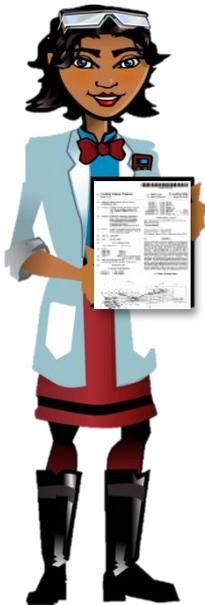


Reach for an Idea and Make it Your Own



Hands-on Activity

Build a mechanical grasper using cardboard and brass fasteners.

Mechanical Graspers

Mechanical graspers can be much stronger and more adaptable than human hands. Engineers have created unique designs of mechanical graspers that provide dexterity and strength to assist individuals in moving devices they are unable to move with their own strength. For example, NASA engineers have developed devices that can be used on space missions.

[Can you think of how an astronaut might use a mechanical grasper?](#)
[What other uses might one have for this type of device?](#)

Definitions

Tension: A pulling stretching force

Compression: A pushing squeezing force

Friction: A force that resists motion

[What's the effect of changing the length of a cardboard section, or of changing the attachment point of a string?](#) (Changes will alter the force required to move the grasper)

Like the grasper you made today, **exoskeletons** (artificial external supporting structures) can be used to enhance the strength and dexterity of humans by extending their capacity and range of motion.

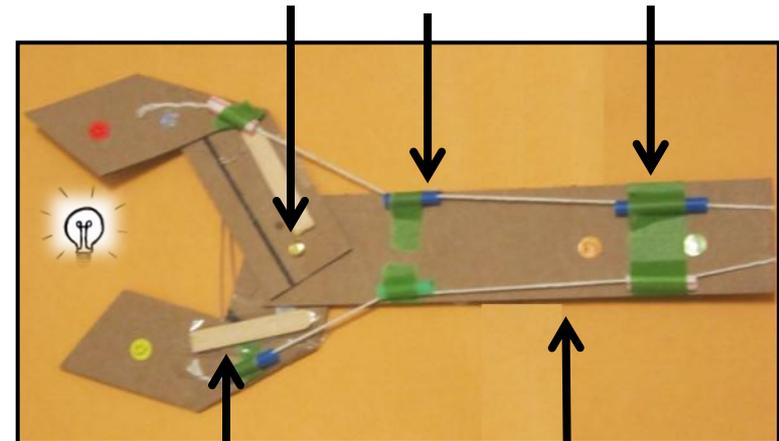
[What are some advantages of using a mechanical grasper or an exoskeleton?](#)

[Can you think of inventions that use this same concept?](#)

Illustrated instructions

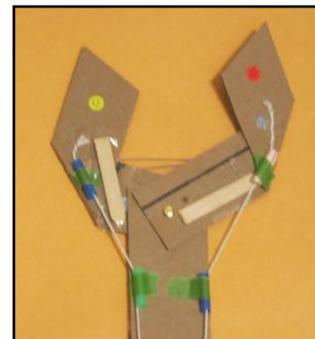
Insert brass fastener

Tape pieces of straws



Reinforce the claws with ice cream sticks

Feed string



FRONT



BACK

What is a Patent?

A Patent is a temporary property right granted by the government that allows an inventor to stop others from making, using, or selling their invention for a certain amount of time without his or his permission. This gives the inventor a chance to make money from their work. Patents also allow the public to learn how an invention works so that others can learn from the invention, come up with ways to improve the it, or create an invention of their own.



Design a Trademark

Trademarks, sometimes also called brand names, help us tell the difference between one person's product or service and another. Most trademarks are words, designs, or a combination of such but trademarks can take many other forms. Sounds, scents, shapes and colors can also function as trademarks.

Today, you made a mechanical grasper!

Think of what design, name, or symbol you would use to help the world identify and distinguish your grasper from those made by others.

Draw your trademark in the space below.
Make sure it is unique to you.



To learn more about inventors and intellectual property, including patents and trademarks, visit uspto.gov/kids or contact us at education@uspto.gov

United States Patent and Trademark Office (USPTO)
Office of Education and Outreach
600 Dulany Street Alexandria, VA 22314

United States Patent No. : US 8,255,079

Title: HUMAN GRASP ASSIST DEVICE AND METHOD OF USE

Inventors: Douglass Martin Linn, Chris A. Ihrke, Myron A. Diftler

US008255079B2

(12) **United States Patent**
Linn et al.

(10) **Patent No.:** US 8,255,079 B2
(45) **Date of Patent:** Aug. 28, 2012

(54) **HUMAN GRASP ASSIST DEVICE AND METHOD OF USE**

(75) **Inventors:** Douglass Martin Linn, White Lake, MI (US); Chris A. Ihrke, Hartland, MI (US); Myron A. Diftler, Houston, TX (US)

(73) **Assignees:** GM Global Technology Operations LLC, Detroit, MI (US); The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, DC (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 479 days.

