

香港教育大學

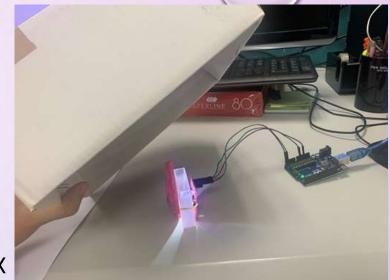
SCHOOL: CHRISTIAN AND MISSIONARY ALLIANCE SUN KEI SECONDARY SCHOOL (S4)

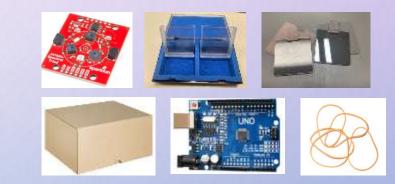
TOPIC:WORKSHOP 1 – DEVELOP PORTABLESPECTROPHOTOMETER WITH DATA LOGGING



# **REQUIREMENT LIST:**

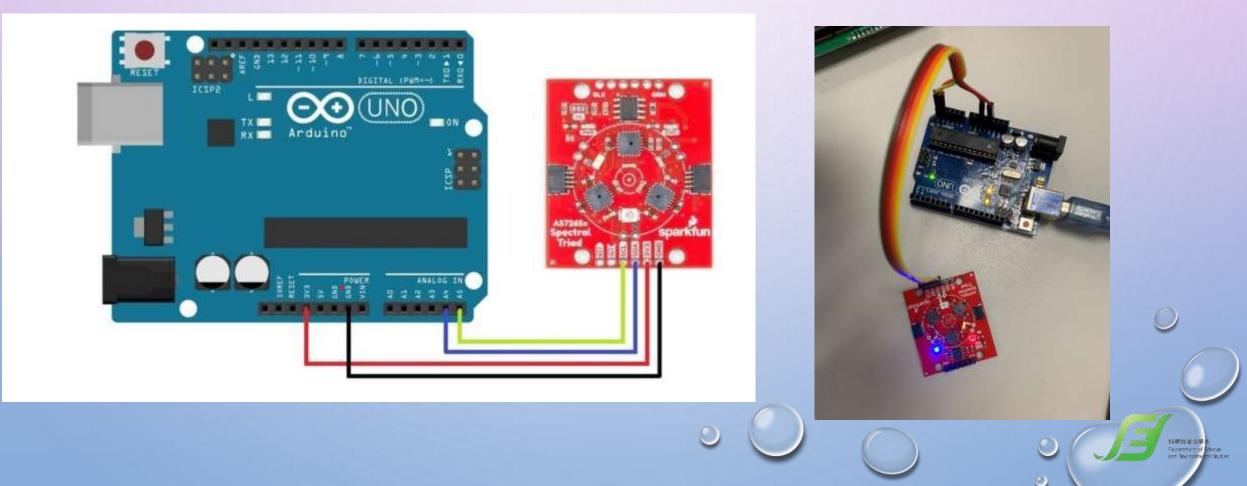
- SEN-15050 SPARKFUN TRIAD SPECTROSCOPY SENSOR -AS7265X
- ARDUINO-UNO (WITH POWER SUPPLY)
- COMPUTER WITH ARDUINO IDE AND EXCEL
- SAMPLE HOLDER
- MIRROR
- - RUBBER BANDS
- BOX(FOR COVERING THE WHOLE DEVICE FROM ANY OTHER LIGHT SOURCE)
- SAMPLE WATER FOR DEMONSTRATION(RECOMMEND RELATED TO TEACHING PLAN)







