

# Volt, Paper, Scissors! Transcript EASE Talk 2022

## **Introduction:**

Hi I am Michael the creator of volt paper scissors. I am a game designer and maker. Since many years I have been teaching kids about creativity and technology. And my passion has always been to make learning about electronics and coding more accessible to schools and private households. So I created volt paper scissors, a website for teachers and parents dedicated to paper circuits. It is a growing resource for creative STEAM projects using paper, conductive tape and simple electronics. All my templates are free to use and published under the CC-BY-NC-SA 4.0 license.

## **Overview**

In this presentation I will give an overview of the work I do and why I think paper circuits are awesome. Then I will showcase two inspiring examples in detail. In die end, I will give you a quick introduction on how I create my paper circuit projects.

## **Volt, Paper, Scissors?**

On [voltPaperScissors.com](http://voltPaperScissors.com) I publish few but very good dokumented STEAM projects with a fokus on simple electronics used in creative unconventional ways. Instructions are broken down into easy to follow steps in both, written form and video. The videos are seperated into chapters for easy navigation.

However the projects leave room for experimentation or creative freedom so that participants can turn their projects into something unique.

## **Why paper circuits are awesome?**

I use paper circuits for my projects because you can recreate them using only scissors and glue. There are no tools or technical equipment needed. This makes it perfect for schools and private households. Also it is equally attractive for boys and girls. Furthermore paper circuits are much more visual, making learning more intuitive than for example the use of a breadboard.

I use standard through hole components which are cheap and can be ordered in large quantities. So kids can take their projects home afterwards. Important to know is that there are different types of conductive tape and you should always use the one with conductive adhesive. I find conductive nylon fabric tape is working the best with no lose connections and easy handling for kids.

All my projects use small button cells which makes the process not only very save but also gives the possibility to power all projects with small solar cells.

## **Example 1: RGB TouchCubes**

A great beginners project is my modular RGB TouchCube. It is an interactive circuit using an RGB LED. The cubes can be attached to each other to make a large touch-sensitive lightshow. So this is a great beginner project for larger groups of kids.

## **Example 2: Smartphone Robot**

A more complex but way more powerful paper circuit is my Smartphone Robot. It uses two lightsensor-transistor circuits to drive two motors. The lightsensors sense the brightness on the screen which changes the rotation speed of one or both of the motors. All programming is done via MIT App Inventor an app programming environment for kids, just like scratch. So kids learn how to create their own apps for IOS or android. Doing so, kids can not only let the robot drive around but give it character, a voice, make it listen to voice commands or remote control it using a second smartphone.

The tutorial for this is modular. So kids can start with a very basic robot first. They can give it a wired remote control, upgrade it with solar power or make a nice robot body for it. After that kids can simply exchange the circuit on the robots back to turn the normal robot into a smartphone robot.

## **How can I learn this?**

I create all my work using open source software. If you want to do it, first research some ideas and make a prototype of the circuit using a breadboard. Then try to sketch a 2D version of the circuit on paper and try it out. Next try to turn the circuit into an actual object. Tinker around until everything works as intended. Now bring your sketch into Inkscape, an open source vector based design tool, and turn your sketch into a printable template. Add important hints, details and explanations. Do not forget to make a cool design, but do not over design it. There should be some creative freedom for participants.

In case you want to create a more complex 3D paper design you can use Blender for your design and Pepakura to turn your design into a printable template. Don't get to crazy since kids have to cut and fold every edge you create.

## **End card**

This was a very short overview of my work and how I create it. I do give workshops for teachers who want to learn this. If this is interesting to you or you want to contact me for any other reason just write me an e-mail.