(21) **Appl. No.:** 12/564,095

(22) **Filed:** Sep. 22, 2009

(65) **Prior Publication Data**
US 2011/0071664 A1 Mar. 24, 2011

(31) **Int. Cl.**
A61H 1/00 (2006.01)
G06F 7/00 (2006.01)
A61B 2/04 (2006.01)

(52) **U.S. Cl.** 700/213; 601/5; 601/23; 601/33; 601/40; 482/47; 700/250

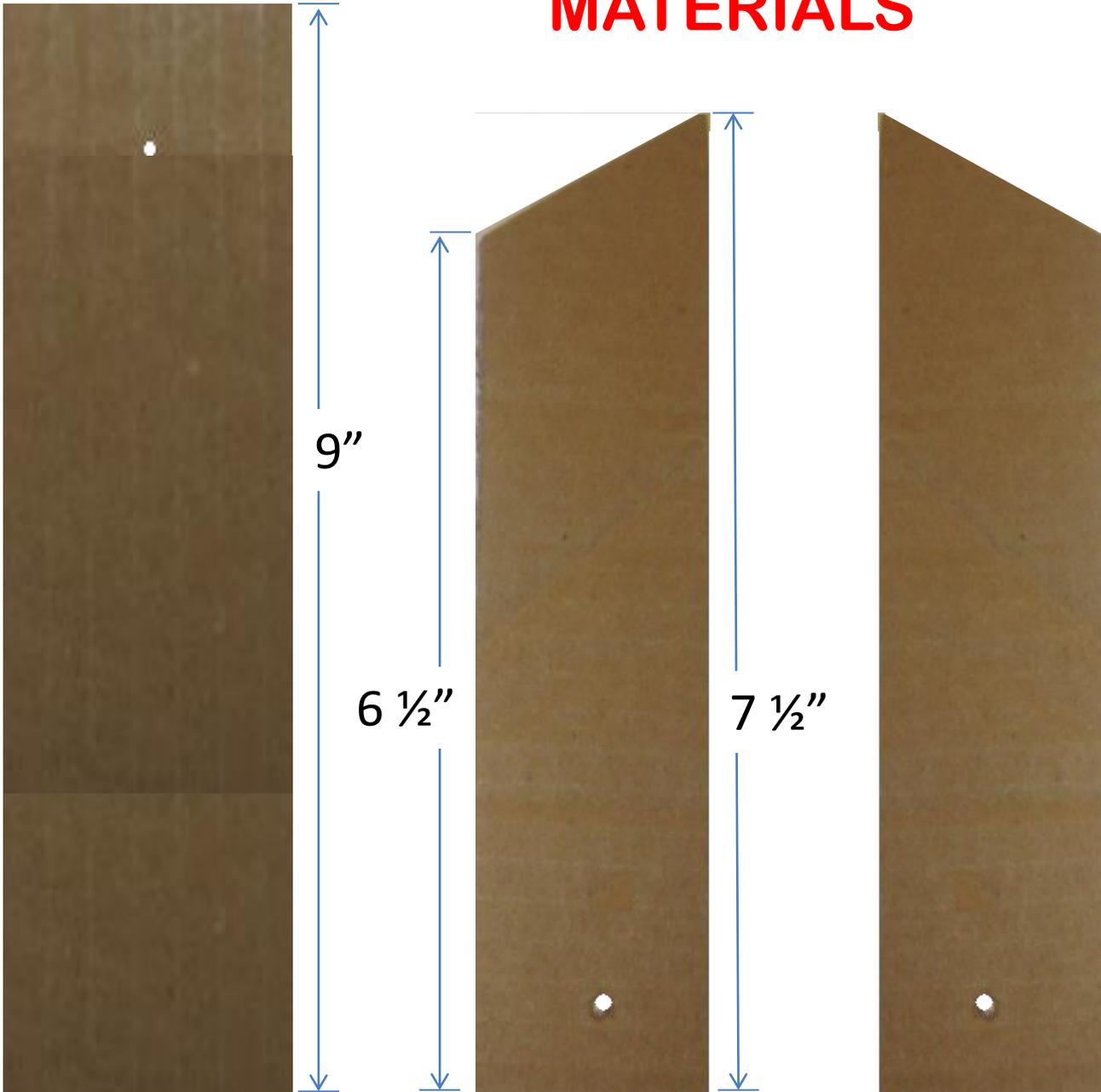
(58) **Field of Classification Search** None
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
5,117,700 A 6/1992 Trechsel
5,184,319 A 2/1993 Kramer
5,316,249 A 5/1996 Brimball

17 Claims, 2 Drawing Sheets



MATERIALS

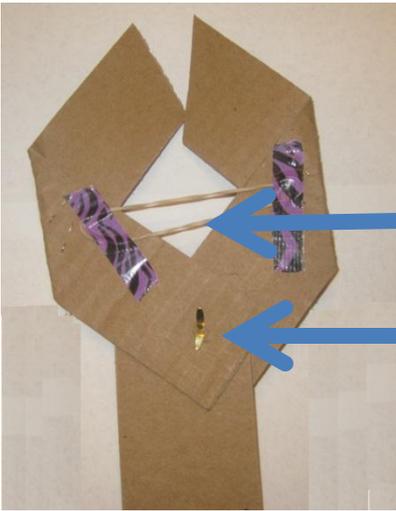


1 - large strip of corrugated cardboard. Shown actual size.