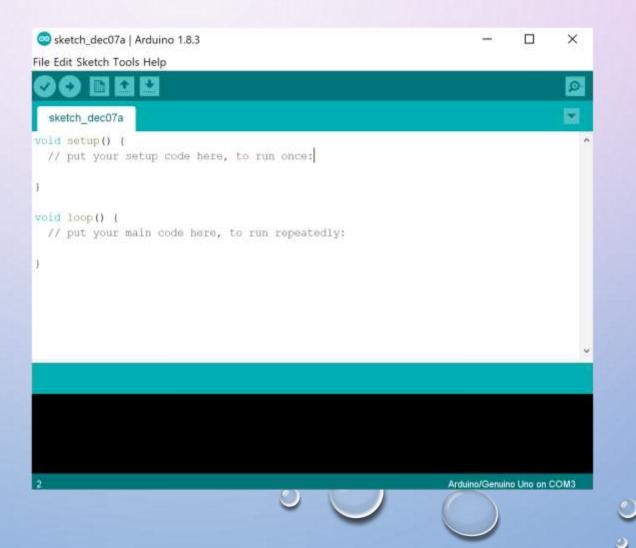
CIRCUIT





# CODING





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### BASIC READING WITH LEDS

### 90 B D D

#### Example2\_BasicReadingsWithLEDs

#include "SparkFun\_AS7265X.h" //Click here to get the library: http://librarymanager/All#SparkFun\_AS7265X AS7265X sensor;

#include (Wire.h)

woid setup()

Serial.begin(115200); Serial.grintln("AST265x Spectral Triad Example");

Serial.printlm("Foint the Triad away and press a key to begin with illumination..."(r
while (Serial.avaliable() == false)

//Do nothing while we wait for user to press a key Serial.resd(); //Thruw away the user's button

if (sensor.begin() -- false)

Serial.println("Sensor does not appear to be connected. Please theck wiring. Freezing...");
while (1)
;

sensor.dieableIndicator(); //Turn off the blue status LED

Serial.println("A, B, C, D, E, F, G, E, R, I, S, J, T, U, V, W, E, L");

#### vais loop()

1

sensor.taleMeasurementsWithHulb(); //This is a hard wait while all 15 channels are measured

Serial.print(wetwor.getCalibratedb()); //410m Serial.print(","); Serial.print(","); Serial.print(ensor.getCalibratedD()); //435m Serial.print(","); Serial.print(sensor.getCalibratedD()); //465m Serial.print(sensor.getCalibratedD()); //485m Serial.print(sensor.getCalibratedD()); //510m Serial.print(sensor.getCalibratedD()); //510m

### 

### Example2 BasicReadingsWithLEDs

#### Total Loop ()

sensor.tainWysourcountoWithBulb(); //This is a hard wait while all 15 channels are measured

Setial.print(sensor.petCalibratedA()); //410ms
Setial.print(",");
Setial.print(sensor.getCalibratedB()); //435cm
Setial.print(",");
Setial.print(sensor.getCalibratedD()); //465cm
Setial.print(",");
Setial.print(sensor.getCalibratedD()); //455cm
Setial.print(sensor.getCalibratedD()); //455cm
Setial.print(sensor.getCalibratedD()); //510cm
Setial.print(sensor.getCalibratedT()); //535cm
Setial.print(sensor.getCalibratedT()); //535cm
Setial.print(sensor.getCalibratedT()); //535cm
Setial.print(",");

Serial.print(sensor.putCalibratedS()); //560m Serial.print(","); Serial.print(","); Serial.print(sensor.putCalibratedB()); //610m Serial.print(sensor.putCalibratedB()); //640m Serial.print(","); Serial.print(","); Serial.print(","); Serial.print(","); Serial.print(sensor.putCalibratedF()); //660m Serial.print(sensor.putCalibratedF()); //701m Serial.print(sensor.putCalibratedF()); //701m

Serial.print(sensor.petCalibratedT{)); //730m
Serial.print(",");
Berial.print(",");
Berial.print(sensor.petCalibratedV{)); //810m
Serial.print(sensor.petCalibratedV{)); //810m
Serial.print(sensor.petCalibratedV{)); //800m
Serial.print(sensor.petCalibratedV{)); //800m
Serial.print(sensor.petCalibratedV{); //800m
Serial.print(sensor.petCalibratedV{); //800m
Serial.print(sensor.petCalibratedV{); //800m
Serial.print(sensor.petCalibratedV{); //800m
Serial.print(sensor.petCalibratedV{); //800m
Serial.print(sensor.petCalibratedV{); //800m

Serial.printls();

