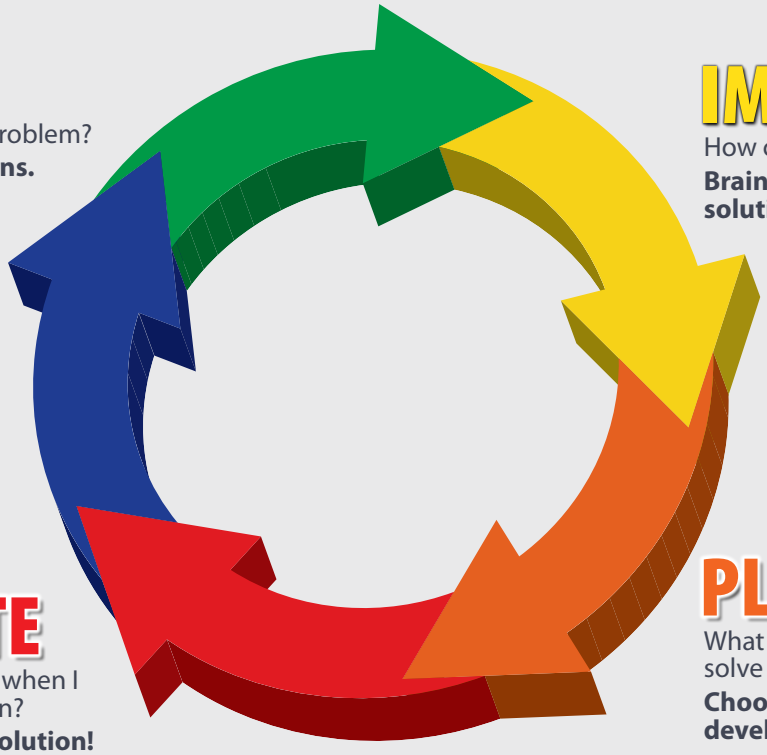
ALL ABOUT INVENTIONS

OK, maybe not *all*, but enough to get us started.

When engineers consider improvements to an existing product (an innovation), they use the engineering design process. It looks like this:



ASK
What's the problem?
Ask questions.

IMAGINE
How can I solve this problem?
Brainstorm possible solutions and share ideas.

PLAN
What steps will I take to solve my problem?
Choose a solution & develop a plan.

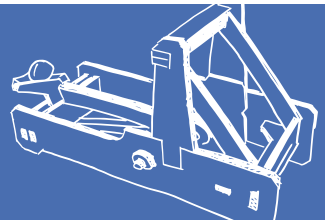
CREATE
What happens when I test my solution?
Let's test my solution!

IMPROVE
How can I make it better?
Make your solution better!

The process goes through several steps that enable engineers to go from an idea to a completed design. Sometimes engineers go around the loop several times as they modify their prototype and test it to see how it works.

You should go through a similar process as you innovate your prototype.

ACTIVITY 1
BASIC CONSTRUCTION

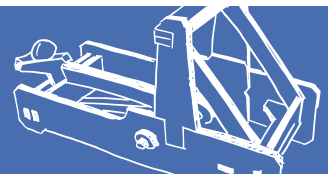


Catapults have gone through a number of innovative changes throughout their history. In this activity, you'll build a basic catapult. In later activities, you'll perform experiments with this catapult so you can innovate your own catapult.

DID YOU KNOW?