2 - small strips of corrugated cardboard. Shown actual size.

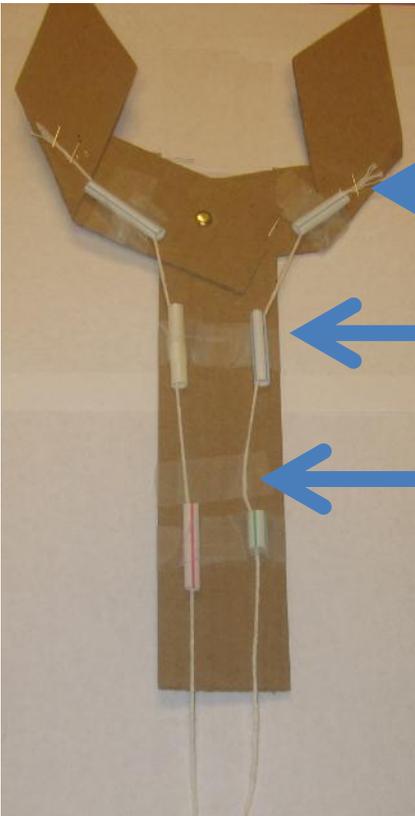
Punch one hole in each strip of corrugated cardboard as shown.

MATERIALS (continuation)



1 - Rubber band #16

1 - Brass fastener (1/2" or 1")



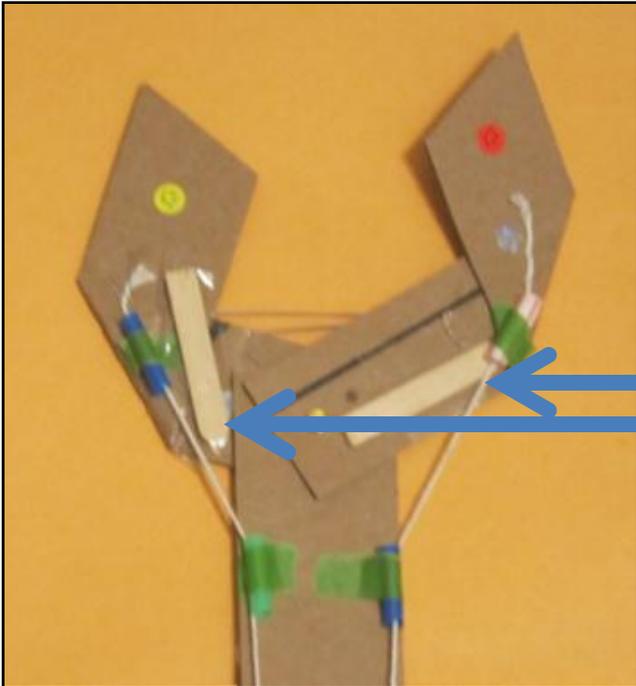
6 - Pieces of straw (approximately 1" each).
They will serve as guides.

2 - Pieces of smooth string (approximately 18 inches each)

1 - Stapler

1 - Heavy duty tape

MATERIALS (continuation)



