UV Sensor
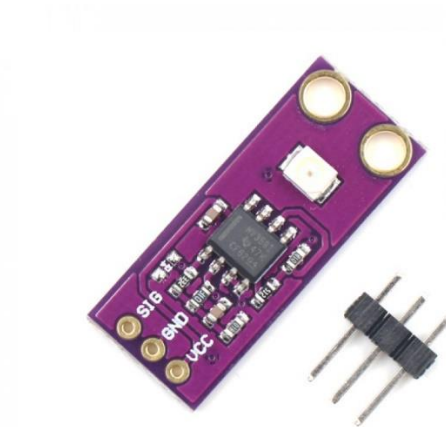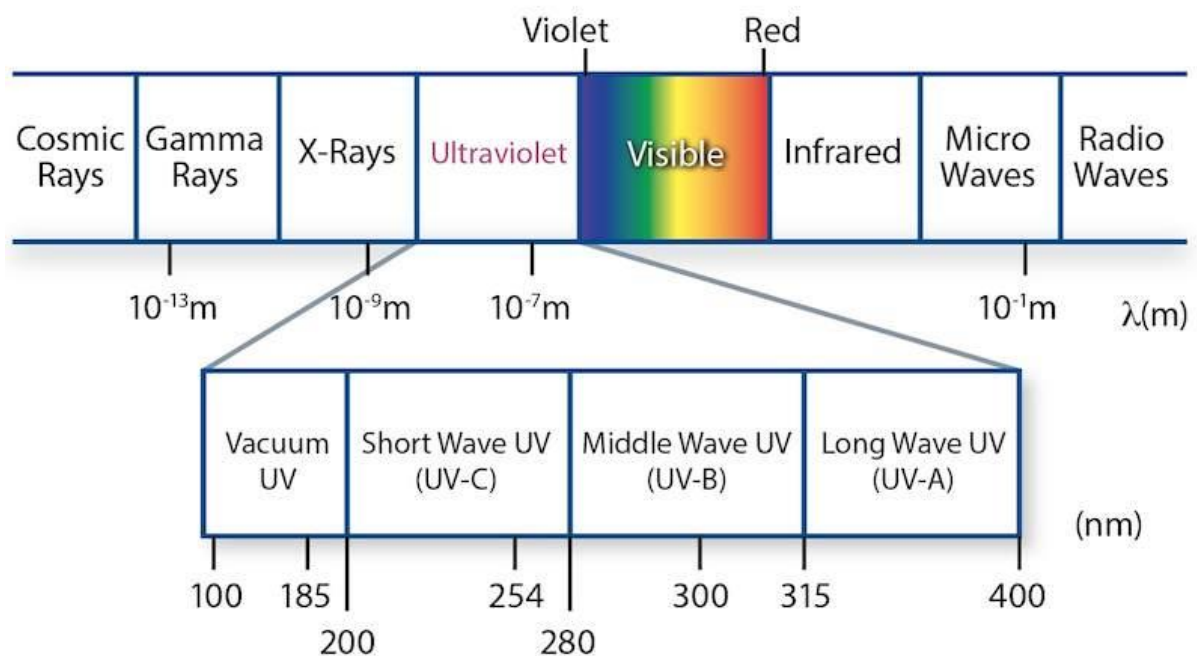

Introduction

(https://www.uvfab.com/uv-spectrum-and-applications/)

Ultraviolet refers to the light frequency with wavelength around 100nm to 400nm. It is present in sunlight and constitutes about ~5% of the total radiation from the sun. UV is generally classified in 4 different types, UV-A, UV-B, UV-C and vacuum UV.
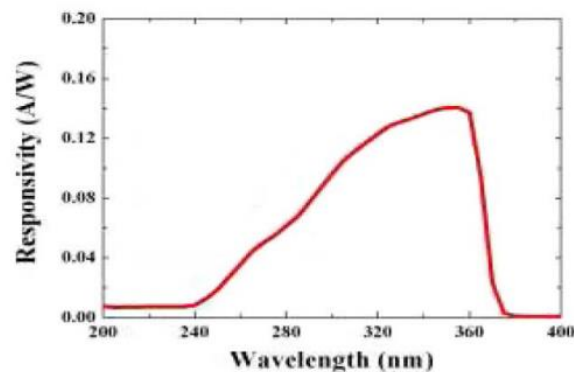
UV-A has the lowest energy and is generally used in your blacklights. It is also used on tanning machines.

UV-B is the small but dangerous portion of the sun's radiation. They are generally absorbed by our ozone layer.

