

DESIGN A PROSTHETIC BUILD MONKEY A HAND

Hi! I'm Nana the monkey, and I need your help! I love to cook, but I do not have a left hand. I am having trouble cutting bananas and mixing the batter for my banana bread. Can you please help me by building me a prosthetic hand?



LEARN HOW TO



THINK LIKE AN
ENGINEER

1. IDENTIFY A PROBLEM
2. BRAINSTORM
3. BUILD A SOLUTION
4. TEST SOLUTION
5. IMPROVE DESIGN



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1. Identify a Problem

Some people are born without arms or legs, or their limbs are amputated after a bad accident or illness. Prosthetic devices replace the function of body parts, such as hands, arms, or legs. A person can use a prosthetic to help them perform daily tasks like holding a glass of water or walking.

Imagine you are an engineer designing a prosthetic hand. What are important features to build for a replacement hand so Nana can cook?



2. Brainstorm Solutions

Brainstorm designs that could perform the functions you identified.

What properties are important to your design? Try thinking about. . .

- Grip strength
- Stability
- Durability
- Comfort
- Weight
- Appearance
- Longevity
- Size
- Cost

Choose your best design to build a prototype.



2.5 Need Help or Ideas?

Our hands are very similar to a monkey's hand. Here is a picture of an X-Ray of a human hand. You can see the bones in the hand! Is our finger made of one bone? *(Notice there are small spaces in each finger. Those are joints!)*

Guiding Questions

1. What material will make the prosthetic last long?
2. How will you make the fingers bend?
 - a. Hint: What can you use the holes of the straw for?
3. How will Nana the monkey wear the prosthetic so it won't fall off?

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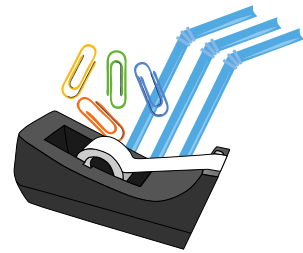


3. Build a Prototype

How can you use materials around your house to make a prototype, or model, of your design?

Suggested Materials:

- Straws
- String or yarn
- Popsicle sticks
- Jumbo paper clips
- Tape
- Play-Doh
- Rubber bands
- Pipe cleaners



4. Test Your Prototype

How do you know your prosthetic hand works? You need to test it! Think of what your hand can do. Can your prosthetic hand do the same jobs as your hand?

Possible Ideas:

- Can your prosthetic hand bend its fingers?
- Can your prosthetic hand hold a paper cup?
- Can your prosthetic hand survive a 3 ft drop?



5. Make Improvements

What parts of your design worked well? What parts of your design can you improve? What would you do differently next time?

You just learned the engineering design process! Try following it to make another prosthetic device. Remember to use your imagination!