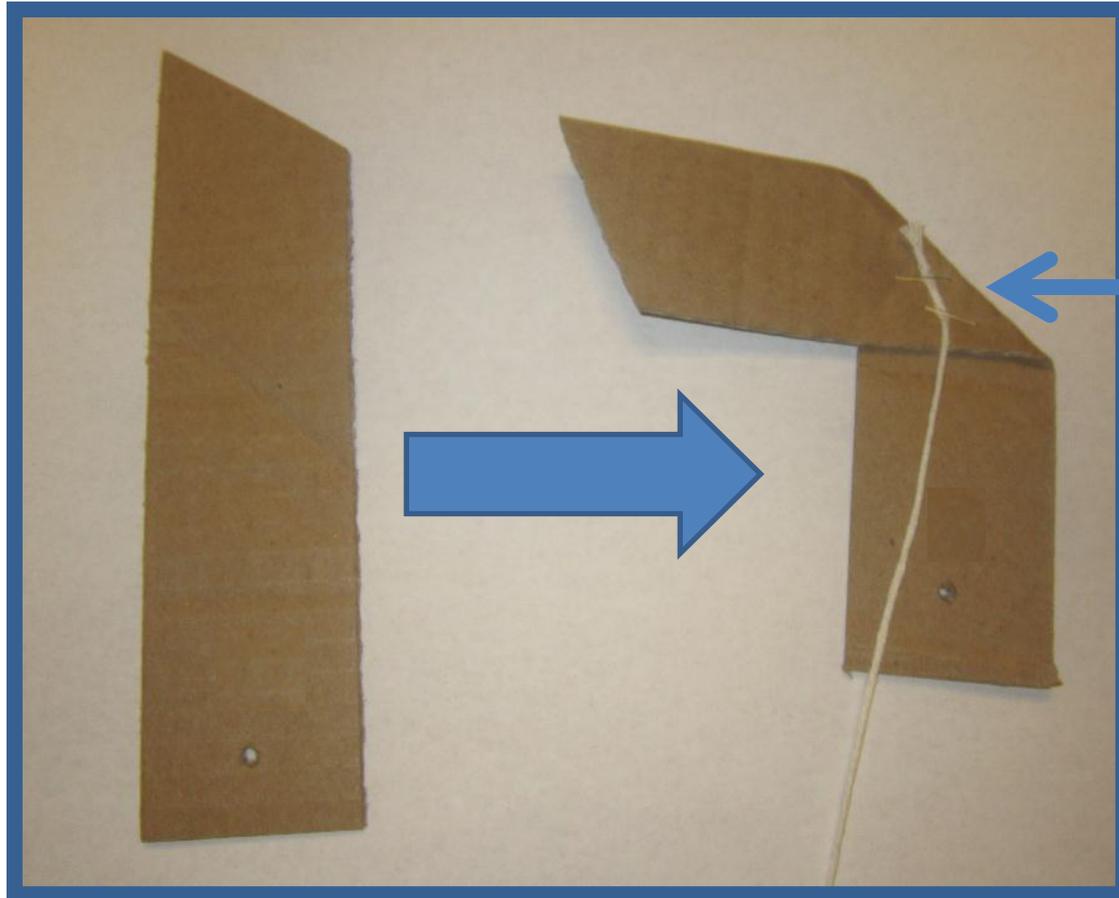
**1 or 2 pieces of ice
cream sticks
for reinforcement**



**MECHANICAL
GRASPER
BUILDING
INSTRUCTIONS**

Step 1

See the materials list for templates. Fold the first cardboard strip as shown below.