UV-C is your germicidal UV and is used to sanitize surfaces. Prolonged exposure to UVC may cause severe burns.

Responsivity Curve

(UV Response Curve from the product datasheet)

The sensor used in your module is the GUVA-S12SD. It is sensitive to a wide portion of UV light. It is most sensitive however to UV-A portion of the spectrum. The circuit on the board outputs a voltage proportional to the UV index intensity equivalent of the light detected.

The UV index can be calculated by multiplying the output voltage by 1.64. This is due to how the module circuit was setup and we won't go into much details around it.
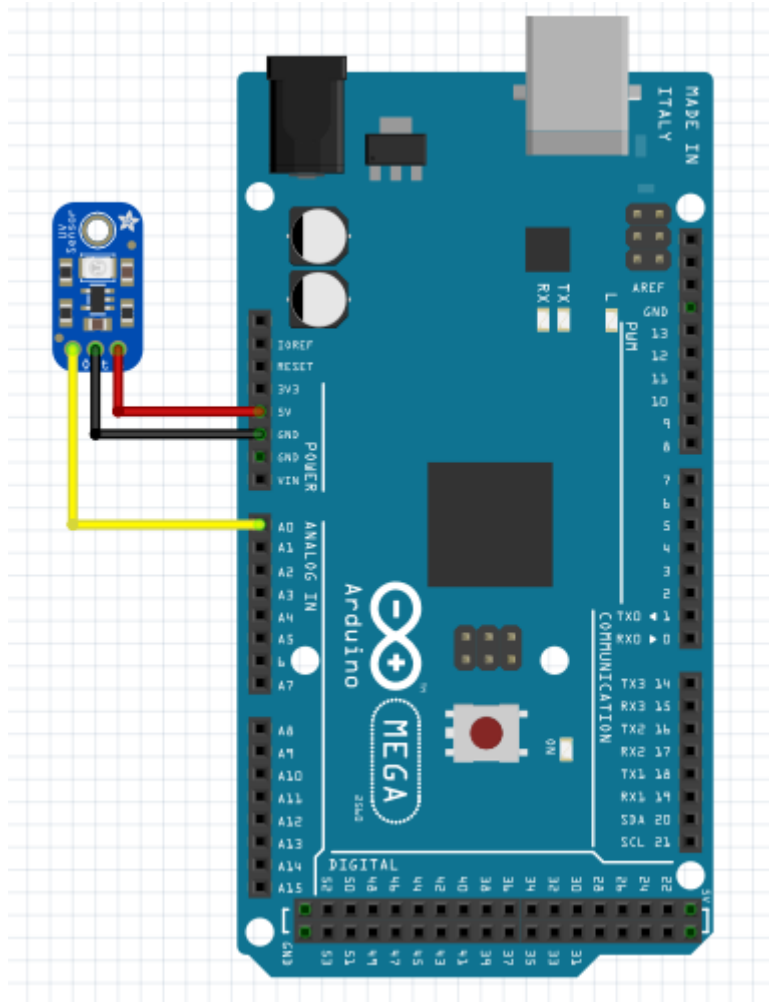
Wiring the sensor is pretty straightforward, just connect VCC to 5V, GND to Ground and SIO to A0. Reading the sensor is also very straightforward as you only need read the ADC value and convert it to voltage.

Load the following code (GUVA-S12SD sketch)

```
#define UV_Sensor A0

void setup()
{
  Serial.begin(9600);
}

void loop()
{
  float sensorVoltage;
  float sensorValue;
  float UV_index;

  sensorValue = analogRead(UV_Sensor);
  sensorVoltage = sensorValue/1024*5.0;
  UV_index = sensorVoltage * 1.64;

  Serial.print("Sensor voltage = ");
  Serial.print(sensorVoltage);
  Serial.println(" V");
```

```
  Serial.print("UV Index = ");
  Serial.println(UV_index);

  delay(1000);
}
```

The code is a straightforward reading on analog input A0. Line 15 only converts the ADC reading to the equivalent voltage. Note that for Arduino Mega, the reference voltage is 5V. Also, as mentioned earlier, to get the UV index, you have to multiply the voltage value by 1.64. The circuit can only measure up to UV index 8.

Also, as a tip, if you are buying UV disinfectants, to verify that it is actually emitting UV-C, you can take a piece of glass and cover the sensor. The voltage should drop abruptly as UV-C does not easily pass through glass.

So that's it, as an experiment, you can go outside on a sunny day and determine the amount of UV light.

Useful Links
https://www.vedantu.com/physics/ultraviolet-rays
https://protosupplies.com/product/guva-s12sd-uv-light-sensor-module/