

# RGS innovative teaching grant resources - Investigating the geography of Crime,

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The purpose of these resources are to provide teachers and students with the information and skills required to be able to conduct a sophisticated investigation into UK crime patterns using GIS mapping techniques using primary and secondary data. An interactive online version of this resource is available here <http://arcg.is/1TZiyvj>

The resources will contain a number of useful web links and a series of online videos. It is intended that this will support sixth form students with conducting individual investigations or extended project qualifications. It is an ideal topic for allowing students to take a very individual slant. These resources will provide access to a range of skills, without being fully prescriptive about one route to enquiry, so allowing teachers and students to adapt these to local issues and original ideas.

While the resources are aimed at Key Stage 5 Geography research opportunities there are clearly a lot of aspects which could be used for a GCSE investigation or a Key Stage 3 scheme of work and study. They are also a useful overview of GIS skills and can be used by teachers or students to simply learn about GIS mapping techniques.

The study of crime is a suitable area for investigations for the new 2016 A level specifications as it links well to topics relating to changing places focusing on urban and rural issues. While crime patterns themselves may not be a requirement the specifications, there is an opportunity for students to explore their relationship to specific themes such as patterns of deprivation urban decline, rebranding and regeneration initiatives. It is also an area where there is a wealth of freely accessible data which can be drawn upon alongside various types of primary data which the student can collect.

The richness of the data available, alongside the range of potential primary data collection, means that it should be possible to generate a large number of different titles and focuses for each student's individual investigation, so allowing for large groups to all be conducting studies on this topic.

## Advice for teachers

This resource is aimed to be useful to both teachers and students. No previous skills or knowledge of either the geography of crime or GIS are needed to undertake this work. The table below outlines for teachers how these resources could be organised into a series of lessons:

Lesson stages	Approach and resources
1 – Introduction to the personal investigation	Introduce students to the concept of the personal investigation. Ask students to come up with a range of physical and human geography investigations which they could carry out. Get students to consider the steps involved in planning an investigation. Could present give small groups of students different titles for geographical investigations to develop an outline plan for and then present their ideas to the class.

	<p>Explain the steps in the enquiry approach to students.</p>
<p>2 – Introduce the geography of crime</p>	<p>Introduce the idea of a geographical investigation into crime patterns. Discuss with students what patterns they might expect to find in their local area and possibly to come up with a range of possible types of titles. This can be compared to the list of titles provided in this resource.</p> <p>Show students some of the video clips about crime mapping. Students take some notes and also consider how the information could be useful for their investigation.</p>
<p>3 – Background research work</p>	<p>Give the students some time to access the links to professional research into the geography of crime such as by UCL. They should use this to help develop an interesting theme and title. They should take notes for their project introduction.</p>
<p>4- Looking at local crime data</p>	<p>Demonstrate the web sites with useful information with summary crime data (video tutorial 1). Let students use the interactive sites to start focusing down on their study area. They can use this to help finalise their study aims if they have not already done this. Then they can start collecting screenshots of key information and write notes about the initial findings from this.</p>
<p>5 – Planning the study</p>	<p>By this stage, or possibly earlier, students should be in a position to be able to start planning out the approach to their study. They would complete some kind of investigation planning table which gets them to outline their title and aims, synopsis of background research and theory, the methods they plan to use, any relevant risk assessment, the sources of data they would need, starting to think about how they would want to process and present the data. These plans could be presented to the class or discussed one on one with the teacher to ensure they will work.</p>
<p>6 – Gathering relevant crime data</p>	<p>Demonstrate the process of obtaining crime data and getting it prepared to input into a GIS package (video tutorial 2). Give student's time to collect and start displaying their data in ArcGIS Online.</p>

7 – Processing the crime data	<p>Explain to students how to use the key functionality of ArcGIS Online and ways to visualise their data. Include how to create density and hot spot maps (video tutorial 3 and 4).</p> <p>Get students to prepare their initial maps and to describe the distribution of crime of relevance to their study. Student should explain how they processed the data to create certain types of maps which enhanced visualising the patterns.</p>
8 – Explaining the patterns	<p>Explain to students how to add various types of secondary data to their GIS crime maps, such as deprivation patterns (video tutorial 5). You could explain about data enrichment also (video tutorial 6). Pupils to find relevant data to their study and start producing maps which effectively visualise any relationships between various variables. They write about what the patterns are showing and try to explain any relationships in the data.</p>
9 – Gathering primary data	<p>This stage may have occurred earlier, perhaps at the outset of the study. However it is possible that it would fit in well here, as primary data is now needed to develop some of the initial findings produced from secondary data sources. If relevant you would explain to students how to set up their data collection within ArcGIS online and possibly set up to use the Esri Collector app in the field (video tutorial 7 and 10).</p> <p>Students need to plan out the detail of their primary data collection methodology and prepare all recording sheets and equipment. They need to consider any relevant risks and modify their approach as needed.</p>
10 – Analysing links and relationships	<p>Explain some of the relevant GIS tools for looking at the spatial patterns between the data sets This may include counting crime occurrences within certain areas or within a distance of some influencing factor. You can also show how to export merged data back into a spreadsheet for further graphical and statistical analysis (video tutorial 8 and 9).</p> <p>Give students time and support to complete their study analysis tasks.</p>

	Students to write up this section of their study and reach conclusions.
11 – Completing the study	Students write up their conclusion and evaluation to the study. Hand in any drafts to be checked before final submission.

## Possible titles

There are a wide range of studies which can be conducted into the geography of Crime. Firstly different students looking at the same area can each focus on a different type of crime. In addition similar studies could be done but using different locations by each student, such as different parts of a town. In addition there is the opportunity to look at the data from a temporal as well as spatial perspective, such as seasonal variations in different months or changes over different years. Here are some examples of the types of titles which could be generated:

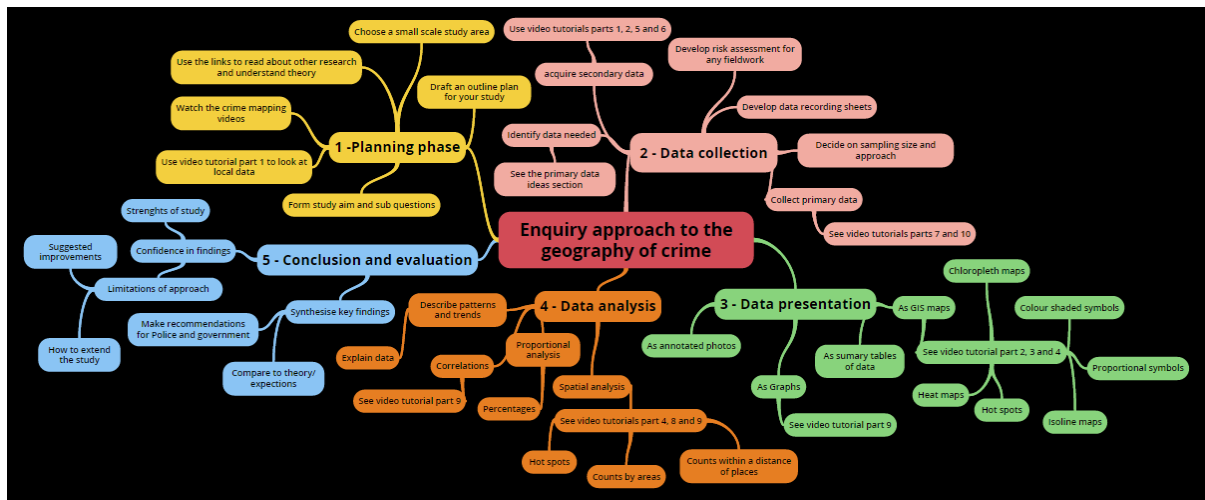
- How and why do patterns of a certain type of crime vary across an urban area?
- How and why do patterns of a certain type of crime vary seasonally in one area?
- Explain the variations in fear of crime in different areas
- How do perceptions of crime levels compare to actual crime patterns in an area?
- How effective have specific policing measures been in reducing crime in an area?
- Can crime vulnerability ratings for areas explain the patterns of crimes?
- What is the influence of urban design on the patterns of crime in an area?
- To what extent can levels of economic deprivation explain hotspots of anti-social behaviour?
- What impact has a regeneration project had on crime levels?
- What impact has gentrification and social changes had on crime patterns in an area?
- How does studentification affect the crime levels in an area?
- Why are certain streets more prone to vehicle thefts?
- Why are certain streets more prone to muggings?
- To what extent does dereliction and urban decline create crime hotspots?

The list above is just a starting prompt. Clearly there are many different investigation themes. All can be based in any area across the UK using the data shown in this resource. It should also be interesting research for students to carry out, as they will be genuinely conducting new research in their local area into an important issues that effects everyone.

## The enquiry approach.

Students will need to demonstrate skills across the whole enquiry approach. Here is an overview of how an investigation into the geography of crime, as explained in this resource, will support this approach.

[https://www.goconqr.com/en-GB/p/3113117-Enquiry-approach-to-the-geography-of-crime-mind\\_maps](https://www.goconqr.com/en-GB/p/3113117-Enquiry-approach-to-the-geography-of-crime-mind_maps)



Enquiry questions	Geographical skills	Approaching a study of crime
<p>Planning – what is the geographical enquiry process?</p>	<p>Prepare to investigate a geographical question in the field; make and justify decisions on the task including data collection methods</p>	<p>Use the links to background research, articles and videos relating to the geography of crime. Use Part 1 of the video tutorials to start looking at data for your location. Use this to help form a focus for your personal investigation. Start to plan out the approach to your investigation.</p>
<p>Data collection – how is data and information (evidence) collected?</p>	<p>Acquire primary and secondary data / information pertinent to the research question using quantitative and qualitative methods and primary and secondary data / information</p>	<p>Use the video tutorials parts 1, 2, 5 and 6 to help gather secondary data on crime and also on social and economic factors. See the section on primary data for ideas on data you can collect to add to the study. Use video tutorials part 7, 9 and 10 for explanation of how to link your primary data to the GIS maps.</p>
<p>Presentation and display – how is the collected data and information presented?</p>	<p>Process data / information using quantitative and qualitative methods</p>	<p>Part 3 of the video tutorials outlines the key principles of displaying your data, however all the tutorials contain elements of data presentation in map and graphical form.</p>

Enquiry questions	Geographical skills	Approaching a study of crime
		There may be additional data you have collected which can be displayed differently such as using line graphs and pie charts as appropriate.
Analysis and interpretation of findings – how can the evidence be analysed?	Interpret and analyse data / information from primary sources, and, as relevant, secondary data / information; describe patterns, trends, relationships; apply knowledge and understanding of geographical concepts and processes to specific evidence collected	The video tutorials in parts 4, 8 and 9 focus on ways you can analyse and process your spatial data within the GIS application and also within a spreadsheet.
Conclusion – what conclusions can be drawn and how do these relate to the initial aim of the enquiry?	Synthesise findings to draw conclusions based on evidence	See the brief section with advice on conclusions.
Evaluation of the whole investigation – what evaluative techniques should be applied to the enquiry process?	Critically reflect on every stage of the whole investigation in order to appreciate the strengths and limitations of the primary and secondary data, links to original question; note strengths and limitations (accuracy, validity and reliability) and anomalies and / or errors or misuse of data; evaluate the methodology including, if relevant, sampling techniques; suggest improvements for further research	See the brief section with advice on evaluating your study.