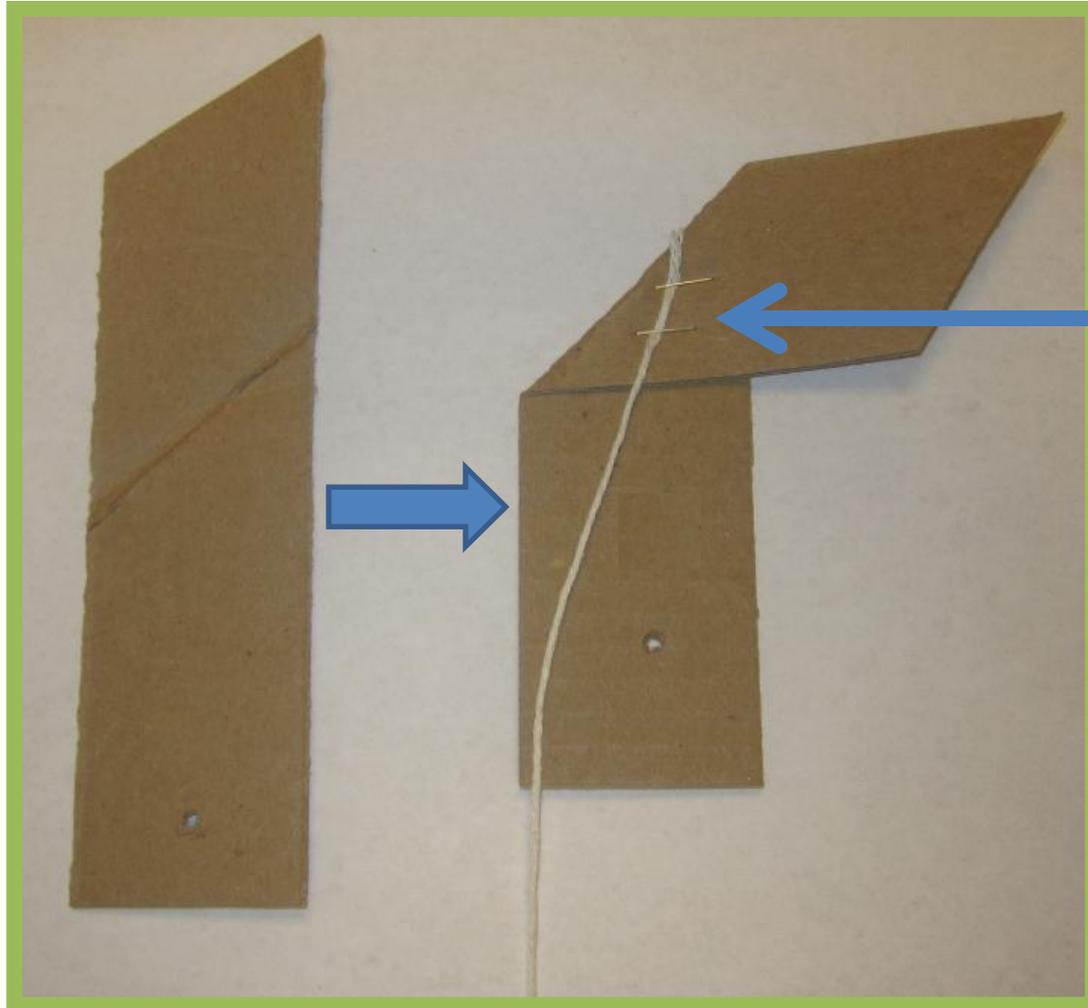


Attach a string using staples.

The staples will hold the string and keep the cardboard folded.

Step 2

Fold the second strip as shown below.

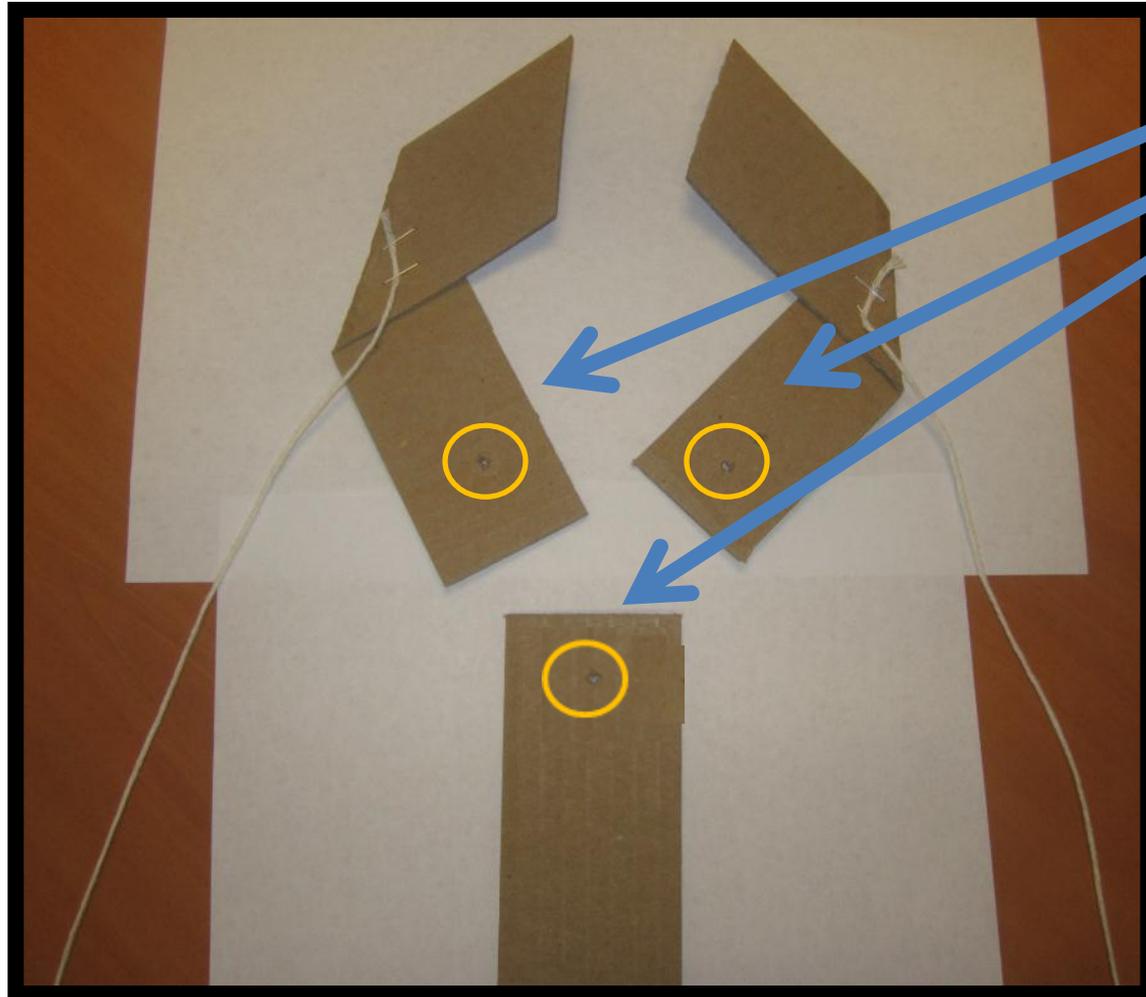


Attach the other string using staples.

The staples will hold the string and keep the cardboard folded.

