



## JUNIOR SEABEE

# SW – STEELWORKER



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## Welding with Chocolate

Steelworkers are the welders of the Seabees, and while their jobs extend beyond welding, a large part of what they do on a regular basis involves using welding to join two similar or dissimilar types of materials.

We're going to use some of those skills to "weld" chocolate bridges. We'll demonstrate WHY people weld and even try practicing how you might be able to weld.

For this exercise, we will need the following:

- 5 Standard Chocolate bars (Hershey bars work great)
- 1 tall glass bottle or jar as tall as a candy bar (Kombucha bottles work great as do, spaghetti sauce jars or wine bottles)
- A funnel (or really great pouring skills)
- 2 same-sized cups to use as supports for your bridge (place upside down on paper) – if you'd like, while you're preparing, have your child draw what the bridge goes over – a river, a valley, or an obstacle of some kind
- A source of hot water (a coffee pot with water run through works well)
- Some kind of weight for your bridge, in a perfect world, you'll have a set of mini weights that show how many grams your bridge can hold, but look for something you can quantify (Hot wheels cars? Jenga blocks?)
- Some kind of box large enough to set your chocolate down so it holds the 90° shape while it cools. This box will be a "Form" - a small cereal box with one of the large flat sides cut off of the top works well
- Wax paper to line the inside of the box
- Something to clean hands (and weights/toys) with when you're done

**JUNIOR SEABEES CAN DO TOO!**



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Okay, take a moment to view some of these optional videos.

The first one talks about what welding is, and what different types of welds are used. It is generally for kids with a basic understanding and it can be found here:

<https://www.youtube.com/watch?v=OWThL97tq3k>

The second video is more specific to what Steelworkers are and what they do. It is perfect for all ages and can be found here:

<https://www.youtube.com/watch?v=uuOGB9NWPYU>

The final video explains what we're going to be doing in this exercise – welding with chocolate:

<https://www.youtube.com/watch?v=L9PBwtL1Ybw>

If you have watched the video, you have an understanding as to what we will be doing. If you chose not to watch the video, instructions are as follows:

1) Place a single chocolate bar on the two cups and see how much weight the “bridge” can withstand before collapsing. This will be your “control” weight. This part can be done so kids can understand the process of adding weights/determining how much it takes to collapse the bridge. \*\*I recommend saving the chocolate used in this portion of the exercise to use as a stick weld for your later bridges.\*\*

2) Fill your bottle or jar with hot water using a funnel, if necessary.

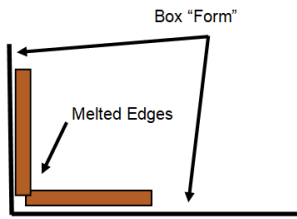
3) Place the wax paper on the insides of the box form to make it easier to remove the chocolate.

3) Next you will make your welds. 2 at a time, heat the long edge of the chocolate by rubbing the length of the bars on the hot water bottle, until the edges are soft and smear easily. If the chocolate isn't melting evenly, you can try using one of the pieces from step 1 and melt THAT on the water bottle, then use it to “paint” the weld, adding chocolate to the inner and outer edges to make the welds hold.





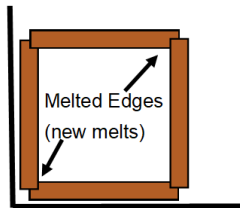
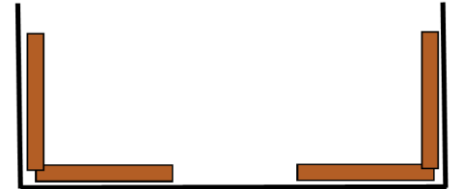
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4) Place the two long edges side to side at a 90° angle and allow to cool. Use your box “Form” to hold the angle. (Place bars inside box with one on the bottom and one up the side)

5) Repeat steps 4 and 5 with 2 more bars, and place those two

pieces on the other side of the box, again using the side to hold the pieces in place. At this point, you can carefully refrigerate the box if you’d like.

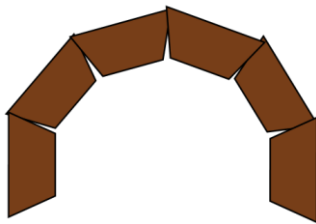


6) Once the welds have solidified, we move on to the tricky part. With your two pieces at 90° angles, melt the rest of the edges, and connect the 2 L shapes to create a box. Allow the box to cool and the welds to solidify. You can use your box Form to hold the edges again, if needed.

7) Once the welds have cooled, place the box bridge across the cups, and begin weighing again. Place weights on bridges to see how much MORE the box bridge that you have built can hold.

8) Clean-up is always the last part of anything we do! Wipe down your “weights” as well as any other equipment that you have used.

9) Please remember to post pictures on social media using #JuniorSeabee and #USNSeabeeMuseum so the world can see what you’ve learned. Share your creations on our Instagram or Facebook pages – tag us at **U.S. Navy Seabee Museum** and don’t forget to follow us!



Other ideas - While bridges are cooling in the fridge (if fridge is used), try to use small (bite size) chocolate bars, melting the longer edges and build a long bridge going from one edge to the next. Use the natural angle of the bite sized bars to create the arched bridge (Will require additional small chocolate bars)