DATALOGGING WITH MICROCONTROLLERS

Date : _____

Name: _____

CRADLΣ
Centre for Research and Applied Learning in Science
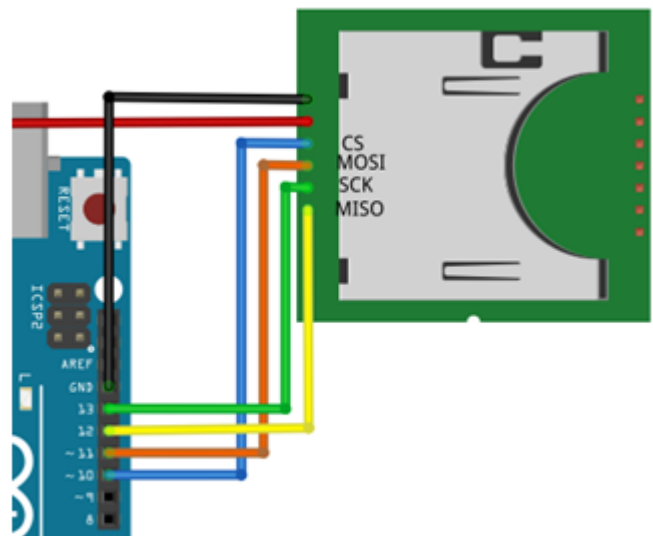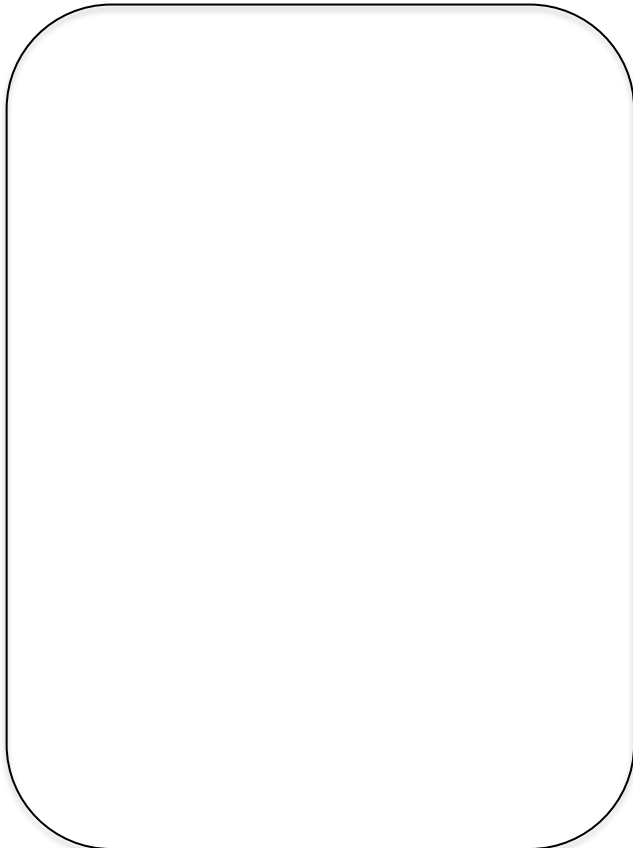
Activity 1 – Temperature sensor

```
int analogVal;
const int tempPin = A0;
float voltage, temp;

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

void loop()
{
  analogVal = analogRead(tempPin);
  voltage = (analogVal*5.0)/1024;
  temp = 100*voltage;
  Serial.print("Temperature: ");
  Serial.print(temp);
  Serial.println(" deg C");
  delay(500);
}
```