Step 3

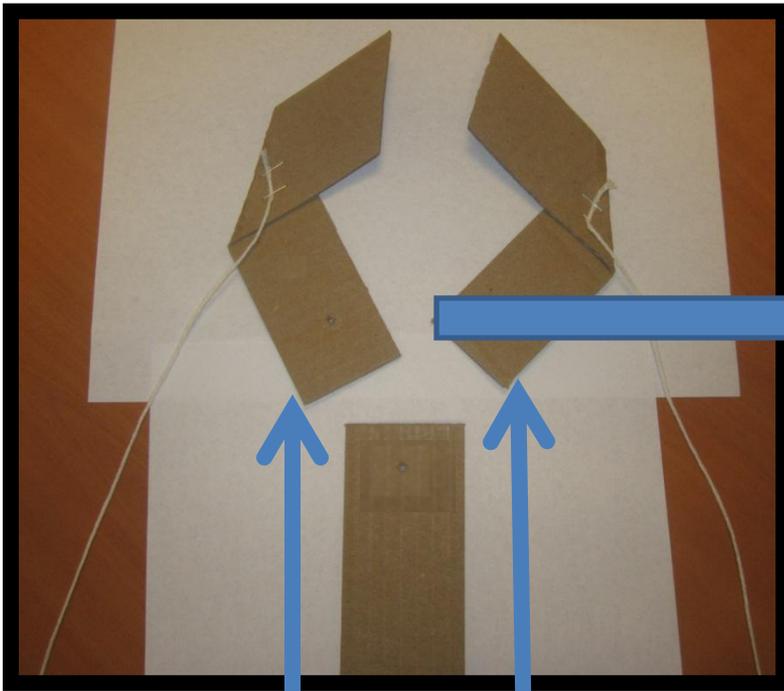
Attach the three cardboard strips using the holes on the template.



See
template
for hole
placement

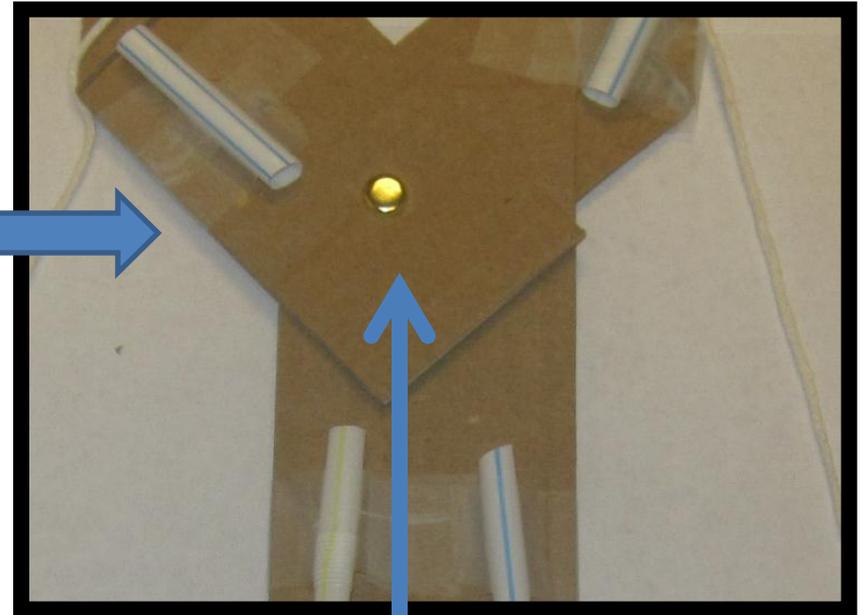
Step 4

Attach the three strips of cardboard using a fastener.



Strip 2 goes on top.

