

A Girl Scouts Gold Award by Ariella Hirsch



[www.helpinghand4vets.com](http://www.helpinghand4vets.com)

## Description

The Helping Hand is an articulating arm to assist wheelchair bound individuals to carry items without assistance from others. It is mounted to the handles of a wheelchair to assist the user to carry either in front, beside or behind them. There is no locking mechanism as the weight of a bag creates enough friction that the arm doesn't swing when loaded. This is the do-it-yourself instructional guide on how to build a Helping Hand. Once completed, you can access your possessions easily and more comfortably, without assistance. You may build, install and use the item in most cases without any additional assistance from others. The Helping Hand can also be modified and altered by the builders or users. If you'd like to share your modifications with us please use the Contact Us form on our website at: [www.helpinghand4vets.com](http://www.helpinghand4vets.com). We would love to receive images or details of your modifications and hear how we helped you find more independence.



In 2020, Ariella Hirsch is a Senior Girl Scout in troop 60246 of Girl Scouts of California Central Coast. She is currently 15 years old. She was inspired to imagine and engineer this device herself while selling cookies a few years back, wanting this to be her Gold Award project. While in front of a grocery store, she witnessed a Veteran carrying a gallon of milk in a bag in his mouth. She knew right then this was not OK and she could help. She reached out to the veteran community for guidance.

**“I hope this helps you find more independence. I want to thank the VFW for support and inspiration, my community partners, and all the engineers who helped me make this dream a reality. A Gold Award takes a team.”**

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**Do not start project until you have read through entire instruction manual at least once.**

***\*\*After reading instructions through once, build loosely before taking apart and reading directions again while gluing to ensure proper sizing and fit.***

# Bill of Materials:

-  4 Each 1" Elbow PVC Fitting (A)
-  2 Each 1in x1 in x1in x 1in diameter Tee PVC Fitting (B)
-  1 Each 1 in x 1 in x 1 in x 1 in x 1 in diameter Cross Tee PVC fitting (C)
-  2 Each (1 in slip x  $\frac{3}{4}$  in threaded) Reducer Coupling PVC Fitting (D)

*Alternate to Reducer Coupler if not available:*

-  2 Each  $\frac{3}{4}$ in x  $\frac{3}{4}$ in x  $\frac{1}{2}$  in Diameter Adapter PVC Fitting (D)
-  1 Each  $\frac{3}{4}$  in MNPT x  $\frac{3}{4}$  in MNTP Cut-Off Riser (E)
-  1 Each 1" Diameter by 4 Feet L 450 PSI PVC Pipe (F)



1 Each

Christie's PVC Pipe Cement 8 Oz PVC  
Cement and Primer (or Equivalent) (G)

## Supplies:

May be purchased at any Home Improvement store. Instructions will reference the alphabetical letter that corresponds to the part or piece from here forward. See bill of materials for pictorial reference.

4 Each - 1" Elbow PVC Fitting (A)

2 Each - 1in x1 in x1in x 1in diameter Tee PVC Fitting (B)

1 Each - 1 in x 1 in x 1 in x 1in x 1 in diameter Cross Tee PVC fitting (C)

2 Each - (1 in slip x  $\frac{3}{4}$  in threaded) Reducer Coupling PVC Fitting (D)

*\*Alternate to Reducer Coupler if not available:*

*\*2 Each -  $\frac{3}{4}$ in x  $\frac{3}{4}$ in x  $\frac{1}{2}$  in Diameter Adapter PVC Fitting (D)*

1 Each -  $\frac{3}{4}$  in MNPT x  $\frac{3}{4}$  in MNTP Cut-Off Riser (E)

1 Each - 1" Diameter by 4 Feet L 450 PSI PVC Pipe (F)

1 Each - Christie's PVC Pipe Cement 8 Oz PVC Cement and Primer (or Equivalent) (G)

## Tools:

Pipe Cutter or HackSaw

File or rasp, flat and round

Pencil and/or Marker- (It helps to mark pieces and parts with a water based marker with their assigned letter and for marking cut lines.)