## Background research links

Any good geographical enquiry requires effective use of background reading to put the study in context and to learn from other research. It is often helpful to spend a bit of time researching around the topic before developing a focus for the investigation. I would then suggest looking at the links shown in part 1 of my video tutorial in order to start looking at your study area and see what issues seem to be potentially interesting. From this a clear focused title could be developed. The information from the other video tutorials will then help explain how to process the relevant data for your specific study focus and location.

A series of clips from the BBC related to mapping crime

<http://www.bbc.co.uk/programmes/b00793ct/clips>

Esri video explaining the role of GIS in analysing crime

<https://www.youtube.com/watch?v=OlXk2Yj9nyM>

Hampshire police explaining crime mapping website information

<https://www.youtube.com/watch?v=7hS-e3EB9Hw>

Channel 5 documentary on UK crime hotspots

<https://www.youtube.com/watch?v=rhGAXUkwDco>

USA police developing predictive crime software using GIS

<https://www.youtube.com/watch?v=nvmjZtz-HK4> or the start of this BBC documentary on big data and predictive crime mapping

<https://www.youtube.com/watch?v=XQgmWFsO4LM>

UCL Department of security and crime science provides information on research work being conducted into crime <http://www.ucl.ac.uk/scs> . This page on geographical analysis of crime is particularly relevant <http://www.ucl.ac.uk/scs/research-consultancy/geographical-analysis>

The Jill Dando Institute at UCL conducts valuable research – this includes the vulnerable localities index <http://www.ucl.ac.uk/jdibrief/analysis/Vulnerable-Localities-Index> and Hot routes <http://www.ucl.ac.uk/jdibrief/analysis/hot-routes> and street robbery - <http://www.ucl.ac.uk/jdibrief/crime/street-robbery>

There are also issues linked to seasons and climate you could consider. This article looks at the links between climate and crime <http://articles.latimes.com/2014/feb/19/science/la-sci-sn-climate-change-crime-20140219>

## Potential primary data collection

There are many resources and books which already explain the types of primary fieldwork which can be conducted to support an investigation into the patterns of crime. Here is a resource produced by the RGS with lots of good ideas

<http://www.rgs.org/NR/rdonlyres/9E65651B-2542-4E76-899A-8917A9499DDD/0/Crime.pdf>

This resource is designed to complement a wide range of primary data which students may collect for their study. It explains how to bring primary data into ArcGIS Online to allow students to examine the links between their data and the crime patterns they are displaying. Key opportunities include:

- Conducting visual crime vulnerability assessments at contrasting locations based on a rating system.
- To plot locations of significant factors like CCTV cameras, street lighting, derelict land, late night businesses, etc.
- To conduct questionnaires into peoples' views about fear of crime.
- To interview key groups like a crime analyst or local community police officer to get a deeper understanding of the factors which are contributing towards crime.
- Measurement of environmental factors which may have an influence, including noise levels, air pollution or weather.





# Video tutorials on developing a geographical crime study

## Part 1 - Sources of useful data

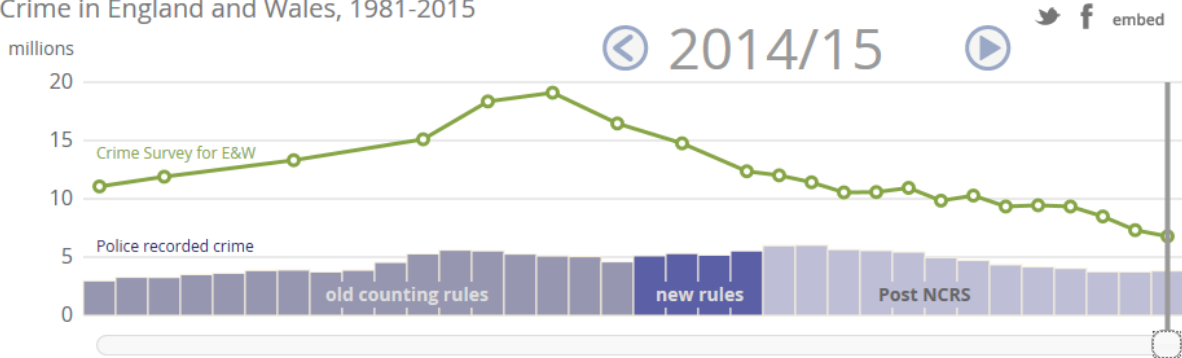
This video outlines a few key websites with useful information for geographical studies of crime:

<https://youtu.be/ODcyudEnPh0>

Office of National Statistics crime trends

<http://www.neighbourhood.statistics.gov.uk/HTMLDocs/dvc188/Crime14.html> (taken from <http://www.ons.gov.uk/ons/interactive/index.html> )

Crime in England and Wales, 1981-2015



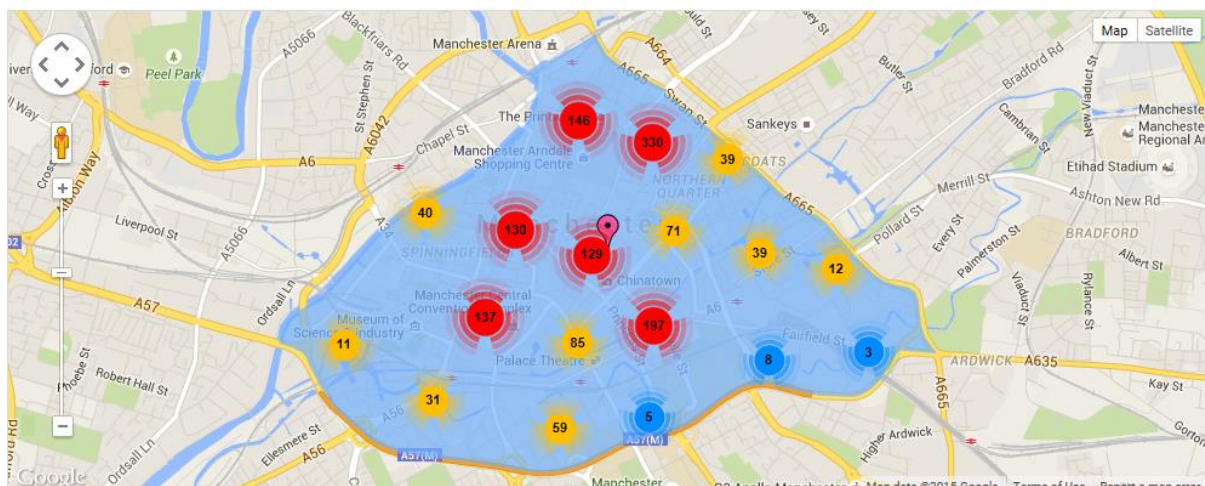
Crime experienced by population resident in households				Crimes recorded by the police		
Total incidents (CSEW)		6.8 million		Total offences		3.8 million
Percentage change with previous survey		-7 %		Percentage change with previous year		3 %
Crimes experienced by 12% of households and 4 % of adults				Crime rate per 1,000 population		67
Incident type	Number of incidents (000s)	% change & significance	Trend	Offence type	Number of offences	change with previous year percent
Violence	1,321	0	█	Violence against the person	779,027	23
Robbery	90	-46 *	█	Sexual offences	88,219	37
Theft from the person	451	-21 *	█	Robbery	50,236	-13
Other theft of personal property	741	-22 *	█	Theft offences	1,755,436	-5
Burglary	785	1	█	Criminal damage and arson	503,842	0
Other household theft	760	-2	█			
Vehicle-related theft	923	-1	█			

UK Crime Stats website <http://www.ukcrimestats.com/Neighbourhood/1340>

### Manchester City

Population: 20,206  
Policed by: [Greater Manchester Police](#)

Jump to: [Maps](#) | [League Table](#) | [Crime Trends](#) | [Neighbourhood Team](#)



UK Police website <http://www.police.uk/> (the apps links <http://www.police.uk/apps/> and the local crime map sections).

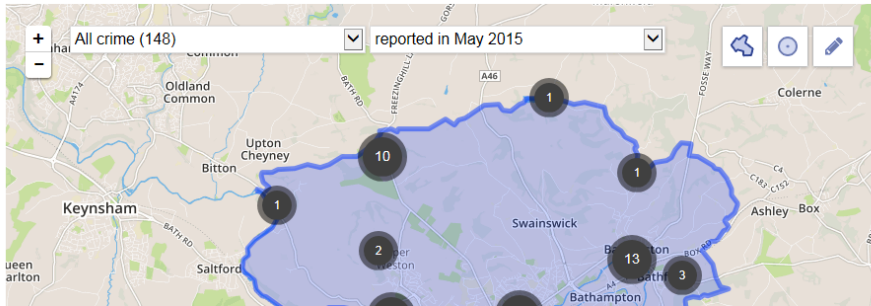
**POLICE.UK** 🔍 🏠 ☰

[Home](#) > [Avon and Somerset Constabulary](#) > [Bath City Outer](#) >

# Crime map

[View A-Z list of crime locations](#)

Click on the dots on the map for information about individual crimes.



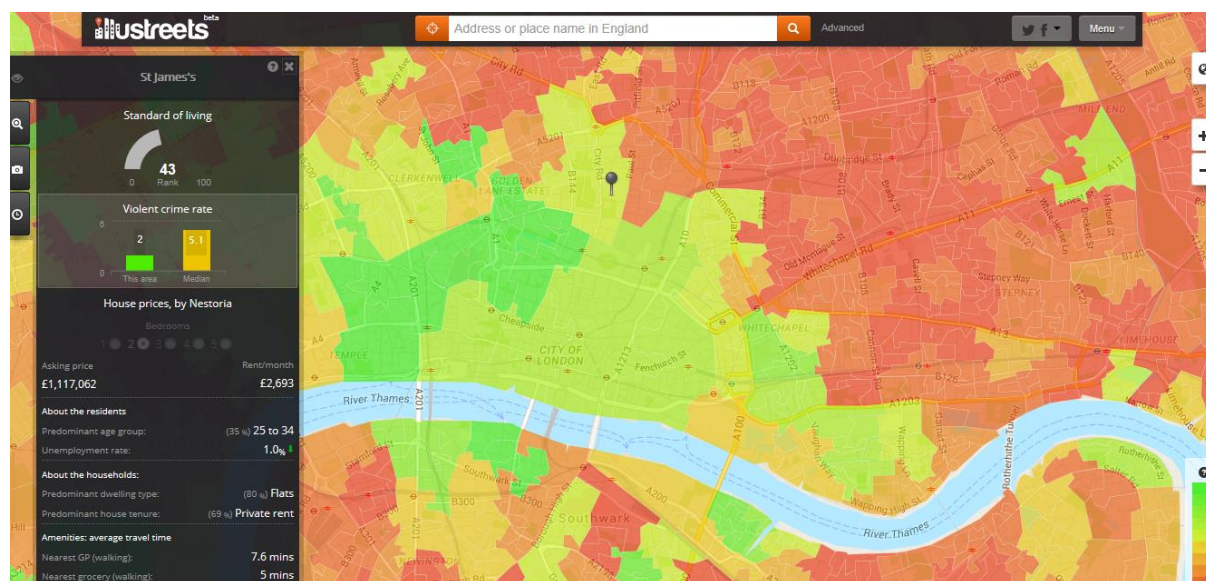
**In this neighbourhood**

- [Overview](#)
- [Crime map](#)
- [Stop and search](#) **NEW**
- [Policing team](#)
- [News and events](#)
- [Local policing priorities](#)
- [Performance](#)
- [Community Payback](#)