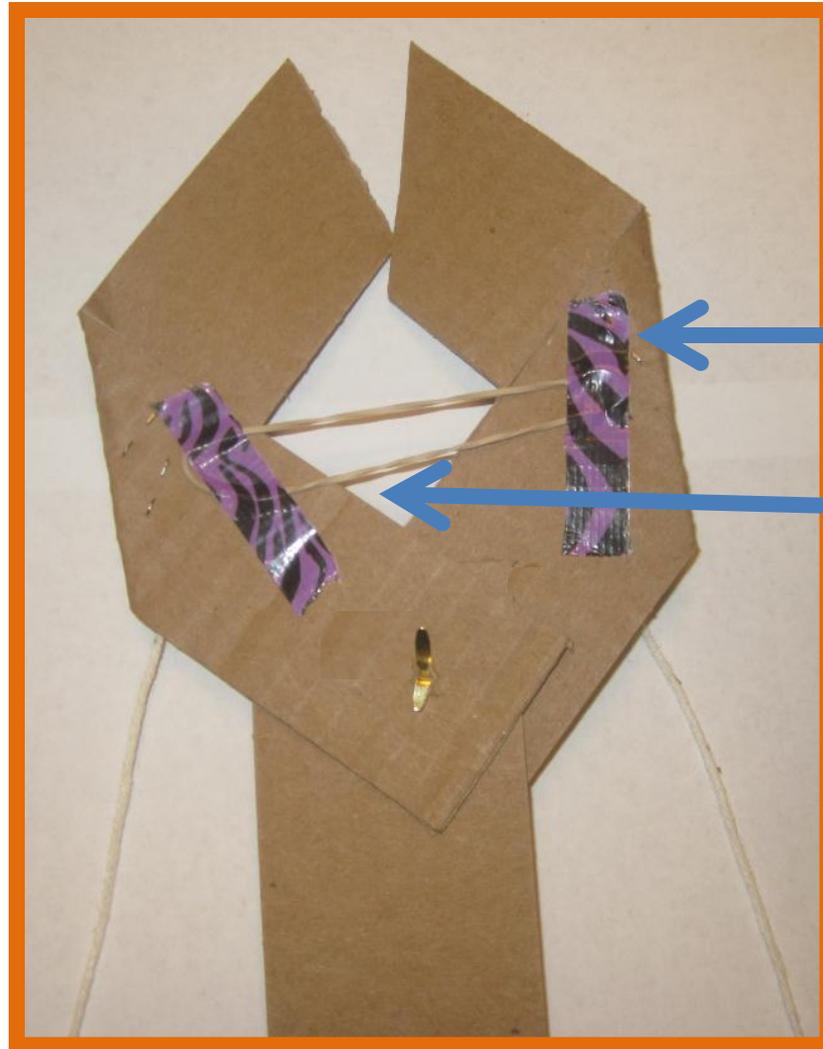
Strip 1 goes on the bottom.



Fastener

Step 5

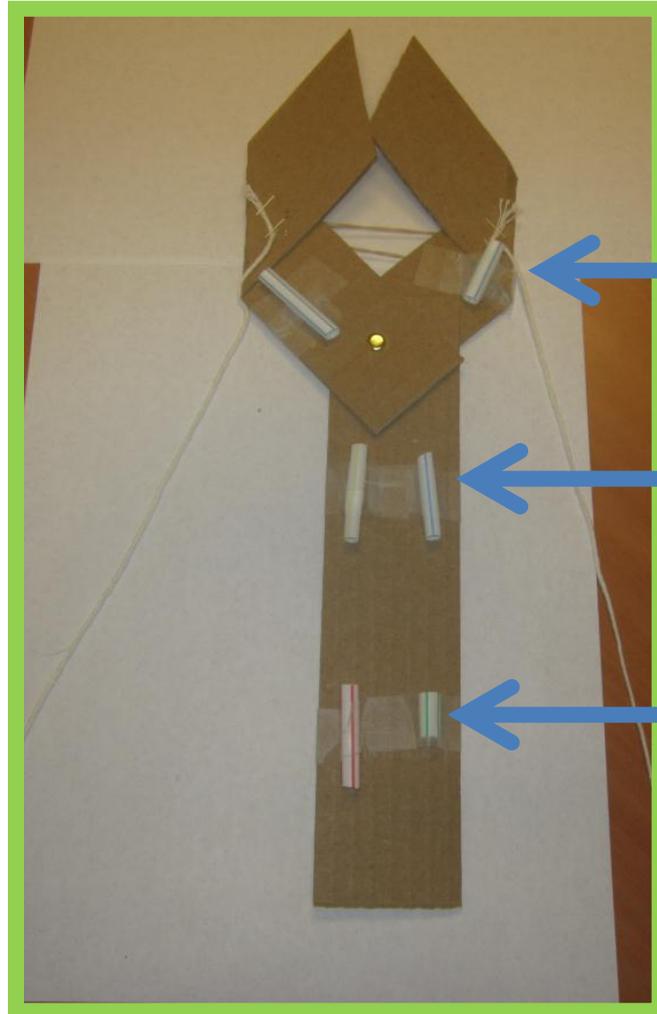
Flip over and use tape to attach rubber band. Reinforce with staples.



