

Urban Heat Island Effect in Sydney Olympic Park

We are going to be investigating Urban Heat Island (UHI) effect by collecting primary data using an infrared surface temperature reader.

Figure 1 represents that the areas in the middle of the park are the highest, whilst the areas on the outer are the lowest. Sydney Olympic Park has a similar format and is of course the perfect testing ground.

If you want to replicate this activity at school, some further great resources:

- <https://canopy.itreetools.org> – assesses tree coverage
- <https://www.smh.com.au/politics/nsw/sydney-to-be-cooled-by-an-extra-five-million-trees-by-2030-20180411-p4z8x7.html>

1. Data Collection

We will be collecting data through infrared surface temperature readers. The data will then be submitted electronically to Survey123.

We will be using PASCO's Pocket Infrared Thermometer, which will measure the surface temperature of different places in Sydney Olympic Park.



Press here to get temperature



When you are in the field, collect the temperature of a variety of surfaces on the walk.

You can submit your answers to: tinyurl.com/gtansw2019

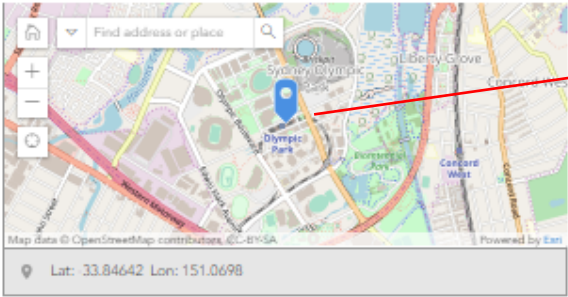
Or hold your camera over this barcode:



Sydney Olympic Park Built Environment

Description content for the survey

What is your location?*



Time*

03:06 PM

Surface Type

Bark Bitumen Brick

Concrete Grass Metal

Vegetation

Surface Environment

Natural Built

Surface Shaded

Fully Partially Not at all

Surface Temperature

12°

Submit

This is the location where you took the sample

This is the time you took the sample

This is the surface type. If it doesn't suit one of these, just choose the closest

Use these terms loosely – if it is a man-made grass patch, still call it natural

Conduct a quick assessment

Surface temperature

2. Back in the Classroom

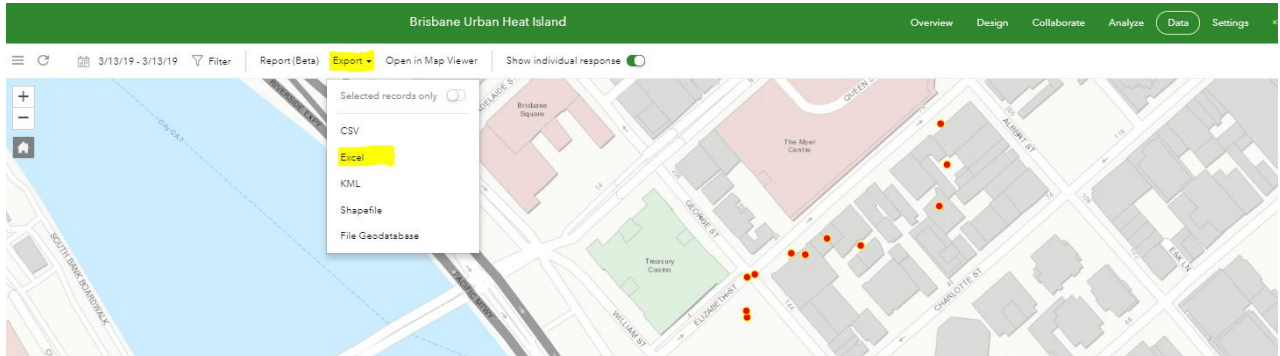
Now we have our data collected, there are a few steps we need to complete before we can analyse it. The first is we need to work with our 'raw' data. At the moment it is showing the total temperature – which is great, but when we are looking at UHI, we need to look at the difference in temperature.

