Arduino Code for “Build Your Own Particle Sensor” Activity

//Build your own PM sensor Outreach activity

unsigned long sampletime_ms = 5000;
unsigned long duration;
unsigned long startprice;
unsigned long lowpriceoccupancy = 0;
unsigned long highprice;
float ratio = 0;

void setup()
{
  Serial.begin(9600);  //start communication with computer
  pinMode(LED1, OUTPUT);  //Define the LEDs as outputs
  pinMode(LED2, OUTPUT);
  pinMode(LED3, OUTPUT);
  pinMode(highprice, INPUT);
  startprice = millis();  //set the start time of the PM measurement
  //millis() gives the time since the program started
  Serial.println("BUILD YOUR OWN SENSOR INITIALIZING");  //Prints to the computer screen
}

void loop ()
{
Done compiling.

Binary sketch size: 5,194 bytes (of a 32,256 byte maximum)
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//duration: waits for pin to go LOW, starts timing, then waits for the pin to go HIGH and stops timing
//Returns the length of the pulse in microseconds, gives up and returns 0 if no pulse starts within a specified timeout
//works well for pulses from 10 microseconds to 3 minutes in length
duration = pulseIn(Pin, LOW);

lowpulsecoupacity = lowpulsecoupacity + duration; //the lowpulse occupancy is the sum of all the durations

if (millis()-starttime > sampletime_ms)//following code executed if the sampletime specified has passed
ratio = lowpulsecoupacity/(sampletime_ms*10.0); // Integer percentage 0-100
Serial.println(ratio); //print value to computer screen

if (ratio<15)//if “low concentration” PM light up 1 LED
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, LOW);
    digitalWrite(LED3, LOW);
}
close if(ratio>20) //if “moderate concentration” PM light up 2 LEDs
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, HIGH);
    digitalWrite(LED3, LOW);
}
close if("high concentration" light up all 3 LEDs
    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, HIGH);
    digitalWrite(LED3, HIGH);
}

lowpulsecoupacity = 0;//reset lowpulsecoupacacy
starttime=millis();//reset the start time of this PM measurement

}