Measuring Tool (Yard Stick, Tape Measure, Ruler, etc}

Wheel Chair (For measuring and Custom Fit) ***May need to substitute pipe size to 1 ½" to fit handles.***

Large slip joint pliers or water pump pliers (to pull parts apart if pipes lock prior to gluing)

### **Optional Parts:**

-Pipe clamps (to hold stabilization bar on handles)

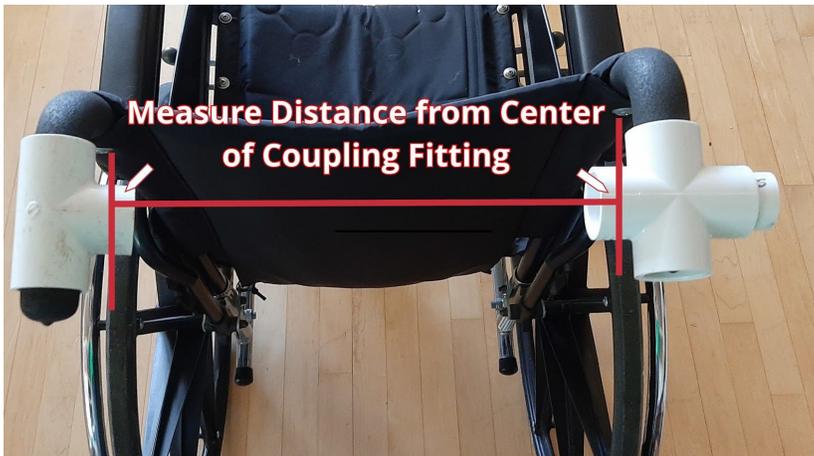
# Measure the Wheelchair:

## Step 1

Which side does the user want the Helping Hand for Vets on? Right or Left?

The side selected will be the handle the Cross Tee will be positioned on. Example below shows right hand mount.

- 1) Place the Cross Tee (C) on 1 handle of the Wheelchair, and the Tee (B) on the other.
- 2) Measure the distance between the 2 pieces and as shown below. Add 2 inches to your measurement as shown in diagram below, "Add A" and "Add B"

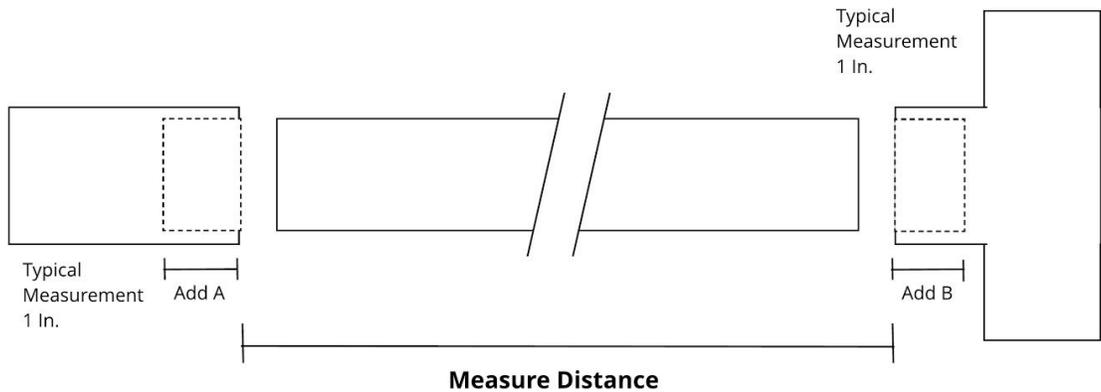


Write Measurement Here:

\_\_\_\_\_

Step 1

## Assembly Notes on Stabilization Bar



$$\text{Total} = \text{Measured Distance} + A + B$$

## Step 2

3) Measure the length of the arm you would like to have to carry your possessions:



Write Measurement  
Here:

\_\_\_\_\_

Step 2

## Cut:

**Cut the 1" PVC Pipe as Follows** (does not have to be exact, or straight. Just close):

- 3 Pieces each cut to **2 Inch** lengths (**H**) (*Do not put in tightly until ready to glue*)
- 1 Piece to the length measured *plus 2 inches* in **Step 1 (I)** (see Diagram above)
- 1 Piece to the length measured *plus 2 inches* in **Step 2** (See photo above)(J)

You should have 5 cut pieces of 1" PVC pipe. (3 of **H**, 1 of **I** and 1 of **J**)

Congratulations, you are ready to assemble the unit.

