

# Beginners STEMSEL Projects

## Project 1: Alarm system

Everyone has things they want to keep secure. Microchips provide a powerful new way of protecting valuables. In this project students will build a simple alarm system that will turn on a buzzer and LED when the alarm is triggered by a pushbutton.



## Project 2: Traffic Lights

Not only do people tell microchips what to do, microchips can also tell people what to do. Therefore it is important that they are sending the correct message. In this project students will learn the importance of the instruction sequence and timing functions while building their own traffic light from LEDs.



## Project 3: Washing Machine

Microchips have the ability to take over many tasks that once needed to be done by hand. However, these tasks often require a set of instructions to be carried out in a specific order. Students will learn more about giving instructions to microchips while they program their own washing machine.



## Project 4: Street Light

Electric lighting has transformed the way people live. However, to produce electricity it is damaging to our environment, therefore it is important not to waste it. In this project, students will make a street light that only turns on when required.



## Project 5: Fridge Alarm

The refrigerator is a very useful device that stops our food from going off and keeps it safe from pests. However, they clearly won't work if the door is left open. Students will be making their own fridge alarm to help keep food fresh and save electricity.



## Project 6: Temperature Controller

While no one likes being too hot or too cold, there are certain situations where keeping the temperature just right can mean the difference between life and death. Students will use the temperature controller in this project to monitor and adjust the temperature just like in an incubator.



### **Project 7: Musical Buzzer**

While it is pleasant to listen to, music is actually quite complex, and can be difficult to teach to microchips. Students will use this project to make their microchips sing while learning about sound waves.



### **Project 8: Smart Light Dimmer**

Lights that are just on or off are so old-fashioned. In this project students will make a dimmer light that can be adjusted to suit the user's needs in addition to adjusting itself to keep a constant light level in the room while the amount of natural light changes throughout the day.



### **Project 9: Cool Hat**

You'd be the life of the party wearing this funky hat! Students will learn more about sequencing as they make their own flashy hat with a fan to keep cool while flashing LEDs make you look cool.



### **Project 10: Bike Indicator**

When riding a bike on the road others need to know what we are doing to avoid accidents. In this project students will learn more about road safety and signals whilst making a bicycle indicator.