**Next steps**

- [View detailed statistics](#)
- [Sign up for alerts](#)
- [Share this page](#)

Illustreets visualisations <http://illustreets.co.uk/> Both the specific crime maps <http://illustreets.co.uk/blog/maps-and-apps/england-crime-map-annual-crime-rates/> and the main explorer map <http://illustreets.co.uk/explore-england/>



**illustreets** Address or place name in England 🔍 Advanced 🌐 🏠 ☰

**St James's**

Standard of living: Rank **43** (0 to 100)

Violent crime rate: This area: **2**, Median: **5.1**

House prices, by Nestoria

Bedrooms: 2

Asking price: **£1,117,062** | Rent/month: **£2,693**

About the residents

Predominant age group: (35%) **25 to 34**

Unemployment rate: **1.0%**

About the households

Predominant dwelling type: (80%) **Flats**

Predominant house tenure: (69%) **Private rent**

Amenities: average travel time

Nearest GP (walking): **7.6 mins**

Nearest grocery (walking): **5 mins**

## Part 2 - Getting GIS data

This video tutorial focuses on getting police data into ArcGIS Online mapping application.

<https://www.youtube.com/watch?v=RiZqMKCmpSM>

UK Police Data web site <http://data.police.uk/data/>

DATA.POLICE.UK
Cymraeg

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Home
Data
API
Changelog
Contact
About

[Home >](#)

## Data downloads

Custom download
Archive
Boundaries
Stop and search
Annual Data Requirement

These CSV files provide street-level crime and outcome information, broken down by police force and [2011 lower layer super output area](#) (LSOA).

See the [changelog](#) for known data issues, and the [about page](#) for a description of each column in the CSV files.

Date range: May 2015 to May 2015

Forces:

All forces

Avon and Somerset Constabulary

Bedfordshire Police

British Transport Police

Cambridgeshire Constabulary

Cheshire Constabulary

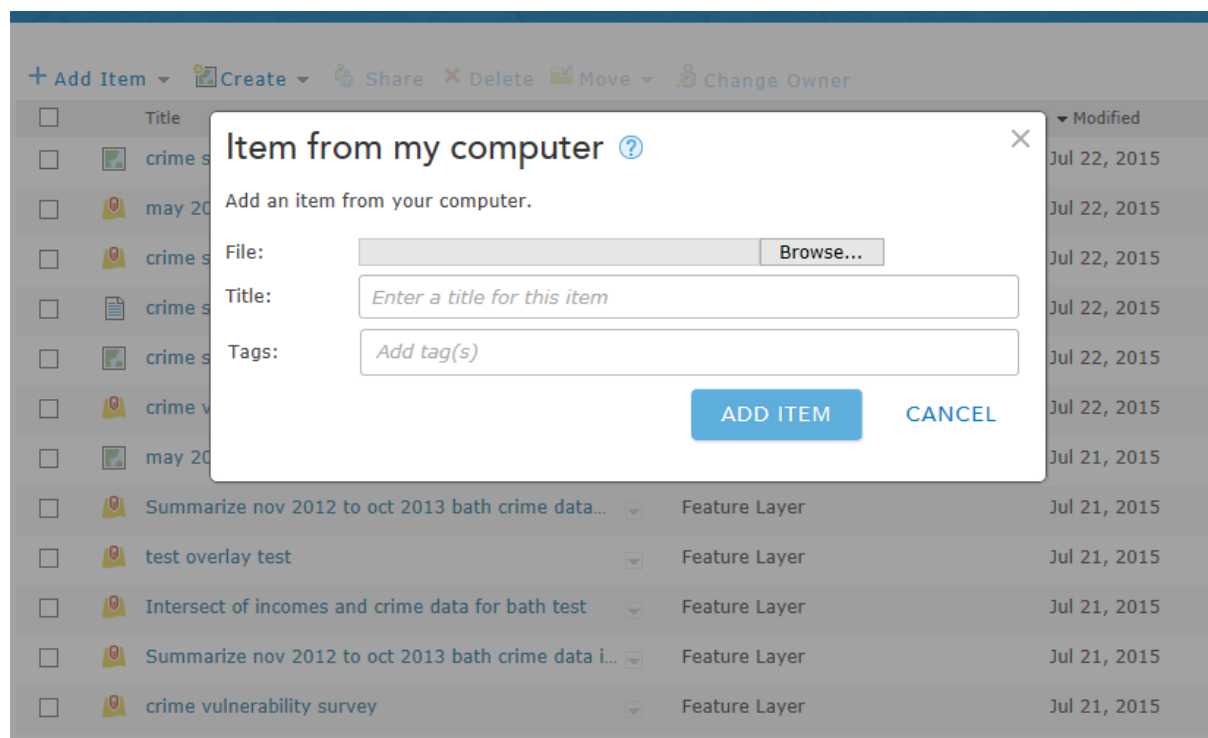
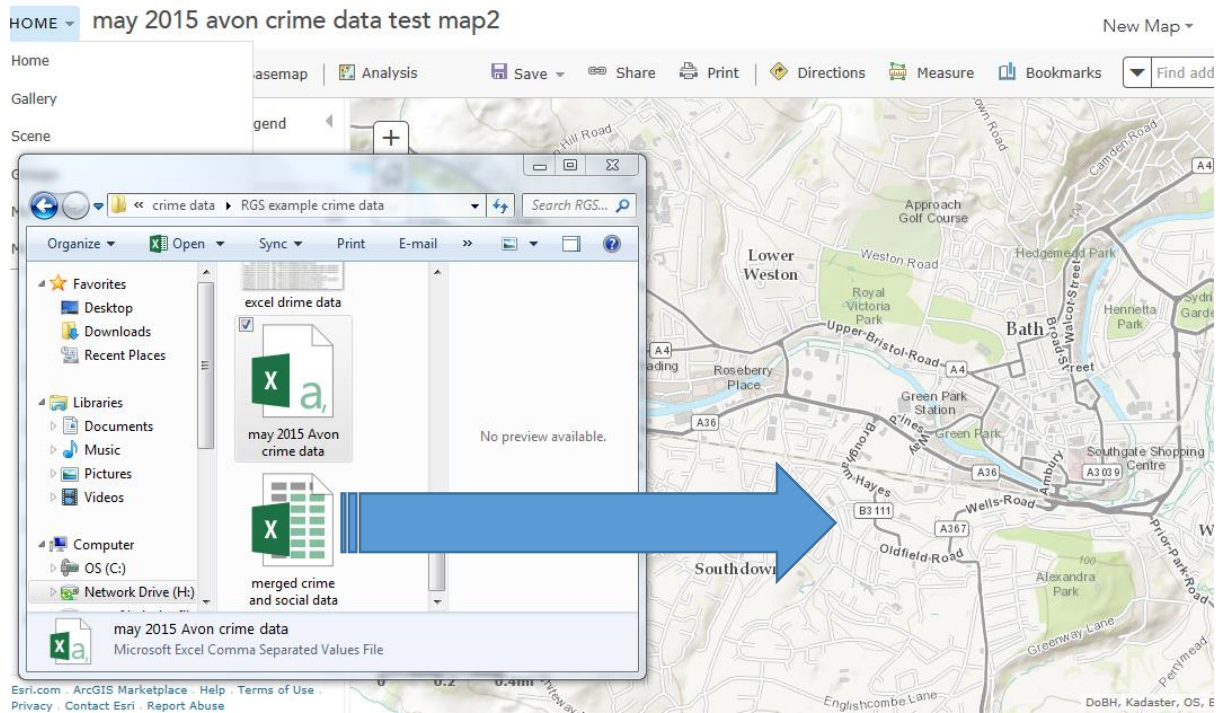
City of London Police

Open a spreadsheet with the data and delete any data which is not needed and combine data from several months if you want a longer time frame

FILE	HOME	INSERT	PAGE LAYOUT	FORMULAS	DATA	REVIEW	VIEW	ESRI MAPS							
A1															
	Crime ID	Month	Reported	Falls with	Longitude	Latitude	Location	LSOA code	LSOA nam	Crime typ	Last outco	Context			
1	95d17224f	2015-05	Avon and	Avon and	-1.42411	53.04614	On or nea	E01019462	Amber Va	Vehicle cr	Investigation complete;	no suspect identified			
2		2015-05	Avon and	Avon and	-2.51215	51.41294	On or nea	E01014395	Bath and f	Anti-social behaviour					
3		2015-05	Avon and	Avon and	-2.51193	51.40944	On or nea	E01014395	Bath and f	Anti-social behaviour					
4		2015-05	Avon and	Avon and	-2.50868	51.4105	On or nea	E01014395	Bath and f	Anti-social behaviour					
5	c29a5d51f	2015-05	Avon and	Avon and	-2.51507	51.41936	On or nea	E01014395	Bath and f	Burglary	Investigation complete;	no suspect identified			
6	44aa7dab7	2015-05	Avon and	Avon and	-2.51334	51.40877	On or nea	E01014395	Bath and f	Criminal d	Under investigation				
7	22afefb5b	2015-05	Avon and	Avon and	-2.51016	51.411	On or nea	E01014395	Bath and f	Other the	Investigation complete;	no suspect identified			
8	4b93e30af	2015-05	Avon and	Avon and	-2.50938	51.40959	On or nea	E01014395	Bath and f	Violence i	Under investigation				
9		2015-05	Avon and	Avon and	-2.4978	51.41523	On or nea	E0101440C	Bath and f	Anti-social behaviour					
10		2015-05	Avon and	Avon and	-2.49861	51.416	On or nea	E0101440C	Bath and f	Anti-social behaviour					
11		2015-05	Avon and	Avon and	-2.50407	51.4178	On or nea	E0101440C	Bath and f	Anti-social behaviour					
12		2015-05	Avon and	Avon and	-2.49861	51.416	On or nea	E0101440C	Bath and f	Anti-social behaviour					
13		2015-05	Avon and	Avon and	-2.51043	51.42318	On or nea	E0101440C	Bath and f	Anti-social behaviour					
14		2015-05	Avon and	Avon and	-2.50143	51.41669	On or nea	E0101440C	Bath and f	Anti-social behaviour					
15	aabe20e77	2015-05	Avon and	Avon and	-2.50281	51.41403	On or nea	E0101440C	Bath and f	Burglary	Investigation complete;	no suspect identified			
16	e729c8857	2015-05	Avon and	Avon and	-2.49861	51.416	On or nea	E0101440C	Bath and f	Burglary	Investigation complete;	no suspect identified			
17	e29e624d1	2015-05	Avon and	Avon and	-2.49861	51.416	On or nea	E0101440C	Bath and f	Criminal d	Investigation complete;	no suspect identified			
18	fd9c002ba	2015-05	Avon and	Avon and	-2.50006	51.4143	On or nea	E0101440C	Bath and f	Criminal d	Investigation complete;	no suspect identified			
19	9f8489c32	2015-05	Avon and	Avon and	-2.4978	51.41523	On or nea	E0101440C	Bath and f	Other the	Under investigation				
20	a75ab937f	2015-05	Avon and	Avon and	-2.49777	51.42023	On or nea	E0101440C	Bath and f	Other the	Unable to prosecute suspect				
21	b51eb1dd	2015-05	Avon and	Avon and	-2.49955	51.41897	On or nea	E0101440C	Bath and f	Other the	Investigation complete;	no suspect identified			
22	0b07da691	2015-05	Avon and	Avon and	-2.49861	51.416	On or nea	E0101440C	Bath and f	Other the	Investigation complete;	no suspect identified			
23	0f8e7f704	2015-05	Avon and	Avon and	-2.4978	51.41523	On or nea	E0101440C	Bath and f	Shopliftin	Under investigation				
24	a07bbf965	2015-05	Avon and	Avon and	-2.50143	51.41669	On or nea	E0101440C	Bath and f	Shopliftin	Awaiting court outcome				
25	617e3cbff	2015-05	Avon and	Avon and	-2.4978	51.41523	On or nea	E0101440C	Bath and f	Shopliftin	Under investigation				
26	9d09f68d7	2015-05	Avon and	Avon and	-2.49861	51.416	On or nea	E0101440C	Bath and f	Shopliftin	Unable to prosecute suspect				



