Hydraulic Prosthetic Hand



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KEY OBJECTIVES

Build your own hydraulic prosthetic hand

INTRODUCTION

Prosthetics may take many forms, but each is intended to restore or enhance the capabilities of a person. These are often mechanical replacements for parts of a person's body that are missing, or poorly functional. These may have arisen through accidents, injury or a result of an irregular development.

These days with more sophisticated manufacturing tools (such as 3D printers) and powerful and flexible microelectronics prosthetics can be created which provide the users with greatly improved function and quality of life.

Sadly not everyone can assess these advanced technologies. But even some basic prosthetics can be designed and produced which can improve people's lives and dignity and ability to care for themselves and their families. Here is a simple activity to get students started in designing and producing simple prosthesis.

GUIDING QUESTIONS

How can you build your own prosthetic hand?



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MATERIALS & PREPARATION

- Strong paper cups
- Straws
- Scissors
- String
- Glue /tape

TASKS & PROCEDURE

Cut a triangular piece out of each straw about ½ of the way from one end, this will form a flexible joint.

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Using a sharp pencil, toothpick or similar make a small hole in the straw about 1 cm away from the joint on the shorter piece of straw.



Push a length of string about 30 cm long through the small hole and out the long end of the straw.

Make a large knot on the string so that it will not pull through the hole.

Repeat for each of the fingers you wish to use. Perhaps add rubber bands to get a better grip on the straws.





Place the straw fingers around a paper cup, Glue or tape these in place.

Bring the loose ends of the strings together. If you wish you can tie these together (if you want all fingers to work together), or tie a button, or paperclip onto each end to help make it easier to pull and control the fingers individually.



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POSSIBLE EXTENSIONS

SOURCES Presented by Dr. Stuart Kohlhagen/The Science Nomad

After assembly, discuss how the different grippers work, how might they be activated, controlled, powered. What different designs might be useful. Who might benefit from these. What would you need to make a fully functional version for someone.