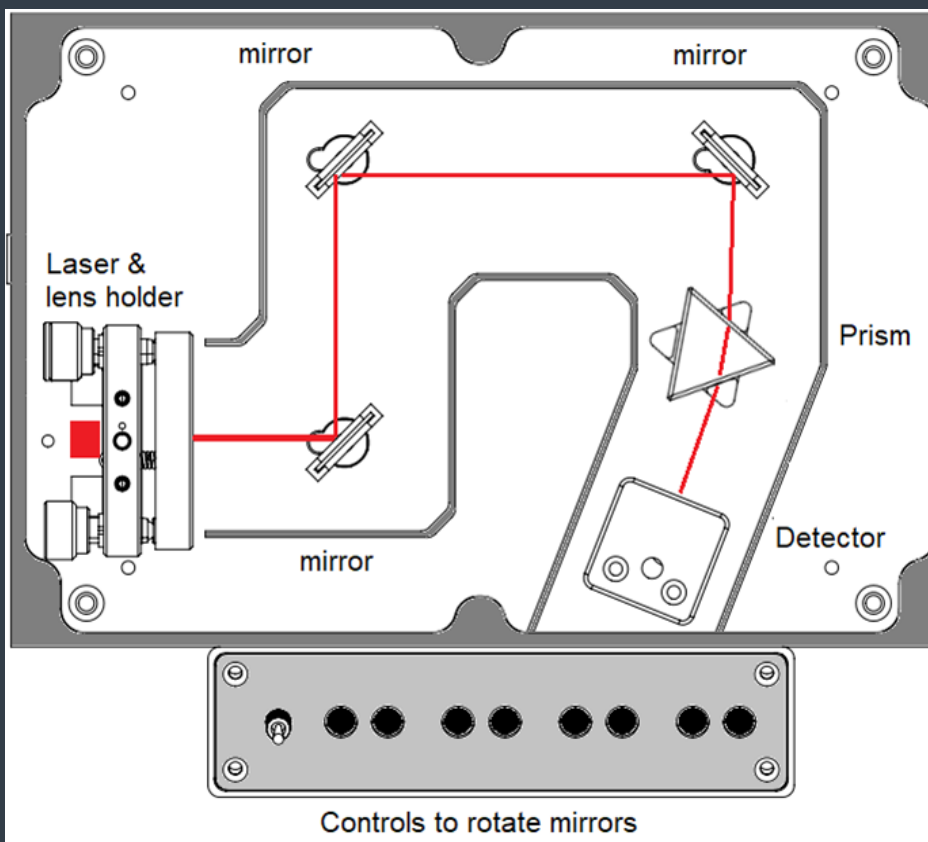


## Laser Maze Challenge



### OBJECTIVE

To guide the laser through a maze using rotating mirrors and prism so it reaches the detector at the end.

### HOW IT WORKS

Operator presses buttons to direct the laser in the correct direction for each mirror so the beam is reflected to the next stage. Finally, when it reaches the prism, the beam is redirected by refraction for the final distance to the detector.

### ABOUT THE CHALLENGE

There is a clockwise and an anti-clockwise button for each mirror and prism so the operator can judge for themselves the best direction at each stage.

### HOW IT IS BUILT

An Arduino is programmed to monitor the buttons and direct the motors using a pulsed output for lower speed and finer positional control. Basic low-power dc motors are used with the mirror mounted on it with a 3D printed holder. The upper base and maze were 3D printed and mounted above the base of the box so that the electronics and motors are contained below it.