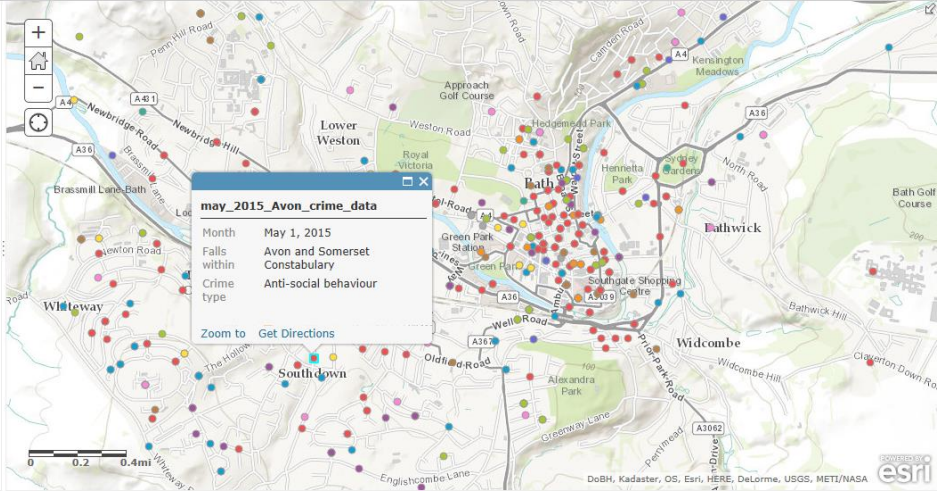
Add spreadsheet (CSV file format) data to ArcGIS Online using drag and drop or “add item” techniques



The data will now be ready to open within a map

Legend

- may 2015 Avon crime data**
- Anti-social behaviour
  - Violence and sexual offences
  - Other theft
  - Criminal damage and arson
  - Shoplifting
  - Burglary
  - Vehicle crime
  - Public order
  - Drugs
  - Bicycle theft
  - Other

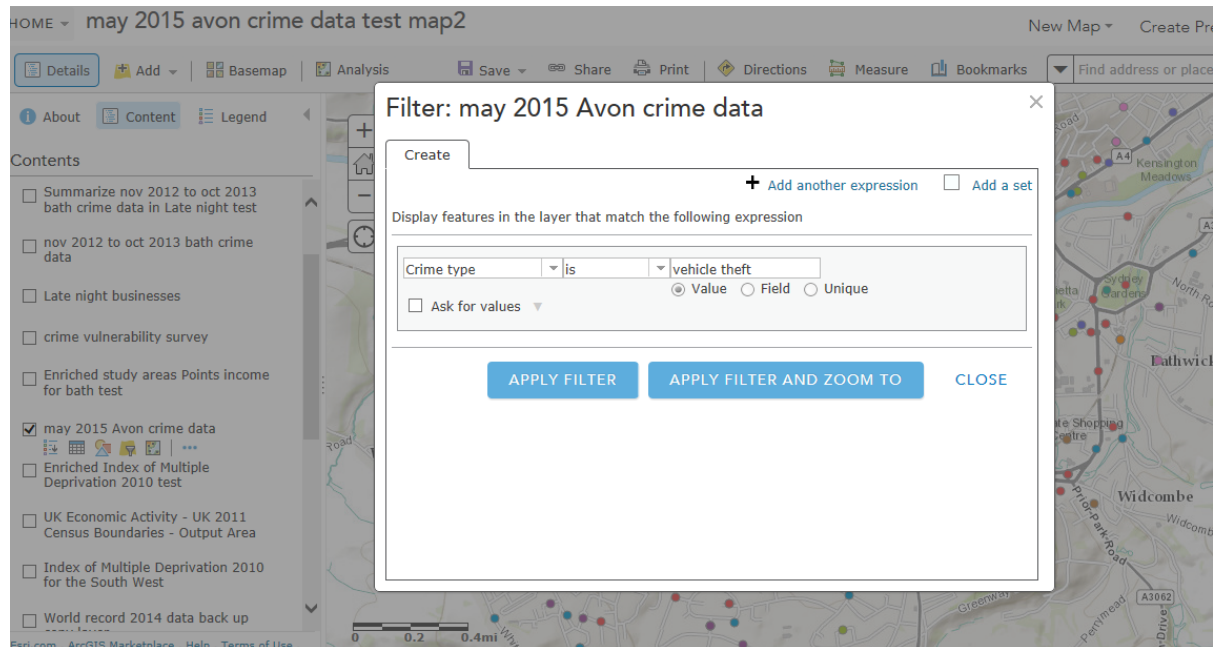


## Part 3 – Visualising your data

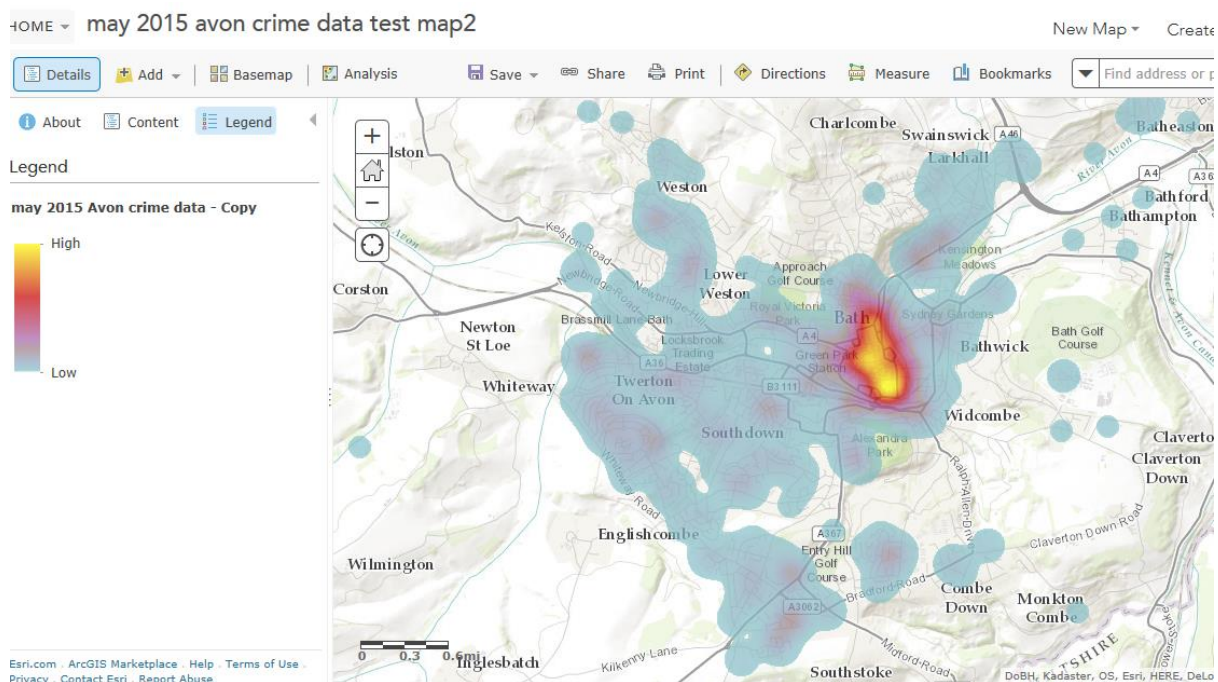
This video explores key ways you can filter and visualise the crime data in your map

<https://www.youtube.com/watch?v=MG9iNGRXOg8&feature=youtu.be>

Filtering can help to display just certain parts of the data which you want to focus on. Crime types are very diverse and your study would probably look at a specific type of crime such as just vehicle crimes or anti-social behaviour.



Spatial patterns can be hard to see. In this data you may also find that there are many points overlapping each other. So you need to be able to visualise the patterns more effectively. One quick way to do this is to use the “Heat Map” display.

