay a piece of paper over different surfaces and gently color over the paper with a crayon or colored pencil. Watch as the texture of what you're coloring over comes onto the paper! Try and find a way to incorporate these new texture rubbings into your character!



Invent at Home: Sketch It!



Sketching is an important part of our invention process. Sketching allows inventors to get their thoughts on paper before they begin to build prototypes, their first models. It can also help them think through how an invention might work or what it might look like if they don't have all of the pieces.



For this exercise, grab any sketching materials and start coming up with different invention ideas!

To get started, pick a prompt from Column 1 and a prompt from Column 2 and get drawing! As you are working on your design, pick a prompt from Column 3 and use it to help you finish your design. Don't worry about making your sketches perfect, as long as you know what you drew and you can tell someone else what it is, that is what is most important!

Column 1:

I'm inventing...

1. Something to sit on
2. Something to clean your house
3. A new toy or game
4. Something to carry groceries
5. Something to cook with
6. A way to keep food fresh
7. Somewhere to shop for food



Column 2:

My invention is for...

1. Me
2. Doctors
3. A Movie Star
4. Astronauts
5. A pet
6. Grandparents
7. Someone who lives on an island

Column 3:

Then think about this!

1. When and where would your invention be used?
2. How can you make your invention easier to use?
3. How can you make your invention better for the environment?
4. What is one thing about your invention you want everyone to know?
5. What materials do you plan to use to build your invention?
6. What will power your design? What sources of energy could it use?
7. What makes your invention different from something you can buy in a store?



After you have finished your design, see if you can build it with any materials you have around!



Can you come up with a commercial to get people to use your product?