**\*\*Put it together once before you glue the pieces in place to check for fit.**

## Assemble:

**DO NOT GLUE** until instructed to do so.

It helps to write a reference Letter on parts in pencil or a water based marker for easier assembly.

### **Stabilization Bar (K)**

1. Place the Tee (B) and Cross (C) in front of you on a flat surface in the position they will be installed on the wheelchair.
2. Insert the cut pipe (I) into Tee (B) on one side and the Cross Tee (C) on the other  
These three parts become the Stabilization Bar (K) to prevent slippage and rotation when in use.
3. Slide the Stabilization Bar (K) back onto the wheelchair handles.
4. Insert a 2 inch section of pipe (H) into the end of the Cross Tee (C) that is to the outside of the wheelchair, opposite the Stabilization Bar (K): *(Do not put in tightly until ready to glue)*

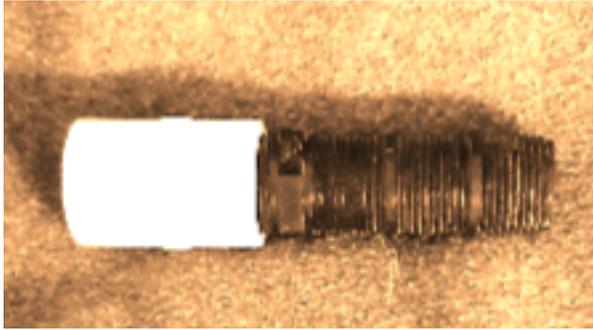


5. On the Stabilization Bar (K) attach another Tee (B) onto the 2 inch section (H) facing away from the handle of the wheelchair. Attach the Tee portion, with the through pipe oriented vertically. (see below) *(Do not put in tightly until ready to glue)*



# Articulation:

1. Take Cut-off Riser (**E**) and one Reducer Coupling PVC Fitting (**D**).
2. Thread the single segment side of Cut-off Riser(**E**) onto the Reducer Coupling PVC Fitting (**D**). This connector is (**L**): (set aside for later)
3. DO NOT GLUE THREADS



## Step 2

- 4) Measure the length of the arm you would like to have to carry your possessions:



Write Measurement Here:

---

4. Slip 1 Reducer Coupling PVC Fitting (**D**) into Elbow (**A**) so it is inserted into fitting (**M**) then slip the completed piece into the upper end of the T-pipe that is on the wheelchair:



# Hook Assembly:

5. Slip a 2 Inch piece (H) into an Elbow (A): **(N)**  
*(Do not put in tightly until ready to glue)*



6. Repeat step above for 2 matching pieces.
7. Slip 2 Inch piece into another Elbow A to form a "U" shape. This is your Hook **(O)**



# Adjust Hook for User:

Hook should be positioned on the arm to be inside the wheelchair, not outside the wheelchair.

8. Slip Connection **(N)** into one Elbow of **(O)**. **Orient for the User as described below.**

9A. If the Helping Hand is on the right handle (used by the pusher's right hand) then have the elbow face inside the wheelchair as oriented in the photo below. **(P)**



9B. If the Helping Hand is on the left handle (used by the pusher's left hand) then have the elbow face inside the wheelchair as oriented in the photo below. **(P)**



## Assemble the Arm with Hook (Q):

10. Slip arm (J) into (M)



11. Slip (P) onto the opposite side of Arm (J) with all attachments hanging in a down position off the arm. See example:

RIGHT Side Mount (Q)