+5V
Output
Gnd

Activity 2 – Micro SD card

CS
MOSI
SCK
MISO
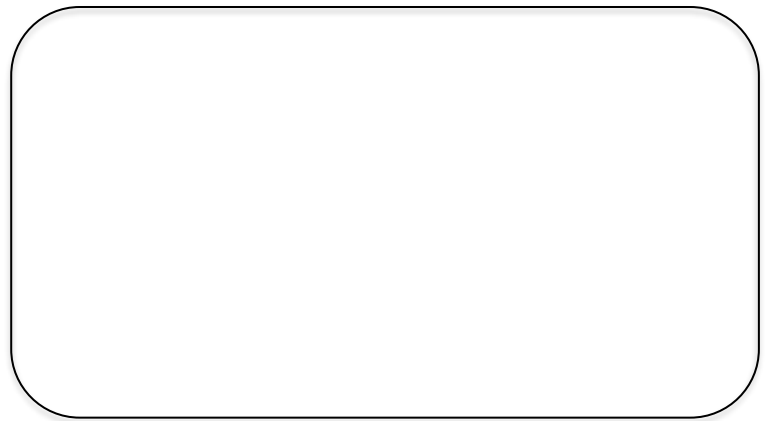
Wiring layout

Activity 2: Micro SD card part 1 – Initializing the SD card

```
#include<SD.h>
#include<SPI.h>
const int CS = 10;

void setup() {
  Serial.begin(9600);
  Serial.print("Initializing SD card...");
  if(!SD.begin(CS)){
    Serial.println("Initialization failed!");
    return;
  }
  Serial.println("Initialization done.");
}


void loop() {

}
```

Activity 3: Micro SD card part 2 – Opening, writing of characters, closing of SD card

```
#include<SD.h>
#include<SPI.h>
const int CS = 10;
File myfile;

void setup() {
  Serial.begin(9600);
  Serial.print("Initializing SD card...");
  if(!SD.begin(CS)){
    Serial.println("Initialization failed!");
    return;
  }
  Serial.println("Initialization done.");

  myfile = SD.open("Templigh.csv",FILE_WRITE);

  if(myfile){
    Serial.print("Writing to Templigh.csv...");
    String header = "Number, temperature, light";
    myfile.println(header);
  }
  else{
    Serial.println("error opening file");
  }
  myfile.close();
}


void loop() {

}
```

Activity 4: Micro SD card part 3 – Recording data into SD card

```
#include<SD.h>
#include<SPI.h>
const int CS = 10;
File myfile;

void setup() {
  Serial.begin(9600);
  Serial.print("Initializing SD card...");
  if(!SD.begin(CS)){
    Serial.println("Initialization failed!");
    return;
  }
  Serial.println("Initialization done.");

  myfile = SD.open("Templigh.csv",FILE_WRITE);

  if(myfile){
    Serial.print("Writing to Templigh.csv...");
    String header = "Number, temperature, light";
    myfile.println(header);
  }
  else{
    Serial.println("error opening file");
  }
  myfile.close();
}

void loop() {
  String datastring = String(id) + ", " + String(13) + ", " + String(12);

  myfile = SD.open("Templigh.csv",FILE_WRITE);
  if(myfile){
    myfile.println(datastring);
    myfile.close();
    Serial.println(datastring);
  }
  else{
    Serial.println("Couldn't open file");
  }
  id = id + 1;
  delay(500);
}
```

Activity 5: Micro SD card final – Datalogging temperature and light values

```arduino
#include<SD.h>
#include<SPI.h>
const int CS = 10;
File myfile;
int id = 1;

void setup() {
  Serial.begin(9600);
  Serial.print("Initializing SD card...");
  if(!SD.begin(CS)){
    Serial.println("Initialization failed!");
    return;
  }
  Serial.println("Initialization done.");

  myfile = SD.open("Templigh.csv",FILE_WRITE);

  if(myfile){
    Serial.print("Writing to Templigh.csv...");
    myfile.println("......");
    String header = "Number, temperature, light";
    myfile.println(header);
  }
  else{
    Serial.println("error opening file");
  }
  myfile.close();
}
void loop() {
  int analogVal = analogRead(A0);
  float voltage = (analogVal*5.0)/1024;
  float temp = 100*voltage;
  int lightvalue = analogRead(A1);

  String datastring = String(id) + ", " + String(temp) + ", " + String(lightvalue);

  myfile = SD.open("Templigh.csv",FILE_WRITE);
  if(myfile){
    myfile.println(datastring);
    myfile.close();
    Serial.println(datastring);
  }
  else{
    Serial.println("Couldn't open file");
  }
  id = id + 1;
  delay(500);
}
```