## Lesson 13 – Activity Sheet

## Getting Started

Smart traffic lights are already in use:

* Carnegie Mellon University is piloting smart traffic light in order to reduce vehicle emissions in Pittsburgh. The system will dynamically change the timings of the traffic lights by communicating with the different lights in the city and adapting for changing driving conditions in order to reduce or avoid congestion
* In the UK, traffic lights that monitor vehicle speed and change to red when cars are travelling to fast are already in place – this helps reduce accidents by encourage drivers to slow down to avoid red traffic lights

The future rise in **autonomous** and self-driving cars means that we will have to consider how we apply traffic rules so they can be ‘seen’ and obeyed by human drivers as well as autonomous vehicles.

We have already looked at how we can use Radio to communicate between to computer devices.

By applying this technology into traffic lights, we could command driverless cars to stop on red lights while human driver stop on seeing the red signal

## Success Criteria

* Apply your understanding, computational thinking and programming skills to achieve a goal
* Design and create a smart traffic light system that will communicate with human and robot drivers
* Program a micro:bit to operate a set of traffic lights

## Pro-tip

* People don’t like change, so make your new system easy for humans to deal with
* KISS – Keep It Super Simple
* Think

## Test Time

* Does the robot stop?
* Does the robot stop in the correct place?
* Is your traffic light sequence correct?
* What is the lowest power setting that works?

## Stretch Tasks

* Try incorporating a line **sensor** to ensure the car stops are the right place
* Try using an ultrasonic sensor to stop at the right place
* Use LEDs or NeoPixels to create your human visible RED, AMBER, GREEN **sequence**.

## Final Thoughts

During today’s lesson we have looked at how technology is already being used to develop smart traffic lights. We have discussed how this technology could be employed using a BBC micro:bit, especially the radio feature.

We have designed, created and tested a set of smart traffic lights, considered how they would be used by both humans and self-driving vehicles.

We have looked at how we can apply LEDs for human use and how additional sensors such as ultrasonic and line sensors could be used to improve these automated systems.