You can view the results here:

Answers: tinyurl.com/gtansw2019result

What we did to get the results

1. Go to the Data tab, and press Export to Excel



2. In Excel, add another column called Actual Temperature and put in today's temperature

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	ObjectID	GlobalID	CreationD	Creator	EditDate	Editor	Time	Surface Ty	Surface Er	Surface Sf	Surface Tex	y		Actual Temperature	
2	1	da96939e-	#####	srodgers9	#####	srodgers9	11:09:00	vegetatio	_natural	not_at_all	45	153.0243	-27.472	33	
3	2	35e190ac-	#####	srodgers9	#####	srodgers9	11:09:00	concrete	built	not_at_all	46	153.0243	-27.472	33	
4	3	6c4c7262-	#####	srodgers9	#####	srodgers9	11:10:00	metal	built	not_at_all	62	153.0243	-27.472	33	
5	4	04fd0af4-	#####	srodgers9	#####	srodgers9	11:10:00	bitumen	built	not_at_all	49	153.0243	-27.4718	33	
6	5	f3ba81ca-	#####	srodgers9	#####	srodgers9	11:11:00	concrete	built	not_at_all	42	153.0243	-27.4717	33	
7	6	5fe0d6d3-	#####	srodgers9	#####	srodgers9	11:11:00	concrete	built	not_at_all	52	153.0246	-27.4716	33	
8	7	39f65e30-	#####	srodgers9	#####	srodgers9	11:12:00	concrete	built	not_at_all	60	153.0247	-27.4716	33	
9	8	3510062b-	#####	srodgers9	#####	srodgers9	11:12:00	metal	built	fully	36	153.0249	-27.4715	33	
10	9	6054d957-	#####	srodgers9	#####	srodgers9	11:13:00	bitumen	built	partially	34	153.0252	-27.4715	33	
11	10	843be303-	#####	srodgers9	#####	srodgers9	11:14:00	concrete	built	not_at_all	60	153.0258	-27.4713	33	
12	11	f4173300-	#####	srodgers9	#####	srodgers9	11:15:00	concrete	built	not_at_all	51	153.0258	-27.471	33	
13	12	bb3b620d-	#####	srodgers9	#####	srodgers9	11:15:00	concrete	built	fully	32	153.0258	-27.4707	33	

3. Add another column called Difference, and calculate the difference between the surface temperature and the air temperature

