

Engineering Challenges

An engineer is someone who designs and builds something new to solve a problem.

- ❖ This document gives you engineering challenges.
- ❖ It **does not** give you instructions on how to solve that problem.
- ❖ It is up to you to be the engineer.

Materials:

Only use materials that you have in your house or outside.

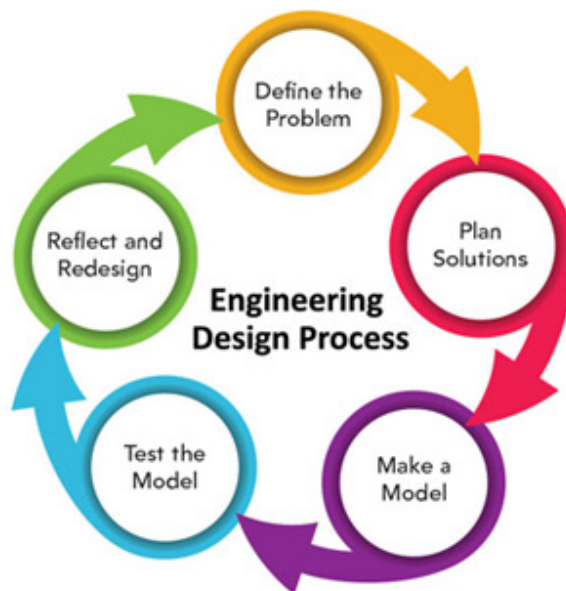
Ideas.....

- | | | |
|-------------------|-------------------|------------------|
| • Paper bags | • Plastic Bottles | • String |
| • Balls | • Cans | • Rubber bands |
| • Paper | • Aluminum Foil | • Binder clips |
| • Paper plates | • Sticks | • Clothespins |
| • Cardboard | • Popsicle Sticks | • Plastic spoons |
| • Cereal Boxes | • Plastic bags | • Tape |
| • Cardboard Rolls | • Paper cups | |
| • Pencils | • Paperclips | |





Remember:

Engineering design **never** ends. There is always a way to make your design better.




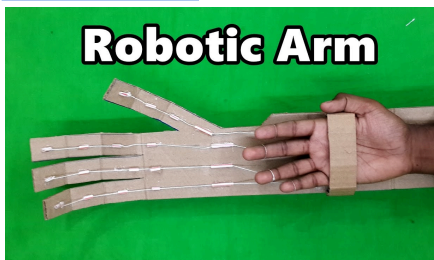

Not succeeding the first time is part of the process. It is the way you learn what works.



Choose your challenge. Use the images for *ideas*. Click on the links if you are stuck.

Challenge	Constraints and improvements	Hints (if you need ideas)
<p>Build a tower</p> 	<ul style="list-style-type: none"> - The tower must be taller than yourself. -It must be built from individual objects that are less than 12 inches high. <p>+ How tall can you go?</p>	<p>Click here to see how sturdy plain paper can be</p> 
<p>Build a fort</p> 	<ul style="list-style-type: none"> -You must be able to fit inside it. -It must be able to hold the weight of a shoe on top of it. <p>+ Can you fit 3 people?</p>	<p>Click here for some useful building tips.</p> 
<p>Make a catapult</p>  <p>Make a Simple Catapult</p>	<ul style="list-style-type: none"> -Launch a small object more than 3 feet into a bowl. -You may not throw the object. You must use the stored energy in your machine. <p>+ Try 2 different designs</p>	<p>Click here for a couple different designs if you need ideas.</p> 
<p>Paper airplane launcher</p> 	<ul style="list-style-type: none"> -Must launch an airplane at least 4 feet. -It can be any airplane design. Here are instructions on how to fold an airplane. <p>+ Can you make it fly further?</p>	<p>This video will help</p> 

Challenge	Constraints and improvements	Hints (if you need ideas)
<p>Make a parachute</p> 	<p>-A small object must be attached to the parachute</p> <p>-The object must fall at least 2 seconds slower than without the parachute.</p> <p>+ Try a parachute for an egg</p>	<p>Here are 3 ways to design a parachute if you need help. Here are even more ways.</p> 
<p>Make a sailboat</p> 	<p>-The boat must be able to hold 10 pennies</p> <p>-It must travel at least 2 feet when you blow on it.</p> <p>+ Can it travel in open water?</p>	<p>Can you make it hold 20 pennies? Here is one idea.</p> 
<p>Squirrel proof bird feeder</p> 	<p>- Use seeds that birds like</p> <p>- Design so the birds can get food, but the squirrels can't</p>  <p>+ Patent your idea if you succeed.</p>	<p>Here is a fabulous video about one man's quest to solve this challenge.</p> 
<p>Design a roller coaster</p> 	<p>-A ball must travel more than 4 seconds on a track.</p>   <p>+ Can you make it longer?</p>	<p>Here is one way to do it if you need help.</p> 

Challenge	Constraints and improvements	Hints (if you need ideas)
<p>Build an elevator for a toy</p> 	<ul style="list-style-type: none"> -The toy must be lifted off the ground without you touching it -The toy must rise at least 10 inches  <p>+ Can you make your own carpark with an elevator.</p>	<p>Here are ideas for a simple pulley system</p> 
<p>Build a hand</p> 	<ul style="list-style-type: none"> -The hand must have at least 2 fingers -The fingers must be able to move. <p>+ Can you make it grasp?</p>	<p>Here is one way to make a robotic hand</p> 
<p>Build an instrument</p> 	<ul style="list-style-type: none"> -The instrument must be able to make at least 3 different pitches  <p>+ Can you make 7 pitches?</p>	<p>Can you play Mary Had a Little Lamb?</p> 