### TOOLS>MANAGE LIBRARIES (CTRL+SHIFT+M) LIBRARY – AS7265X

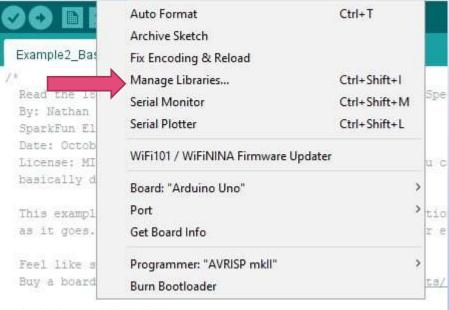
### Example2\_BasicReadingsWithLEDs | Arduino 1.8.16

### File Edit Sketch Tools Help

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~ Topic All	✓ AS7265X	
brary for the AS7265x Ti	ple Spectroscopy Sensor Board The SparkFun Spectr	al Triad detects 18 discrete channels of light from terfeit dectection/ Checkout the <u>SparkFun Triad</u>
w Sintal		
	ctral Triad AS7265X idle and Kevin Kuwata Ve brary for the AS7265x Tri o 966rine (IR) enabling desi	ctral Triad AS7265X idle and Kevin Kuwata Version 1.0.2 INSTALLED brary for the AS7265x Triple Spectroscopy Sensor Board The SparkFun Spectro o 966n (IR) enabling desktop spectroscopy and other fun applications like count

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# DOWNLOAD AND TEST WITH SERIAL MONITOR (CTRL+SHIFT+M)

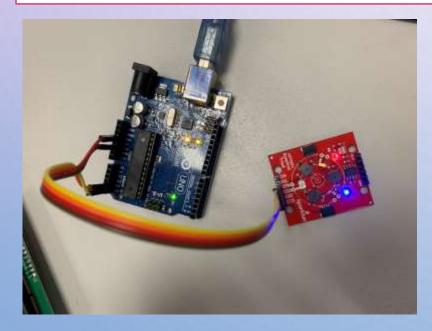
COM20	_	>
		Send
10:53:19.171 -> 0,2.98,20.73,19.41,4.75,1.45,1.02,0.48,3.29,0.84,2.06,0.41,0.00,0.00,0.85,1.12,	0.00,AS7265x	Spectral Tr
10:53:19.312 -> A,B,C,D,E,F,G,H,R,I,S,J,T,U,V,W,K,L		
10:53:19.640 -> 0.00,2.98,20.73,19.41,4.75,1.45,1.02,0.48,3.29,0.84,2.06,0.41,0.00,0.00,0.85,1.3	12,0.00,0.00,	,
10:53:20.484 -> 0.00,2.98,20.73,19.41,4.75,1.45,1.02,0.48,3.29,0.84,2.06,0.41,0.00,0.00,0.85,1.	12,0.00,0.00,	,
10:53:21.328 -> 0.00,2.98,20.73,19.41,4.75,1.45,1.02,0.48,3.29,0.84,2.06,0.41,0.00,0.00,0.85,1.	12,0.00,0.00,	,
10:53:22.125 -> 0.00,2.98,20.73,19.41,4.75,1.45,1.02,0.97,3.29,1.26,2.06,0.41,0.00,0.00,0.85,1.	12,0.00,0.00,	,
10:53:22.968 -> 0.00,2.98,20.73,19.41,3.96,		
		-
<		>
	15200 baud 🗸	> Clear output
	15200 baud 🗸 🗸	-

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### **BEFORE DATA COLLECTION**

# (1) Warm-up(5mins)before using\*\*



# (2) Clean before using

科學與语法書



# DURING DATA COLLECTION

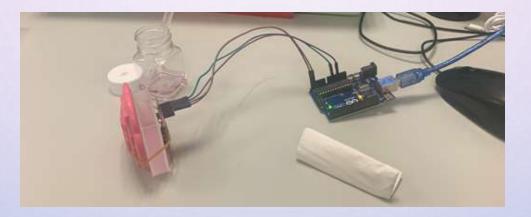
### (3) Mark time and action

1	A	В	C	D
1	Time(From)	Time(To)	Event	Remark
2	15:44	15:51	Warm up	
3	15:52	15:55	H2O	15:54:30
4	15:55	15:57:36	Sample 7	15:58:30
5	16:02:20	16:05	Sample 5	16:03:30
6	16:08:36	16:12:40	Sample 3	16:10:30
7	16:15:20	16:18:20	Sample 6	16:16:30
8	16:20:41	16:23:41	Sample 4	16:22:30
9	16:25:40	16:28:40	Sample 2	16:27:30
10	16:29:00	16:32:00	ACR	16:31:30
11	16:33:17	16:36:00	H2O (2)	16:34:30
12			43.87	
13				