Tape

Rubber band

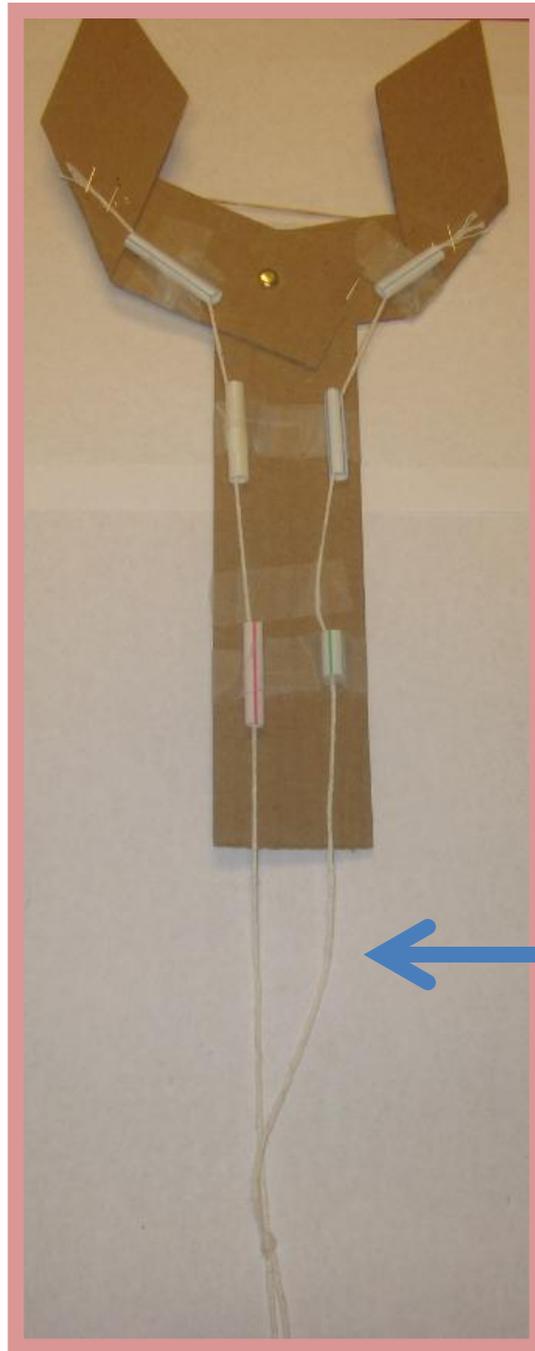
Step 6



Flip over and
use tape to
attach 6
straw pieces.

Step 7

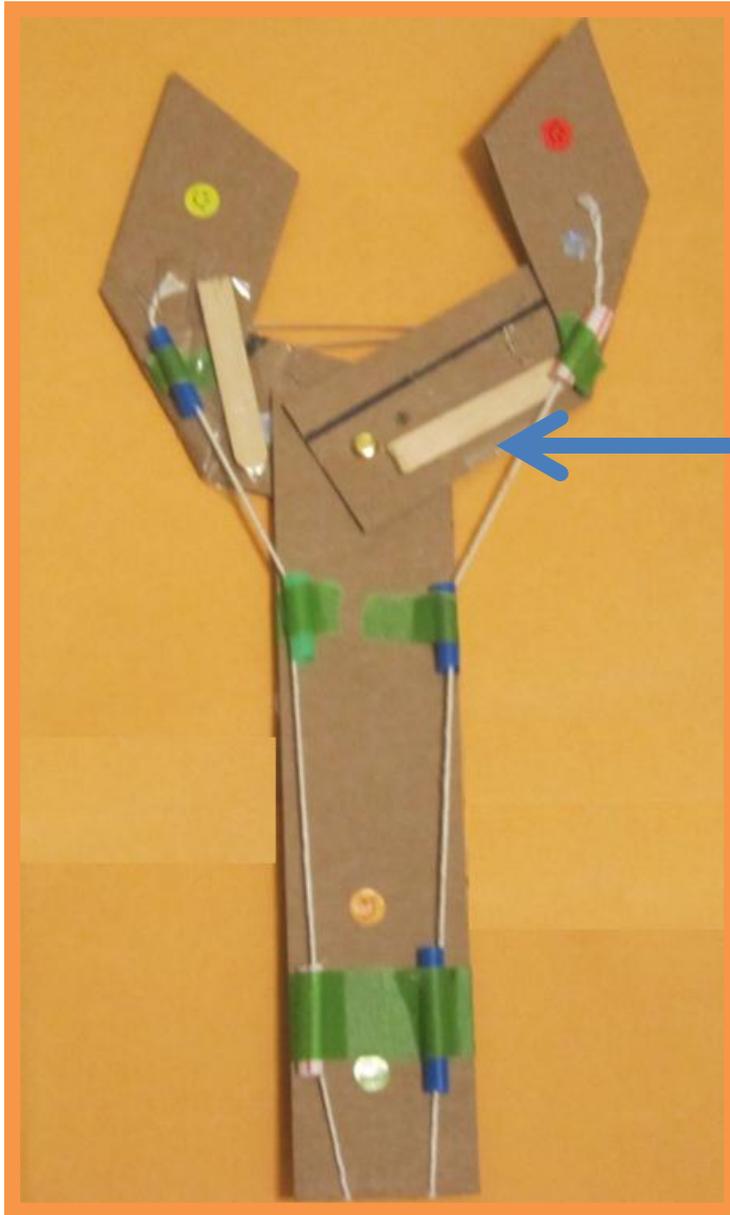
Feed string
through
straw pieces.



String

Step 8

Reinforce
the grasper.



Tape a small
piece of wood
or ice cream
stick on each
side of the
grasper for
reinforcement.

Step 9

Decorate
and have
fun!