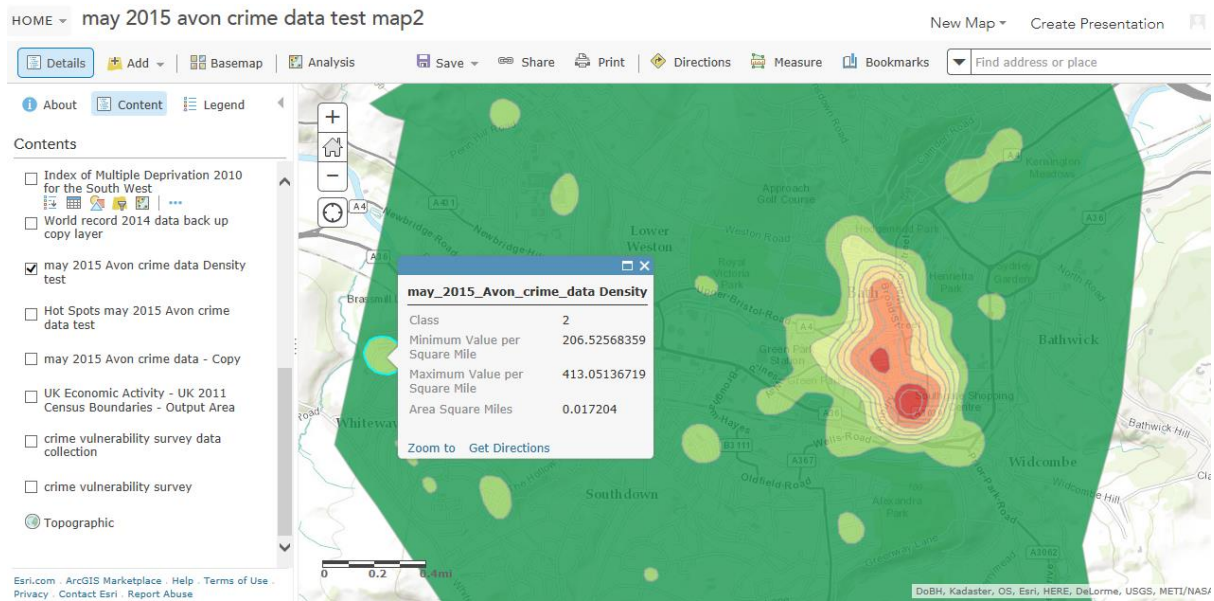




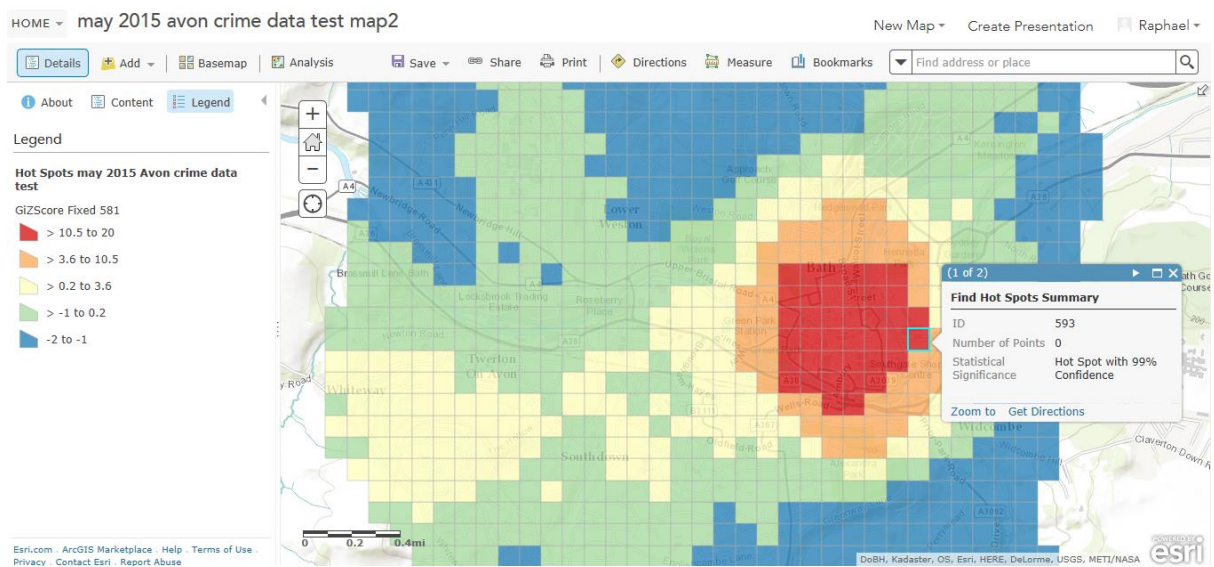
## Part 4 - Hot spot analysis

This video looks at developing various statistical analysis of your crime data's pattern using hot spots and density mapping <https://youtu.be/hnVRK8ol2Zk>

This density map has calculated the number of crimes which are occurring per km<sup>2</sup> for the study area and produces a visually clear isoline map to display these concentrations.



You can also use the data analysis tools to perform a statistical analysis of your crime data patterns. This is called a hot spot analysis and identifies if clusters of crimes are statistically unusually high or low across your study area.

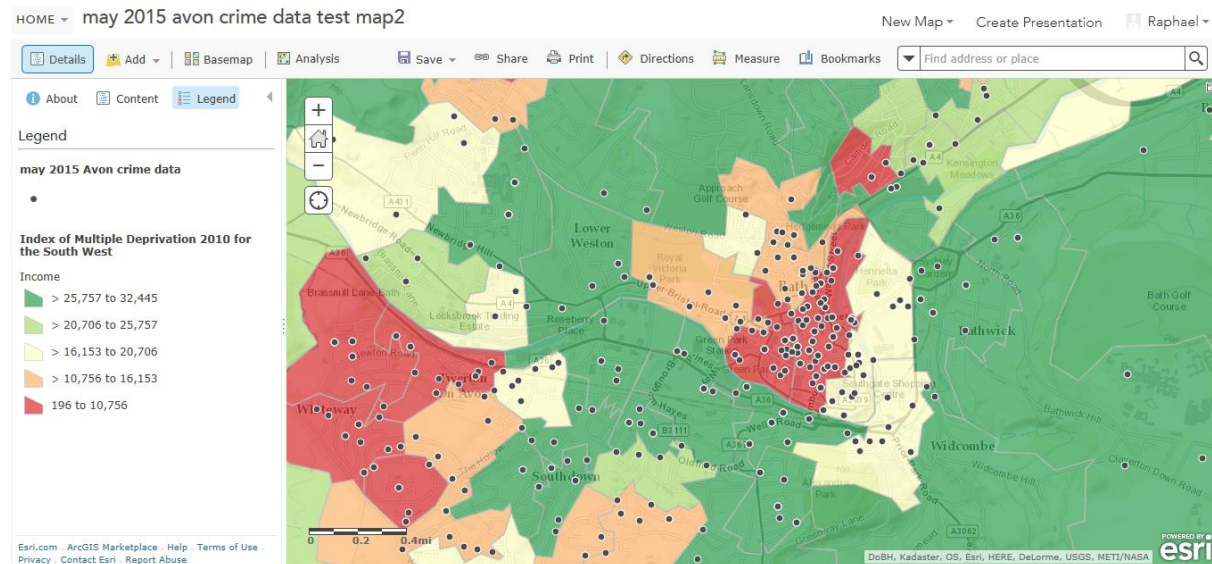


## Part 5 – Explaining crime patterns

This video tutorial explains how you can easily find social and economic secondary data layers within ArcGIS Online to add to your map to compare with the crime patterns.

<https://youtu.be/p940qzbyzTc>

Here is a freely available map of multiple deprivation levels from the UK. From this you can see if higher concentrations of certain crimes correspond with any of these deprivation indicators.



The table below shows the factors within the multiple deprivation index. This ranks every area in the UK where a score of 1 is the worst performing area on any measure and around 33,000 is the best area.

**Figure 1: Domains and Sub Domains**

Domain:	Sub-Domain:	Indicators relate to:	Number of indicators:
Income (22.5%)	Affecting children	Income related benefits	6
	Affecting Older People		
Employment (22.5%)	n/a	Employment related benefits	6
Health & Disability (13.5%)	n/a	Illness, admissions, disability, mental health	4
Education, Skills & Training (13.5%)	Children/ Young People	Exam scores, absences, post 16 education	6
	Skills	Low or no qualifications	1
Barriers to Housing and Services (9.3%)	Geographical barriers	Distances to key services	4
	Wider Barriers	Overcrowding, homelessness, access to housing	3
Crime (9.3%)	n/a	Burglary, violence, theft, criminal damage	4
Living Environment (9.3%)	Indoors	Poor condition housing, central heating	2
	Outdoors	Air quality, road accidents	2

This is a layer showing social and economic data for the UK including things like unemployment rates and percentage of student populations. Again look to see if there seem to be any factors which might explain the patterns of certain types of crime in your study area.



Details Add ▾ Basemap Analysis Save ▾ Share Print Directions Measure Bookmarks Find address or place

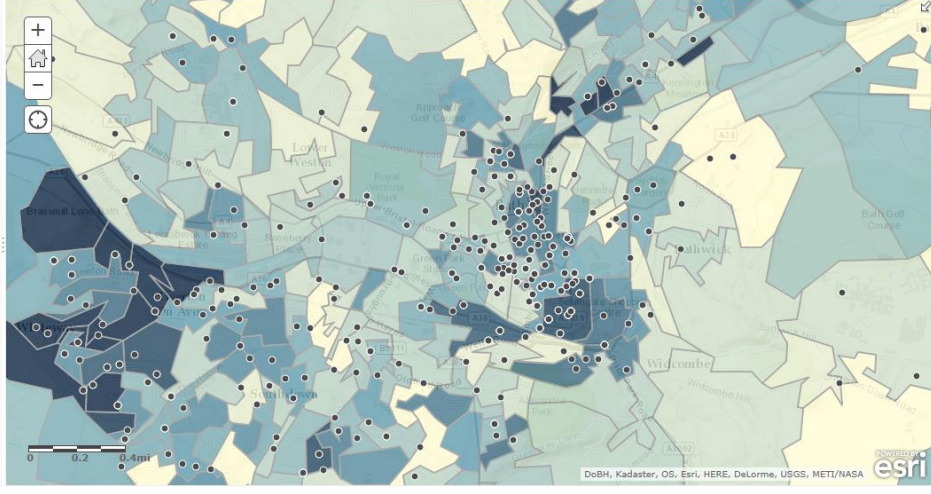
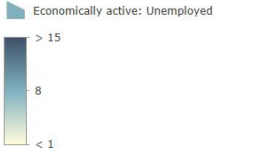
About Content Legend

Legend

may 2015 Avon crime data

•

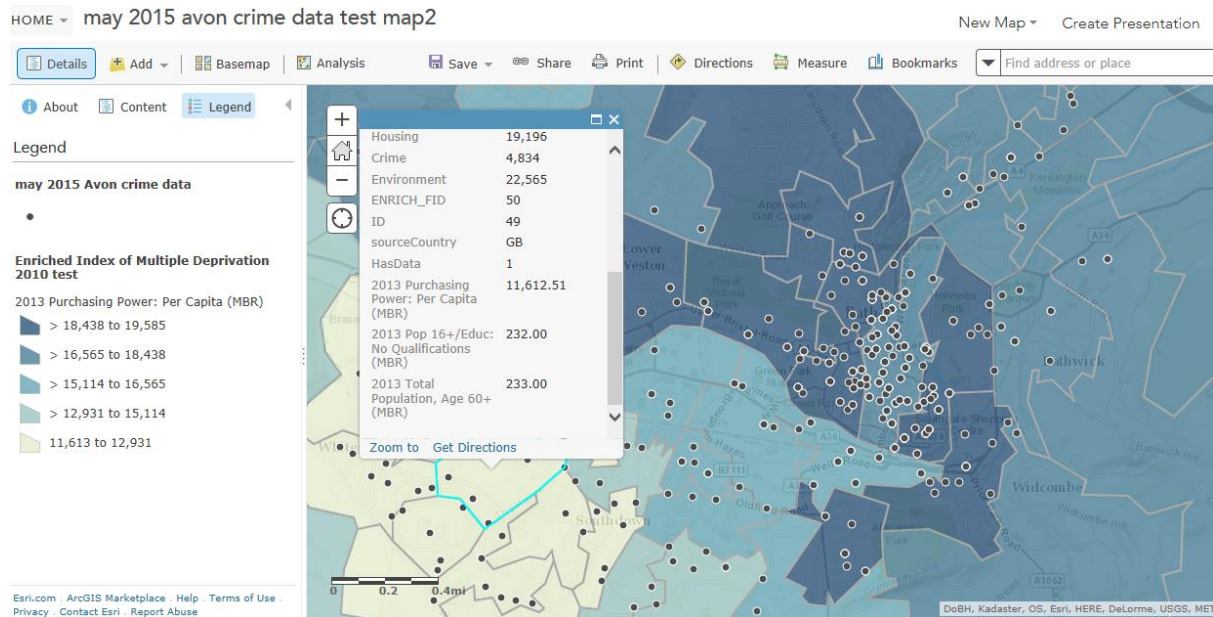
UK Economic Activity - UK 2011 Census Boundaries - Output Area