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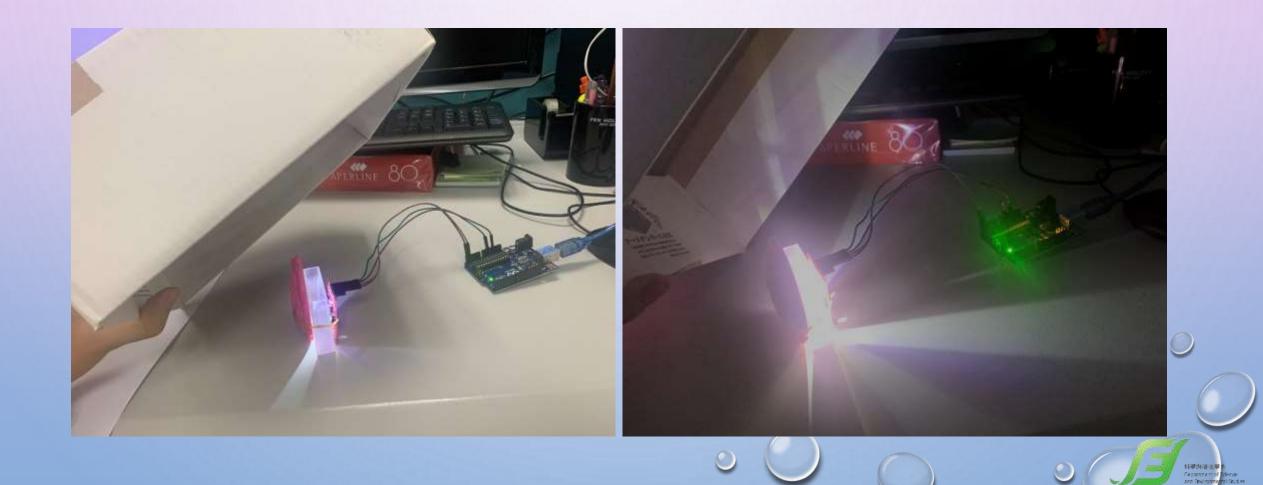


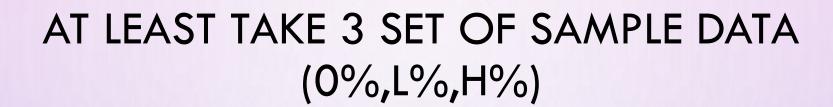






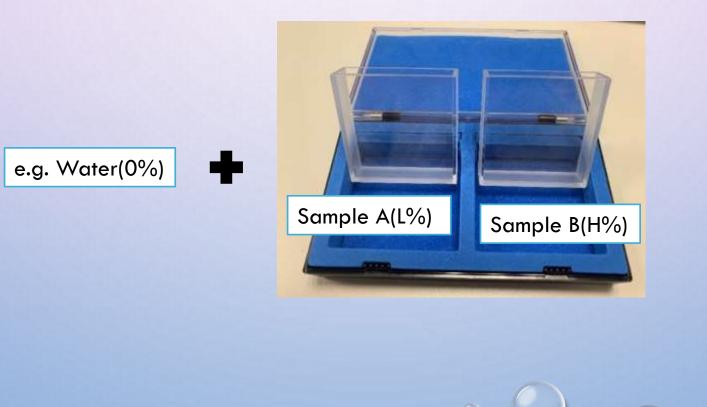
### DATA COLLECTION





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## AFTER DATA COLLECTION TAKE DATA (COPY & PASTE)