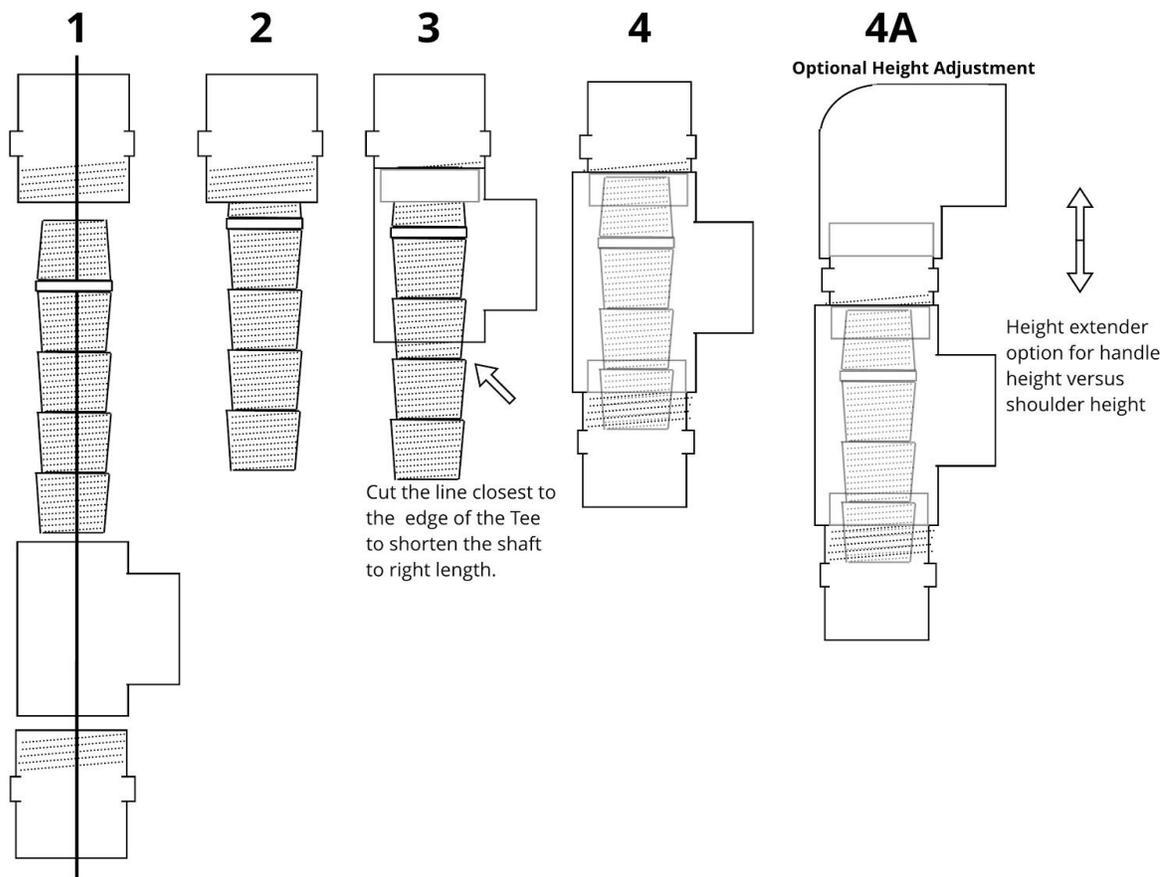
LEFT Side Mount (Q)



# Mount to Wheelchair:

10. Slip (M) part of Arm into Tee of Stabilization Bar (**K**).
1. Slide Connector (L) through bottom of Stabilization Bar (**K**) Tee and thread into (M) until tight.  
See Diagram below for how to attach the side mount Arm to the Stabilization Bar  
DO NOT GLUE THREADS

## Height Adjustment Guide



View from front of chair for **RIGHT** side mount:



**Congratulations! You are ready to permanently assemble the Helping Hand for Vets for installation and use.**

1. Have your parts together as needed for assembly.
2. Use Glue primer on any location to be glued as you are glueing it.

**Begin at the top of instructions and glue all slip joints.  
DO NOT Glue threads.**