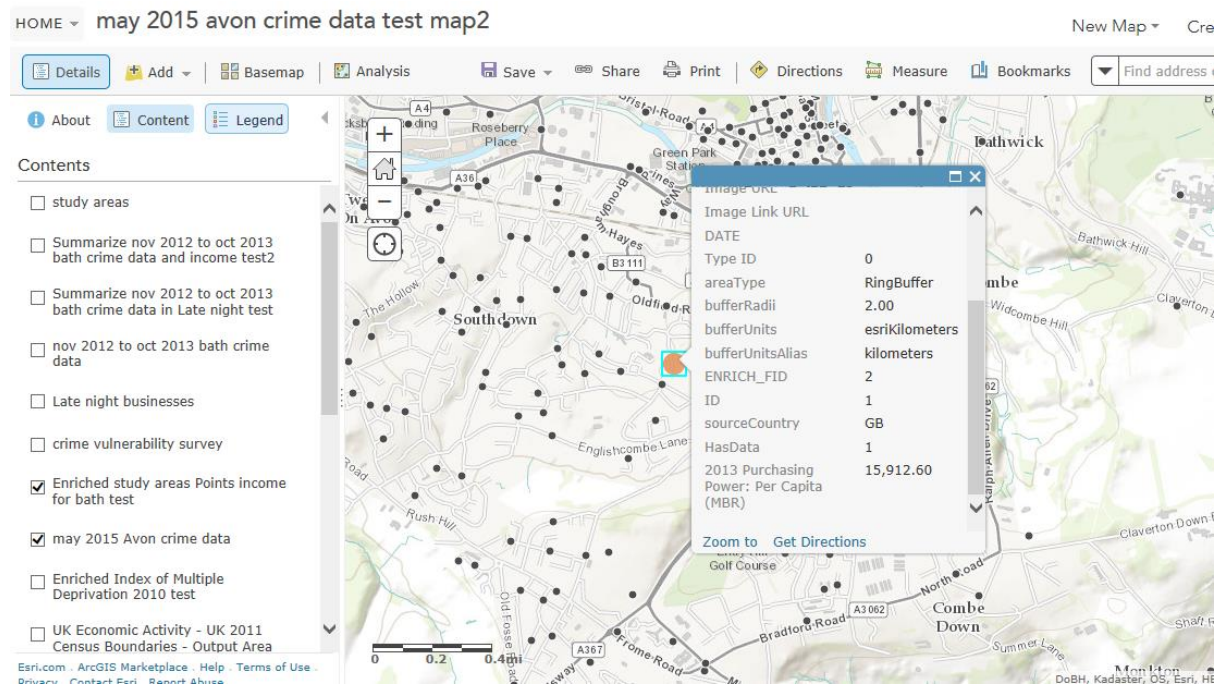
## Part 6 - Data enrichment in ArcGIS online

This tutorial explains how you can access, within ArcGIS online, detailed social and economic data from any location specific to your fieldwork investigation needs. <https://youtu.be/-bixghf6RB8>

Here you can use an existing layer such as the deprivation ranking layer and use the data enrichment tool to add real income and age group data to each area.



Here you can just place points on the map and ask the data enrichment analysis tool to provide you with something like average income data for a distance you choose, such as 1km, from each point.



## Part 7 – Adding primary data

In this tutorial you see how to set up a spreadsheet to add primary data you have collected in the field to your GIS map. <https://www.youtube.com/watch?v=qE3VLgsjzus&feature=youtu.be>

First by creating a spreadsheet with the data you want to collect and saving it as “CSV delimited” format

	A	B	C	D	E	F	G	H	I	J
1	Dereliction score	CCTV score	Overlooking windows score	passers by score	street lighting	noise in DB	Description	Longitude	Latitude	
2	0	0	0	0	0	0				
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										

Then adding the data to ArcGIS Online using the “add” option within your contents or using drag and drop

HOME | may 2015 avon crime data test map2 | New Map | Create Presentation | Raphael

Details | Add | Basemap | Analysis | Save | Share | Print | Directions | Measure | Bookmarks | Find address or place

About | Content | Legend

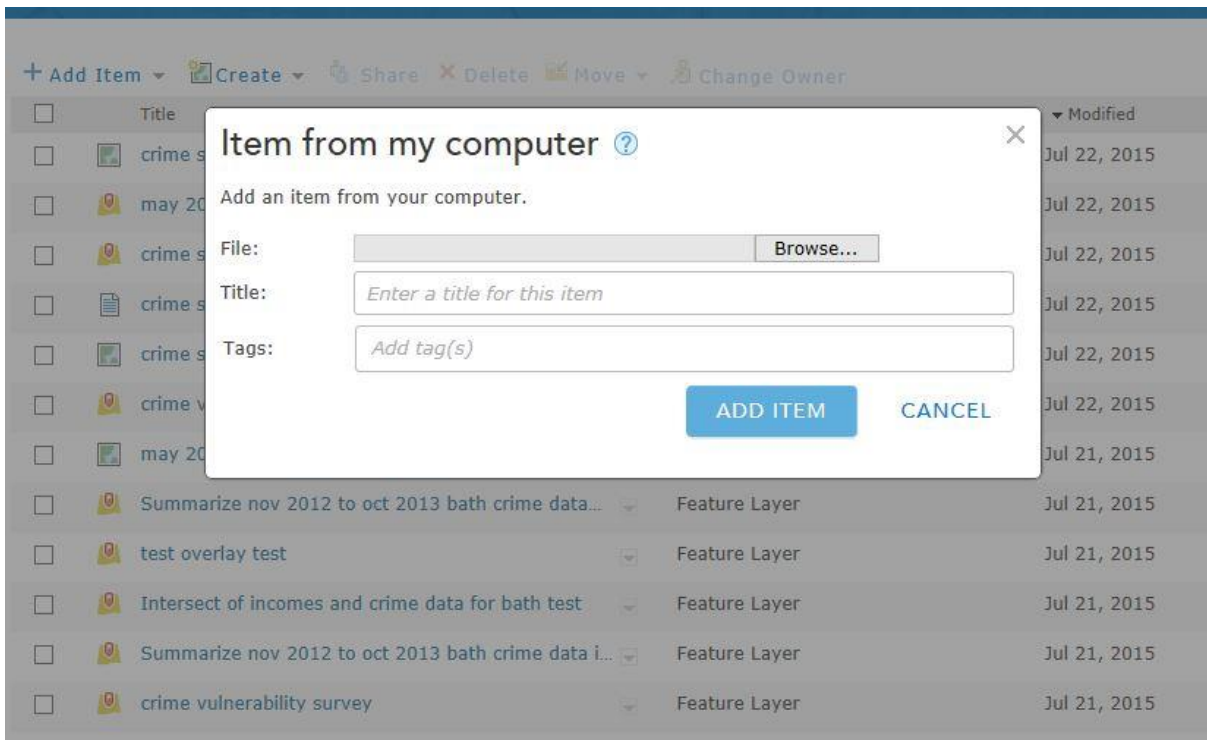
Contents

- study areas
- Summarize nov 2012 to oct 2013 bath crime data and income test2
- Summarize nov 2012 to oct 2013 bath crime data in Late night test
- nov 2012 to oct 2013 bath crime data
- Late night businesses
- crime vulnerability survey
- Enriched study areas Points income for bath test
- may 2015 Avon crime data
- Enriched Index of Multiple Deprivation 2010 test
- UK Economic Activity - UK 2011 Census Boundaries - Output Area

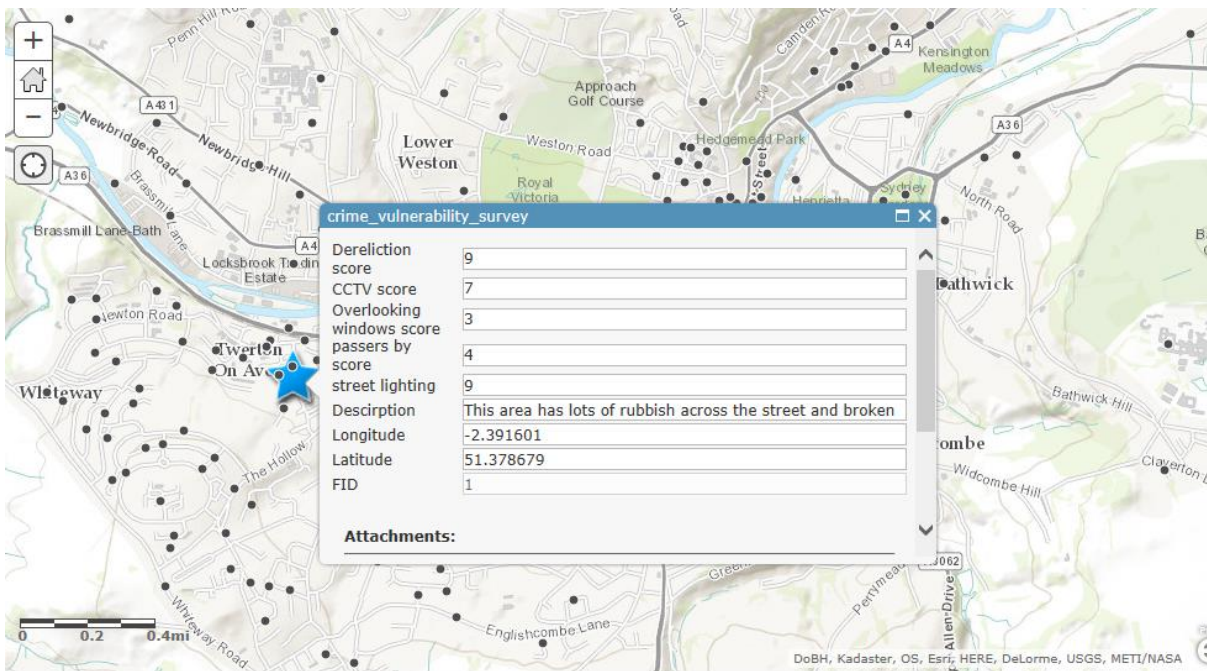
Eri.com | ArcGIS Marketplace | Help | Terms of Use | Privacy | Contact Esri | Report Abuse