#### (4) Copy all data E 5. C. . (Copy & paste) View PDF-XChange Q Tell me what you want to do. Insert Page Layout Data Review Connections Show Quenes 0 E Properties Ty Response From Table From From Other Refresh Fram Existing New Filter C Advanced Recent Sources L1 Told Links All -Access Web Text Sources \* Connections Query Get External Data Get & Transform Connections Sort & Filter A1 20 1. 11:26:59.897 -> A,B,C,D,E,F,G,H,R,I,S,J,T,U,V,W,K,L C (040) E F G H I J K C D N Theory of All and A 11:26:59.887 -> A.B.C.D.E.F.G.H.R.I.S.J.T.U.V.W.K.L 11:27:00. >415.53,904.99,116.83,1276.56,248.45,149.58,673.97,772.51,7122.15,335.55,34.02,23.53,89.85,72.06,266.45,21.30,20.64,14.59 11:27:01. -> 415.53.902.01.116.83.1279.34.250.04.149.58.675.49.773.48.7129.81.337.65.34.02.23.53.89.85.72.06.269.01.21.30.20.64.14.59 11:27:01.9 >415.53.900.03.115.89.1281.18.249.24.149.58.674.98.771.05.7136.38.336.39.32.99.23.53.89.85.72.06.267.30.21.30.20.64.14.59 11:27:02. 193 -> 406 37 866 75 111 18 1777 86 749 74 143 77 670 41 751 66 7046 59 377 14 32 99 77 786 86 69 58 766 45 71 30 20 01 14 59 11:27:03.687 -> 408.83.872.21.110.24,1275.64,250.04,144.50,674.98,754.57,7077.25,327.98,32.99,23.13,87.61,69.58,264.75,21.30,20.01,14.59 11:27:04:481 -> 408.83.876.19.112.12.1278.41,249.24,146.68,676.51,756.99,7081.63,327.98,34.02,23.13,87.61,70.41,264.75,21.30,20.01,14.59 11:27:05.371 34,885,13,114.01,1290,43,251,62,150,31,682,60,765,23,7132,00,329,66,34,02,23,53,88,36,71,24,268,15,22,42,20,01,14,59 11:27:06.20 5->409.67.881.15.114.01.1289.50.252.41.150.31.682.60.764.75.7117.77.329.24.34.02.23.53.88.36.70.41.268.15.22.42.20.01.14.59 11-27:07 9 -> 409.67.880.16.113.06.1288.58,251.62.150.31.681.08,762.32,7102.43.327.56.34.02.23.53.87.61,70.41.266.45.22.42,20.01.14.59 11 11:27:07. > 409.67.881.15.113.06.1288.58,250.83.149.58.680.57.761.35.7109.00.327.14.34.02.23.53.88.36.70.41.267.30.22.42.20.01.14.59 12 11:27:08. -> 408.83,877.18,113.06,1286.73,251.62,149.58,681.08,761.35,7099.15,327.14,34.02,23,53,87.61,70.41,265.60,22,42,20.01,14.59 11:27:09.583 -> 408.83.877.18.113.06.1287.65.251.62.149.58.682.09.761.84.7107.91.327.98.34.02.23.53.87.61.70.41.267.30.22.42.20.01.14.59 14 11:27:10.3 > 409 67 877 18 117 17 1786 73 250 83 148 86 680 57 759 90 7102 43 326 30 34 02 23 53 87 61 70 41 763 90 22 42 20 01 14 59 15 11:27:11. -> 409.67.878 17.113.06.1289.50,250.83,148.86,682.09,761.35,7117.77,326.72,34.02,23.53,88.36,70.41,264.75,22.42,20.01,14.59 16 11:27:12.0 ->409.67,875.19.113.06.1289.50,251.62,148.86,682.60,761.84,7116.67,327.56,34.02,23.53,87.61,70.41,265.60,22.42,20.01,14.59 17 11:27:12.9 70.41.265.60.23.55.20.01.13.62 > 0.84 > 02.754 > 77.713 > 10.3 E6.1 45.7 E7.5 05.3 00.0 41.0 75.0 83 3 41.0 00.0 63.0 7 科學內语演奏 Advantal 1.7 New Insertance