

HELPING HANDS

EXPERIMENT: ASTRONAUT GEAR

In space, you need a suit that protects you from the cold, harsh environment. Astronauts making repairs to the International Space Station on spacewalks must wear gloves that protect them but allow their fingers to move easily. Design your own space gloves and use them to try to use tools to complete various tasks.

MATERIALS

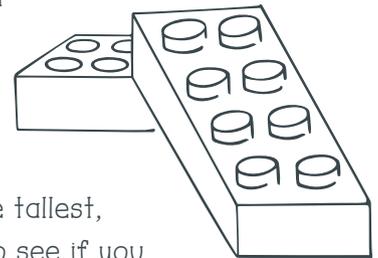
- Tape
- Rubber bands
- LEGO bricks
- Water
- Large tub or bin
- Nuts
- Bolts
- Screws
- Pennies or other small items
- Tools, such as a screwdriver, pliers or wrench
- A variety of large gloves, such as gardening gloves, winter gloves and rubber gloves
- Protective materials like aluminum foil, plastic bags, bubble wrap, fabric, etc.

INSTRUCTIONS

The gloves that astronauts must wear while on a spacewalk are difficult to design. They need to be airtight for protection, but also flexible so the astronaut can use his or her hands. Try wearing some oversized gloves to do simple tasks and see how difficult it can be to get the job done.

Put on an oversized pair of gloves and try to build a wall of LEGO pieces in 60 seconds. Race against a friend to see whose wall is the tallest, or challenge yourself to see if you can do better than your first try.

Make it more challenging by building a wall in just 30 seconds, or using only the smallest LEGO bricks. What did you notice?



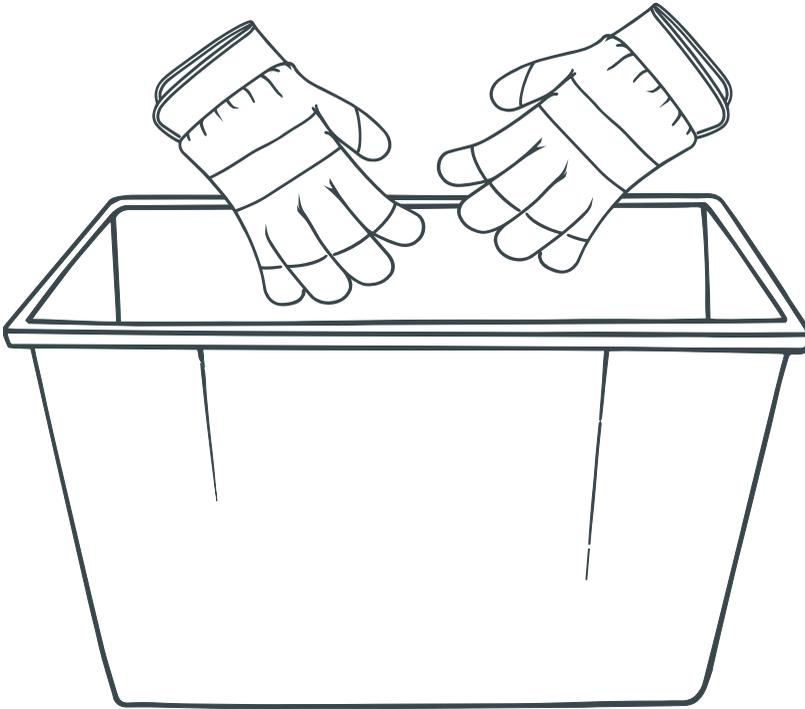
Prepare the supplies for the next challenge. Fill a bin with cold water and put the tools, nuts, bolts, screws and pennies inside. Now make a pair of gloves that will keep your hands dry and warm while



JUPITER

I have more than 50 moons and a huge magnetic field, making me so big that I'm kind of like a miniature solar system. My Great Red Spot is actually a storm that's raged for hundreds of years.

they're in the water using the tools. Be creative! Try layering different types of materials, or several different gloves.



Test your glove design by putting your hands in the water and using the tools. Thread a nut on a bolt, wind a screw with a screwdriver, pick up pennies with pliers. Give yourself a time limit, or see how long it takes you to complete all the tasks. Make sure your hands remain underwater during the entire challenge! When you're done, take off the gloves and see if your hands are dry and warm.

WHAT'S HAPPENING?

Astronaut gloves are even harder to maneuver than the gloves you designed. They're like an inflated balloon, and the fingers resist bending. Astronauts must fight against that pressure just to use their hands, which can make them tired quickly and even cause injuries. Gloves are just one part of a space suit. Space suits provide astronauts oxygen to breathe and water to drink while they're working in space.

GAME ON

Design your own space suit by putting on different layers of clothing, from tight-fitting inner layers to heavy outer layers like snow pants and winter coats. Try physical activities, like jumping jacks, sit ups or climbing stairs to see how easily you can move around. Or experience a little bit of what it feels like to walk in space by walking across a bouncy air mattress. See if you can walk across while balancing something on your head!

MORE WAYS TO PLAY WITH ASTRONAUT GEAR

Train like an astronaut with fun activities from NASA at <http://tinyurl.com/space-training>. You can also see a real NASA space-suit and astronaut tools like tongs and a hammer in MSI's Henry Crown Space Center.

RECOMMENDED READING

"Astronaut Handbook" by Meghan McCarthy

"Astronaut: Living in Space" by Kate Hayden