DoBH, Kadaster, OS, Eir, HERE, DeLorme, USGS, METI/NASA | esri



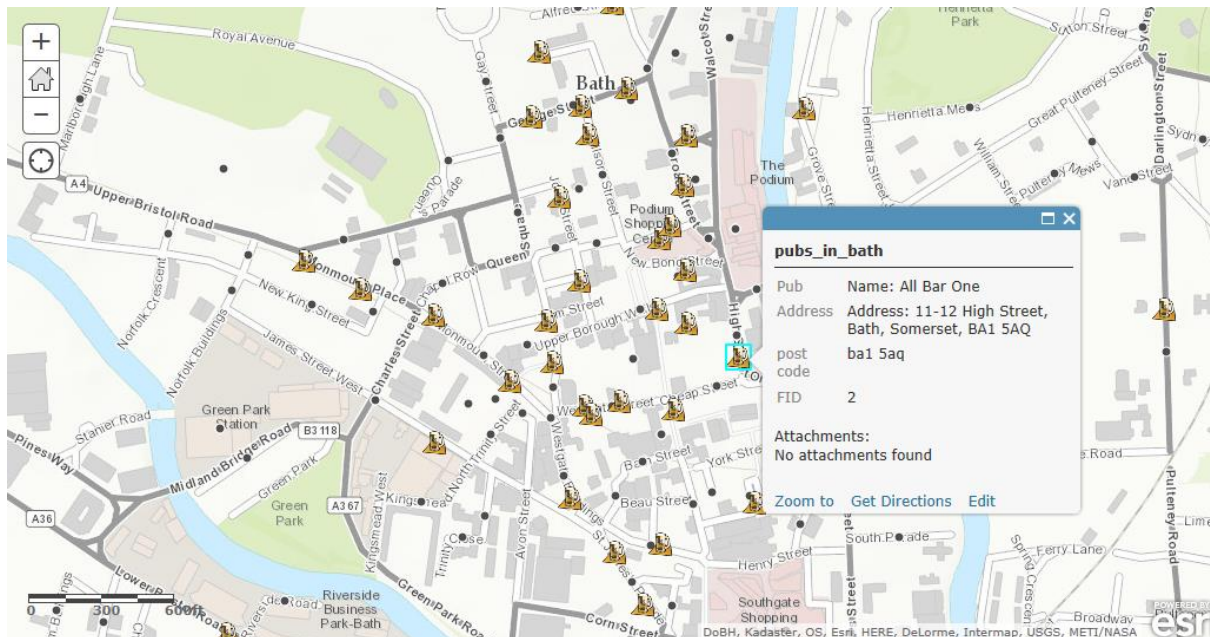


Then you are ready to enter data directly into your map in the right locations.

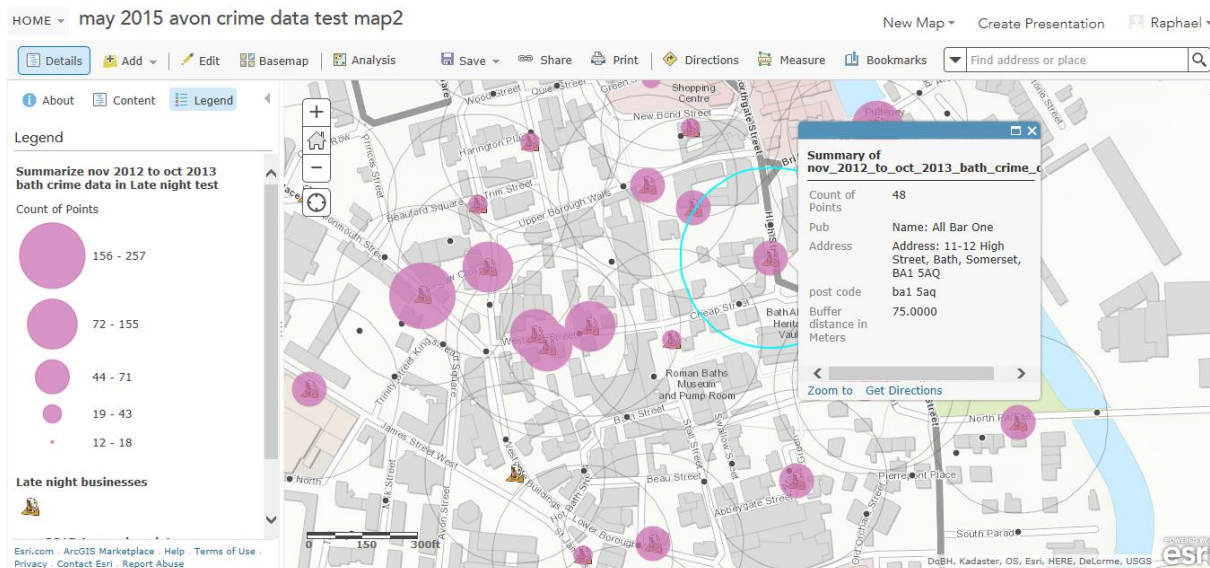


## Part 8 – Analysing spatial links

In this tutorial you will see how you can explore the links between two pieces of data on your map. For example if you added a layer of points showing businesses which were open late at night you could then count the number of drug related crimes within a distance of each one to see if a specific place could be encouraging criminal activity. <https://youtu.be/GhyT1mv2T9Q>



This map shows the counts of total crimes within 75 metres of each late night business in central Bath.



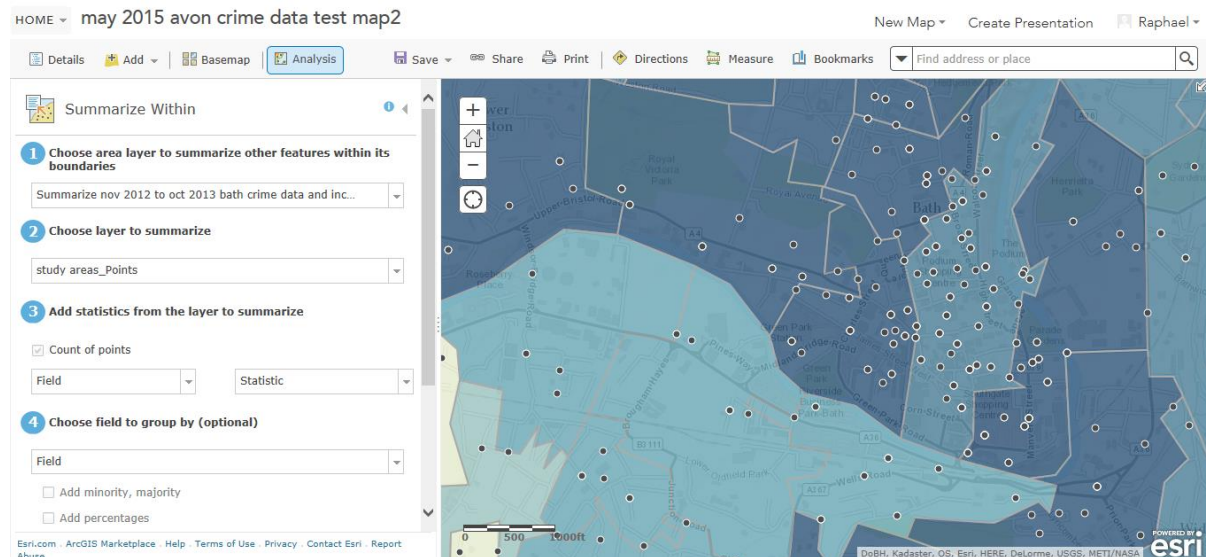


## Part 9 – Merging and exporting data

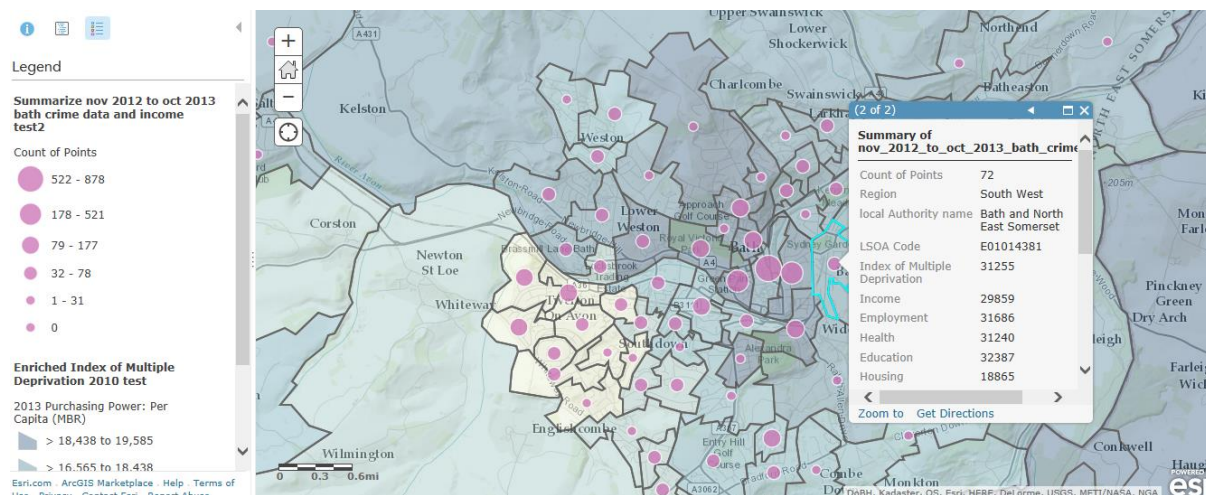
This tutorial shows you how to merge two separate layers. This is a useful way to combine and summarise data for certain areas. Then you can use this newly combined layer to export your whole data set to a spreadsheet. This will then allow you to analyse the relationships between factors such as levels of a type of crime and levels of unemployment across an area. This allows you to then conduct some complex statistical tests on your data such as Spearman's Rank correlation.

<https://youtu.be/f61TqBOPwvI>

Here the deprivation layer is being merged with the crimes layer



The result now shows the total crimes in each of the deprivation layer areas.



This newly merged data layer can be exported as a "CSV" file

## Summarize nov 2012 to oct 2013 bath crime data and income test2



Analysis Feature Service generated from Summarize Within  
 Feature Layer (Hosted) by raphael.heath  
 Source: Feature Service  
 Last Modified: July 21, 2015  
 (0 ratings, 16 views)

Facebook Twitter

OPEN SHARE EDIT DELETE PUBLISH MOVE CHANGE OWNER USAGE EXPORT

- Export to Shapefile
- Export to CSV file
- Export to FGDB
- Export to GeoJSON
- Export to Feature Collection
- Service URL
- Enable Attachments

### Description

Feature Service generated from running the Summarize Within tool. The crime data were summarized within Enriched Index of Multiple Deprivation 2010 test