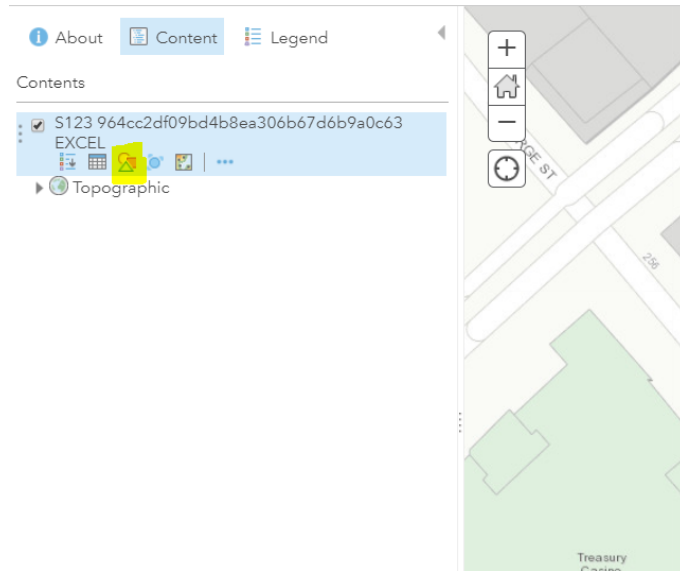
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	ObjectID	GlobalID	CreationD	Creator	EditDate	Editor	Time	Surface Ty	Surface Er	Surface Sf	Surface Tex	y		Actual Temperature	Difference
2	1	da96939e-	#####	srodgers9	#####	srodgers9	11:09:00	vegetatio	_natural	not_at_all	45	153.0243	-27.472	33	12
3	2	35e190ac-	#####	srodgers9	#####	srodgers9	11:09:00	concrete	built	not_at_all	46	153.0243	-27.472	33	13
4	3	6c4c7262-	#####	srodgers9	#####	srodgers9	11:10:00	metal	built	not_at_all	62	153.0243	-27.472	33	29
5	4	04fd0af4-	#####	srodgers9	#####	srodgers9	11:10:00	bitumen	built	not_at_all	49	153.0243	-27.4718	33	16
6	5	f3ba81ca-	#####	srodgers9	#####	srodgers9	11:11:00	concrete	built	not_at_all	42	153.0243	-27.4717	33	9
7	6	5fe0d6d3-	#####	srodgers9	#####	srodgers9	11:11:00	concrete	built	not_at_all	52	153.0246	-27.4716	33	19
8	7	39f65e30-	#####	srodgers9	#####	srodgers9	11:12:00	concrete	built	not_at_all	60	153.0247	-27.4716	33	27
9	8	3510062b-	#####	srodgers9	#####	srodgers9	11:12:00	metal	built	fully	36	153.0249	-27.4715	33	3
10	9	6054d957-	#####	srodgers9	#####	srodgers9	11:13:00	bitumen	built	partially	34	153.0252	-27.4715	33	1
11	10	843be303-	#####	srodgers9	#####	srodgers9	11:14:00	concrete	built	not_at_all	60	153.0258	-27.4713	33	27
12	11	f4173300-	#####	srodgers9	#####	srodgers9	11:15:00	concrete	built	not_at_all	51	153.0258	-27.471	33	18
13	12	bb3b620d-	#####	srodgers9	#####	srodgers9	11:15:00	concrete	built	fully	32	153.0258	-27.4707	33	-1