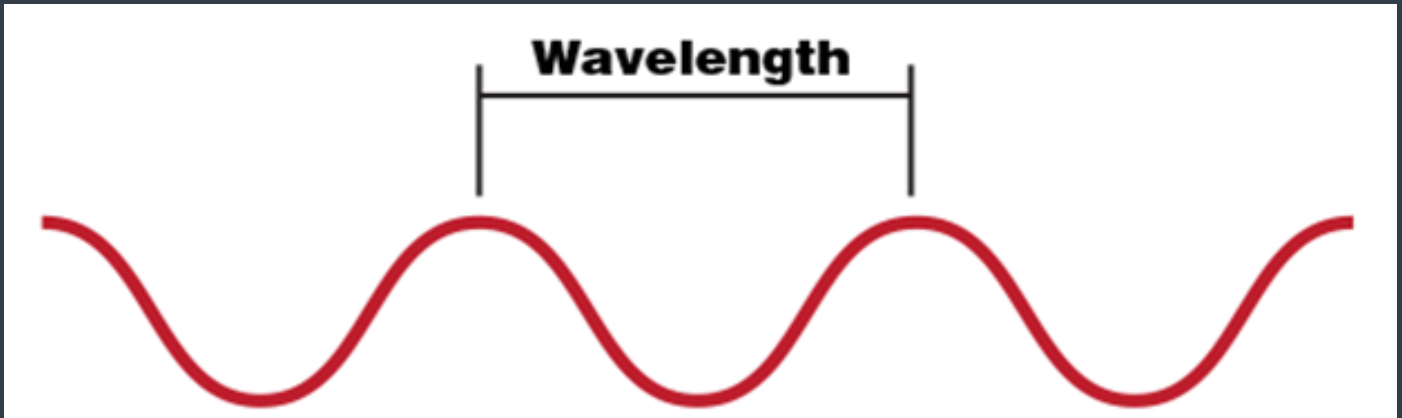
### TELL ME ABOUT LASERS

Laser stands for 'Light amplified stimulated emission of radiation'.

A laser is an unusual light source. It is quite different from a light bulb or a flash light. Lasers produce a very narrow beam of light. This type of light is useful for lots of technologies and instruments—even some that you might use at home!

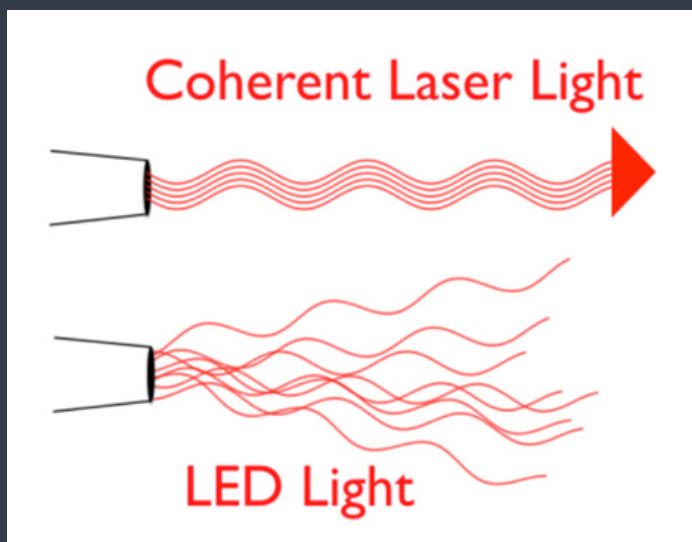
## Laser Maze Challenge

Light travels in waves, and the distance between the peaks of a wave is called the wavelength.



Each colour of light has a different wavelength. For example, blue light has a shorter wavelength than red light. Sunlight—and the typical light from a lightbulb—is made up of light with many different wavelengths. Our eyes see this mixture of wavelengths as white light. [the wavelength of our laser is 650nm]

A laser is different. Lasers do not occur in nature. However, we have figured ways to artificially create this special type of light. Lasers produce a narrow beam of light in which all of the light waves have very similar wavelengths. The laser's light waves travel together with their peaks all lined up, or **in phase**. This is why laser beams are very narrow, very bright, and can be focused into a very tiny spot.



Because laser light stays focused and does not spread out much (like a flashlight would), laser beams can travel very long distances. They can also concentrate a lot of energy on a very small area.

Lasers have many uses. They are used in precision tools and can cut through diamonds or thick metal. They can also be designed to help in delicate surgeries. Lasers are used for recording and retrieving information. They are used in communications and in carrying TV and internet signals. We also find them in laser printers, bar code scanners, and DVD players. They also help to make parts for computers and other electronics. [from the NASA website].