### Layers

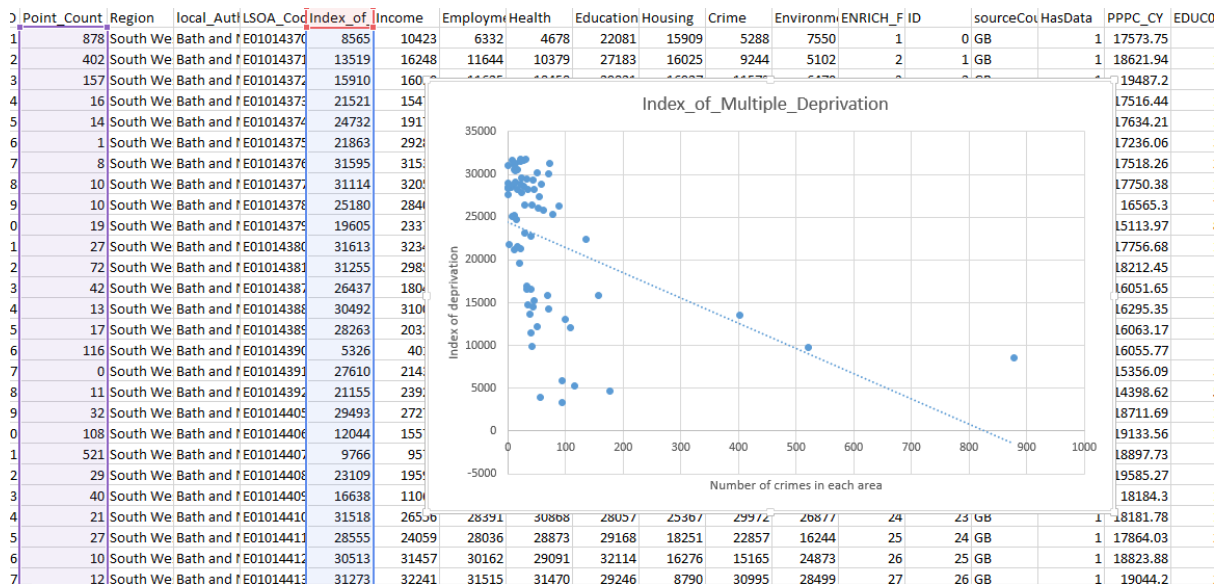
Summarize nov 2012 to oct 2013 bath crime data and income test2

### Properties

This can be opened in a spreadsheet programme

FILE	HOME	INSERT	PAGE LAYOUT	FORMULAS	DATA	REVIEW	VIEW	ESRI MAPS				
A20												
OBJECTID	Point_Count	Region	local_Aut	LSOA_Cod	Index_of	Income	Employe	Health	Education	Housing	Crime	Environm
1	878	South We	Bath and	E01014370	8565	10423	6332	4678	22081	15909	5288	7550
2	402	South We	Bath and	E01014371	13519	16248	11644	10379	27183	16025	9244	5102
3	157	South We	Bath and	E01014372	15910	16030	11625	18458	29821	16927	11573	6470
4	16	South We	Bath and	E01014373	21521	15478	22312	24832	16886	15738	23959	17039
5	14	South We	Bath and	E01014374	24732	19179	24240	23236	26862	8474	25590	27016
6	1	South We	Bath and	E01014375	21863	29286	25302	29645	29401	1285	22973	10852
7	8	South We	Bath and	E01014376	31595	31532	30094	28788	31524	13292	29689	28809
8	10	South We	Bath and	E01014377	31114	32059	30124	30020	31908	8653	29438	29567
9	10	South We	Bath and	E01014378	25180	28405	30264	31568	30599	2430	26683	11476
10	19	South We	Bath and	E01014379	19605	23373	27615	29079	24297	2030	11959	10835
11	27	South We	Bath and	E01014380	31613	32343	32453	31640	32212	8809	28381	30227
12	72	South We	Bath and	E01014381	31255	29859	31686	31240	32387	18865	24337	17547
13	42	South We	Bath and	E01014382	26437	18048	24633	25028	25855	27407	20269	21287
14	13	South We	Bath and	E01014383	30492	31002	28762	29605	32158	9476	30241	23699
15	17	South We	Bath and	E01014384	28263	20325	24769	23240	27252	22703	30346	26819
16	116	South We	Bath and	E01014390	5326	4013	4562	7501	3052	5800	15483	20878
17	0	South We	Bath and	E01014391	27610	21436	27808	27782	23613	16428	26702	20635
18	11	South We	Bath and	E01014392	21155	23925	28770	26157	22092	1181	28395	15522
19	32	South We	Bath and	E01014405	29493	27271	30983	30085	31179	16088	19630	15814

Then the data can be looked at using scatter graphs.



Statistical tests such as the strength of the correlation can be tested. Here are some online calculators which can be used <http://www.maccery.com/maths/> or <http://www.socscistatistics.com/tests/spearman/default2.aspx>

### Spearman's rank

Data1	Rank	Data2	Rank	Difference (d)	d <sup>2</sup>
878	26	10423	3	23	529
402	24	16248	8	16	256
157	23	16030	7	16	256
16	10	15478	5	5	25
14	9	19179	10	-1	1
1	2	29286	20	-18	324
8	3	31532	24	-21	441
10	5	32059	25	-20	400
10	5	28405	19	-14	196
19	12	23373	14	-2	4
27	14.5	32343	26	-11.5	132.25
72	20	29859	21	-1	1
42	19	18048	9	10	100
13	8	31002	22	-14	196
17	11	20325	12	-1	1
116	22	4013	1	21	441



## Part 10 – Using the Esri Collector App

This tutorial explains the process for setting up your data so that you can use the Esri Collector App to input data. You can even set this up for use in the field without any internet connection and then synchronise the data later. <https://www.youtube.com/watch?v=pUgUkBBtoI0>

### Properties

Tags   [Add tag\(s\)](#)

Credits

Delete Protection  Prevent this item from being accidentally deleted.

Extent Left: -2.55 Right: -2.22   
Top: 51.45 Bottom: 51.29

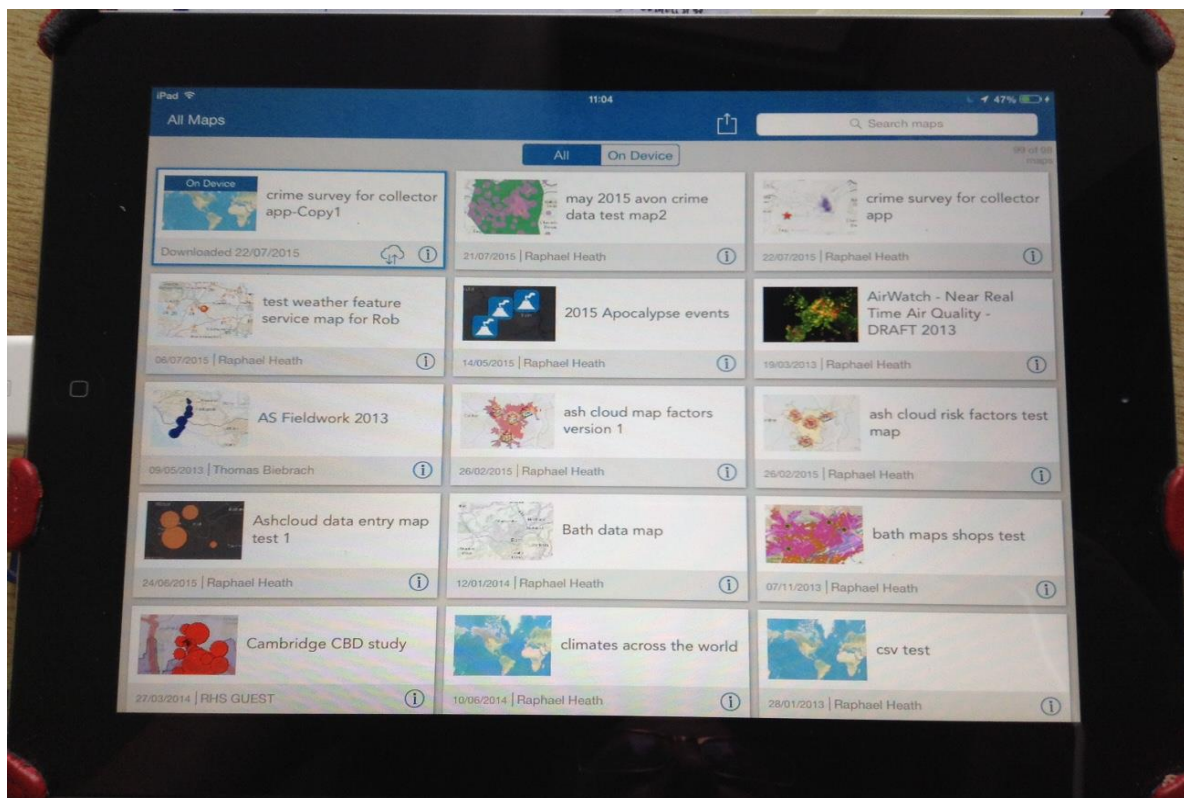
Editing  Enable editing and allow editors to:  
 Add, update, and delete features  
 Update feature attributes only  
 Add features only

Export Data  Allow others to export to different formats.

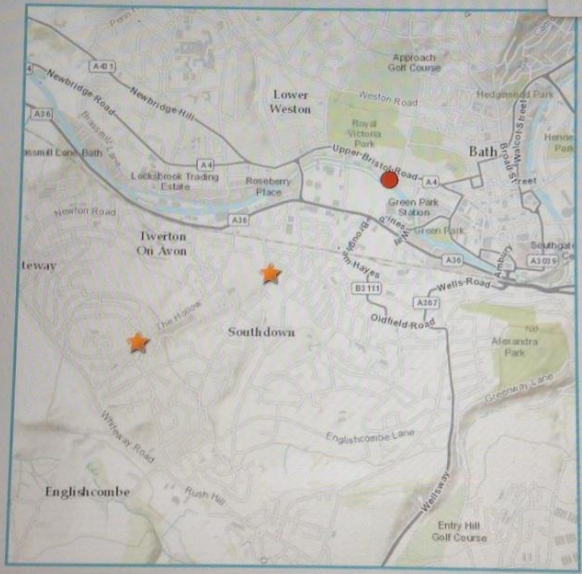
Sync  Enable Sync (disconnected editing with synchronization).

Track Edits  Keep track of who created and last updated features.  
 Editors can only update and delete the features they add.

View of your maps which are set up to work within the collector app



View of a map set up for offline data entry in the field within the collector app. This will be synched to update the map online when back in a WiFi zone.



**Location**  
Lat: 51.383506° Long: -2.372217°

**crime\_survey\_july**

- Dereliction score >
- CCTV score >
- Overlooking windows score >
- passers by score >
- street lighting >
- noise in DB >
- Description >
- Longitude >
- Latitude >

## Conclusions and evaluation

This is an important part at the end of an investigation. Drawing a conclusion involves making a list of brief points about what you consider to be the key findings in relation to your initial aims and hypothesis.

You could make some recommendations based on your study such as suggestions which may reduce the levels of crime in a certain area based on your findings.

There is lots to evaluate with a study of this nature. In your evaluation try to make comment on which parts of your results you are most confident with and which ones you are less certain about.

- Consider the various types of secondary data you have used. While it might look detailed and impressive there are lots of things to consider about it. Is the data from a good quality source? How old is the data? Does the crime data include all reported crimes? What data will it be missing and why? Is the data representative of the patterns for longer time scale than the month(s) you have used?
- How detailed are the areas in the deprivation and economic data maps? Do they help pick out the small scale/ street level factors which may influence the crimes?
- In your primary data you will probably find it easier to identify limitations such as your sample size, sampling strategy, equipment or techniques used.
- Does correlation equal causation – in other words say there is a link between crime levels and poverty can we say it is poverty causing the crime, or that criminal activity is attracted to the poorer areas, or that in fact there are other factors which have actually caused the pattern.
- Consider areas to extend your study through improving the data quality or by collecting new data.