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| **PLTW Logo_Web Small** |
| **Activity 1.1.4 Solder & De-Solder Practice** |
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Introduction

Regardless of whether you have your driver’s license or will soon be getting it, two absolute certainties exist. One; you will want to drive your parents’ expensive car, and two; they will not let you. To a parent, the reasoning is obvious. When you are first learning to drive, you are most likely to make a mistake. Wouldn’t it be better to make these mistakes in the ten-year-old family mini-van?

Like driving, good soldering requires practice. In this activity, you will practice your soldering skills while constructing a simple *Fun Light Project*. This *Fun Light Project* has many of the same components as the ***Board Game Counter***that you will construct in a future activity. Moreover, like the old mini-van, if you happen to damage the *Fun Light* while honing your soldering skills, it’s not a big deal.



Equipment

* Vise
* Safety glasses
* Solder sucker and/or solder wick
* Solder tool
* Diagonal cutters
* Needle nose pliers
* Solder
* Damp sponge
* Soldering iron
* *Fun Light* kit
* 9V battery

**Functional Test Procedure**

1. With the component side facing up, grip the left edge of the PCB marked “PRESS START” between your thumb and index finger, hold for about a ½ second, and let go. This should cause LED L1 to light. An internal clocking pulse from the 555 timer will then cause other LEDs to light sequentially (chase), one at a time and then stop.
2. Hold “PRESS START” for until L1 and L2 are lit and then release. The two lights will chase simultaneously from left to right. The same test can be done for three or more lights.
3. Hold “PRESS START” until all LEDs are lit and then release. The LED’s will turn off, one at a time, from left to right.
4. Hold “PRESS START” for a moment, then release and then grip “PRESS START again. A new pattern of lit LEDs with a space between them will chase from left to right.
5. Press the “PRESS FASTER” edge of the board with your other fingers. The lights should shift faster. Experiment by using one hand to start the pattern and the other to control the chase speed of the pattern.

**Project Completion**

1. Once your *Fun Light* is functioning properly, attach one velcro strip to the battery and the other to the foil side of the PCB. This will secure the battery to the PCB.
2. Remember to unplug the battery after using your *Fun Light* or the battery will die.

**Conclusion**

Answer the following questions related to the soldering/de-soldering process. You may use this activity and the supporting presentation as a reference, but you will need other references (textbooks, Internet, etc.) to answer all of the questions.

1. Solder is an alloy of what two metals?

**Tin and Lead**

1. What is tinning, and why is it important to keep the tip of your soldering iron tinned?

**Tinning is applying a small amount of solder to the iron. It is important because it allows for transfer of heat to the work piece**

1. List the six most common types of bad solder connections.

**Too much solder, too much solder, cold solder joint, not soldered, lifter trace/pad**

1. What are the two techniques that can be used to de-solder a component from a PCB?

**Using a solder sucker, or a solder wick**

1. The solder used in electronic application is frequently called 60/40 solder. Why?

**it’s called 60/40 because it is 63% tin and 37% lead**

1. What is a *cold solder joint*?

**A solder connection that exhibits poor wetting and is characterized by a grayish porous appearance.**

1. What is the melting point of 60/40 solder?

**The melting point of 60/40 solder is 361 degrees Fahrenheit**

1. What is the typical wattage of a soldering iron used in electronic application?

**The typical wattage for a soldering iron used in electronic application is 25-30 watts**.