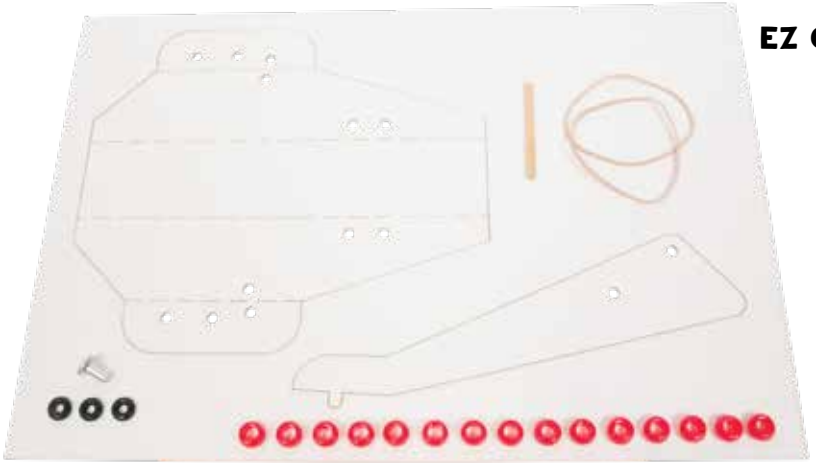
The word catapult comes from the ancient Greek word katapeltēs which is two words – kata means against a wall or through armor, and peltēs means to toss or hurl.

LET'S MAKE



GATHER YOUR SUPPLIES

So we can, you know, do this thing!



EZ CATAPULT KIT

NOT INCLUDED: SAFETY GLASSES

STEP 1

Pop out all the circular pieces from the card stock base and arm.

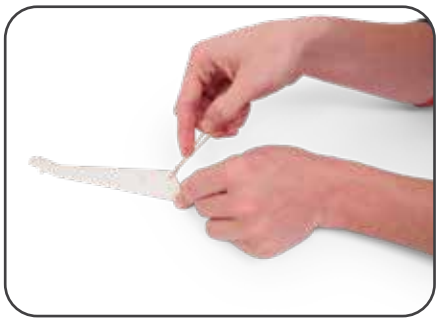
STEP 2

Bend the catapult base along the scored lines. The left and right sides of the base should bend up toward each other. Slightly bend the scored lines at the top of the base away from each other. Press the sides together.

NOTE: When bending the card stock, make sure to bend it only one way.

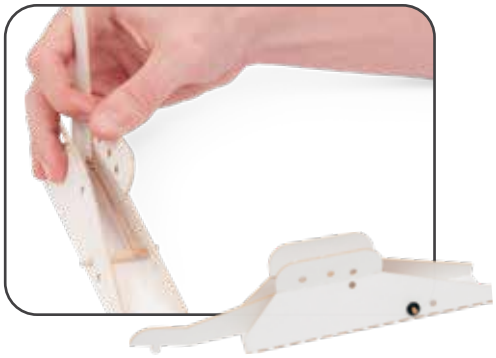
STEP 3

On the catapult arm, slip one end of a rubber band through the bottom hole and put the other end of the rubber band through the loop made in order to tie a knot. Repeat this process with the second rubber band using the same hole.



STEP 4

There are two locations for the catapult's tension pin. Near the back of the base, insert the dowel rod through the first hole. Then, put the dowel through both loops made at the ends of the rubber bands. Finally, slide the dowel through the other side of the base. Secure the dowel rod with an O-ring on each side of the base.



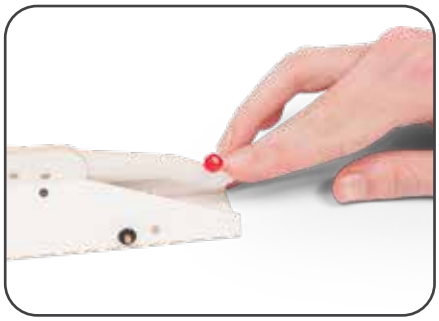
STEP 5

There are three locations for the catapult's pivot pin. Hold the catapult arm between the two sides of the catapult base. Align the open hole on the catapult arm with the holes closest to the front on the catapult base. Slide the pivot pin through the holes. Secure the pivot pin with an O-ring.

STEP 6

To fire the catapult, place a pony bead over the post at the end of the catapult arm and then pull the arm back and release.

NOTE: The pony bead should sit loosely on the post. If the pony bead fits too tight, it will not fire.



THINK ABOUT IT

ASK THE QUESTION

Because understanding the why is important.

What are the strengths of this catapult design?

What are the weaknesses of this catapult design?

Does this catapult pose any safety concerns?