

TAKE AND MAKE: Touchscreen Gloves

Watch the tutorial on Youtube: <https://youtu.be/s1kHBCvBgWQ>



What are touchscreen gloves? They are gloves that work with touchscreens like smartphones or tablets. This Take and Make will show you how to make any pair of gloves or mittens you own touchscreen-compatible for the winter weather!

How do they work? Most smartphones and tablets have capacitive touchscreens that have a layer of a conductive material like copper. Our skin is a conductor of electricity too, so when your finger makes contact with the screen it completes the circuit, and the device can register that it's being touched. However, gloves are made of cloth, which acts like an insulator and prevents you from interacting with the screens. Touchscreen gloves get around this by using **conductive thread**. Conductive thread has threads of metal (stainless steel, in this case) or a metal coating that allows it to conduct electricity. As long as the thread on the outside of the glove is touching your finger on the inside, it can be sensed by your touchscreen the same way your bare finger can!

What is in this Take and Make? Two lengths of conductive thread, a needle, and a threader. There is a list of resources at the end of the instructions if you are interested in trying other projects with conductive thread.

Terms to know before you start:

Electrical conductor: A substance that allows electricity to pass through it. Example: copper, graphite, stainless steel.

Electrical insulator: A substance that is difficult for an electrical current to pass through. Example: rubber, glass, cloth.

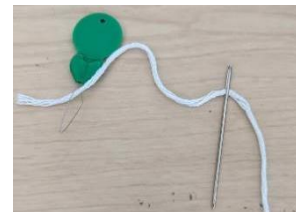
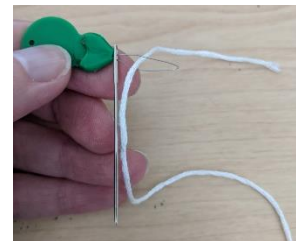
E-textiles: Fabrics that have electronics integrated into them. This can be fabrics woven with conductive threads, like these touchscreen gloves, but it could also mean having components like batteries and LEDs as part of the garment. For example, a bracelet could use conductive thread to connect a battery to an LED and light up whenever the circuit is closed. In addition to **e-textiles**, you may also hear people talk about **smart textiles**, **soft circuits**, **sewn circuits**, and **wearable computing**. Conductive thread is commonly used in all of these.

Instructions: Touchscreen Gloves

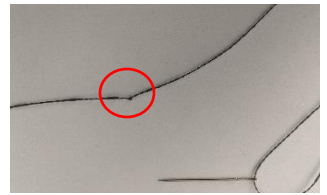
In this project, you will learn how conductive thread works, how to thread a needle, and how to perform a basic straight stitch.

Threading the Needle:

1. Take one length of conductive thread and put it through the eye of the needle. This is called threading the needle. There are two ways that you can do this:
 - 1) Thread the needle by poking the thread through the eye with your fingers. It helps to wet the tip of the thread to make it easier to push it through the eye. Pull the thread through until there are a few inches of thread on the other side of the eye.
 - 2) Use a threader to make getting the thread through the eye of the needle a little easier. You can do this by poking the loop of the threader through the eye of the needle. Now put your thread through this much bigger loop, and then pull the threader back through the eye of the needle. It will take the thread with it, so pull it until there is an inch or two hanging on the other side. Now your needle is threaded!
2. Now we need to tie a knot at the end of the thread so that it doesn't pull through the glove. For this project, we want to **leave an inch or two of thread below the knot**. This is



because we need some of the thread to be in contact with your finger inside the glove. You can tie a simple overhand knot a few times to secure the thread.



Sewing the Conductive Thread into the Glove:

2. First, you need to figure out what finger and what part of the finger you use when you're interacting with a touchscreen. Put your glove or mitten on and pretend to use the device. You can mark the part of the glove that will be making contact with the screen with tape or chalk, or you can eyeball it.
3. Once you know where you're sewing, start from the inside of the glove and push the needle up through to the outside. Keep pulling until you hit the knot you tied earlier. For some gloves, it may be easier to flip inside out to sew. You could also put something like a thimble over your finger and sew with the finger inside the glove.
4. Now push the needle back down through the finger a few centimeters lower on the finger. Pull all the way through. Continue until you have ~3 stitches on the finger.
5. Put your glove on and test it with your screen. At this point, you can add more stitches if needed or adjust their placement.



Tying Off:

When you're happy with the glove, you can tie the thread off. If you haven't flipped the finger of the glove inside out yet, do so now. You'll want to be able to see your stitches. At this point, you have two options:

- a. Push the needle underneath the stitches you've already made, pull it all the way through, and then tie a knot to secure the thread.
 - b. Take the strand you left inside the finger at beginning and the strand dangling from the needle and tie them together.
6. Remove the needle, put the excess thread in the tip of the finger, and flip it back right-side out.
 7. You have a touchscreen-compatible glove!



Resources for Exploring Projects with Conductive Thread:

- "Conductive Thread Basics" from SparkFun has great tips on where to get started sewing with conductive thread.
 - <https://learn.sparkfun.com/tutorials/sewing-with-conductive-thread>
- *MakeZine* has a great collection of e-textile projects using conductive thread to spark your inspiration.
 - <https://makezine.com/2010/04/06/geek-chic-massive-e-textiles-roundup/>
- *Sew Electric* has projects and advice for getting started with sewn circuits using conductive thread.
 - <https://sewelectric.org/diy-projects/>
- *The Big Book of Makerspace Projects* by Colleen Graves includes some great DIY projects, including e-textiles.
 - You can put this book on hold at PPLD using this link: <https://tinyurl.com/dend2t79>
- Find more information on sewing on PPLD's LibGuide at <https://research.ppld.org/sewing>.

Did you know? The East, Sand Creek, Library 21c, and Manitou Springs Library Makerspaces all have sewing supplies that are free for you to use. If you want to use them to explore more sewing projects, check out ppld.org/create/makerspaces!