4. Save this as a CSV comma delimited

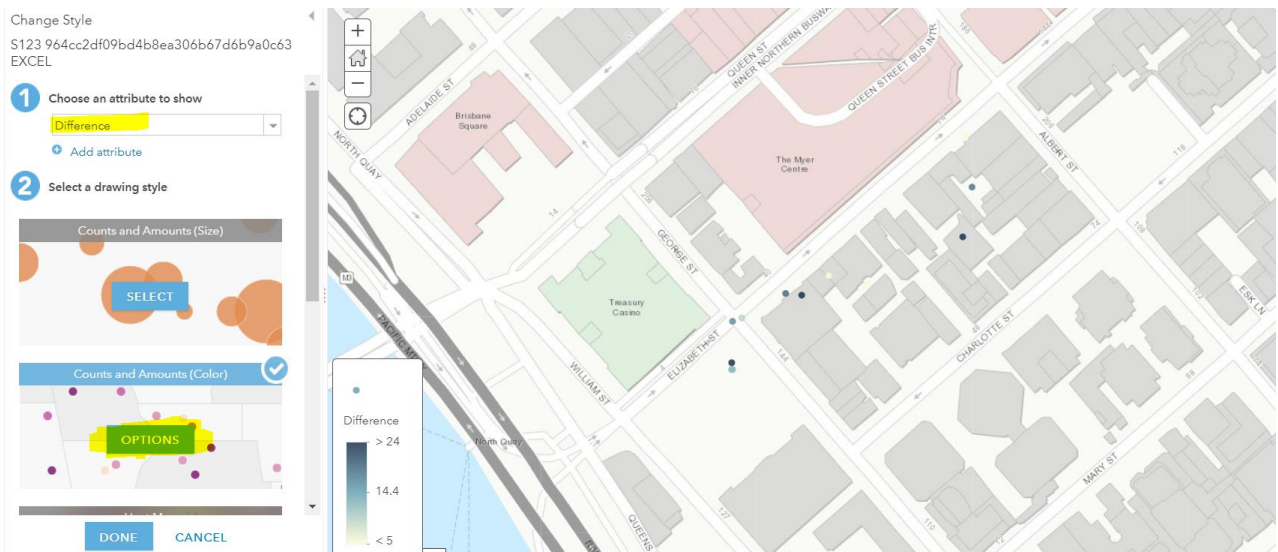
5. Upload this file to ArcGIS Online

6. Open the URL _____

7. Click on the Change Style button



8. Choose 'Difference' from the drop down and select Counts and Amounts (Color)



9. Select Options to change the style

10. You can select Symbols to change the colour and size

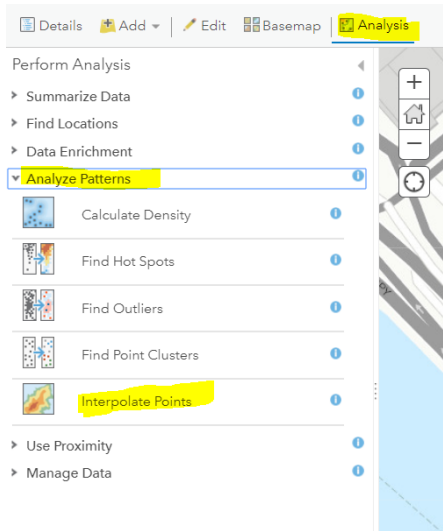


11. You should now be able to see the temperatures



12. We can also interpolate points (make an educated guess on the stuff in the middle).

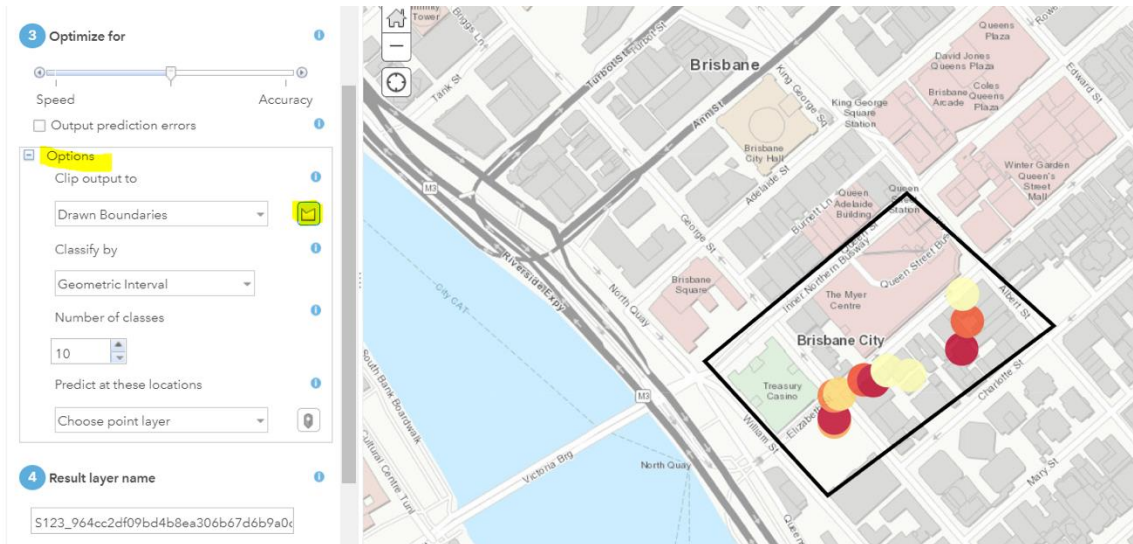
13. Press Analysis, Analyze Patterns, Interpolate Points



14. Make sure your layer is selected

15. Choose Surface Temperature as the field

16. Choose Options and draw a box around the study area



17. Give your layer a title

18. Select Run Analysis

19. You can then analyse your results with your class