

# Displaying crime data with heat maps: Washington, DC, July 2016

# Lesson Overview

In this lesson you will analyze point data using heat maps within smart mapping. To begin your journey, explore the [How to Smart Map: Heat Map](#) story map.

The Washington, DC police department is planning the deployment of its resources for the month of August. The department would like to see different geographic patterns of criminal behavior on a map. The GIS staff were given the July data on Friday afternoon and has been tasked with analyzing it in time for the Monday morning briefing. The police chief is particularly interested in auto theft and burglary. The chief has asked for the following maps to be produced:

- A map showing total crime concentration
- A map showing auto theft
- A map showing burglary
- Two individual maps showing auto theft and burglary for Ward 8

## Builds skills in

- Finding and downloading a csv file
- Uploading a csv file
- Filtering
- Changing basemaps
- Using heat maps at different scales
- Comparing two variables

## Software requirements

- ArcGIS Online account (get a [free trial](#))

## Estimated time

- Under 30 minutes

# Exercise

## Step 1: Find and download a csv file

You'll start with a prepared csv file of crime data from July 2016 in Washington, DC.

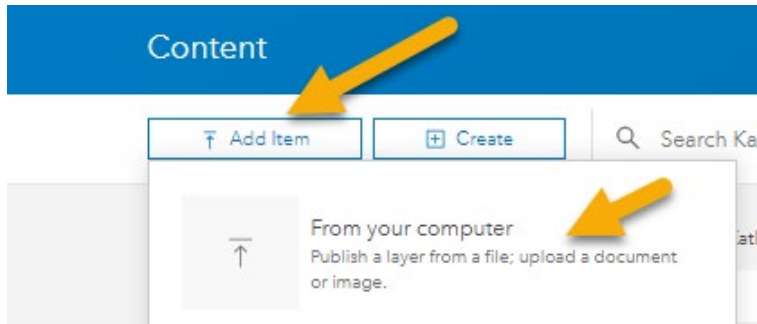
1. Go to [Crime Incidents in 2016 July](#).
2. Click **Download**.
3. Save the file in an appropriate place.

## Step 2: Create a new map

1. Log in to your [ArcGIS organizational account](#).
2. Click the **Map** tab.
3. In the side panel, click **Content**.
4. On the ribbon, click **Save** and **Save As**.
5. For **Title**, type *Crime in Washington, DC*.
6. For **Summary**, type *Crime in Washington, DC, displayed with heat maps*.
7. Add some appropriate tags and click **Save Map**.

## Step 3: Upload and publish the csv file

1. In the upper left corner click **Home** and click **Content**.
2. Click **Add Item** and click **From your computer**.



3. Click **Choose File**. Browse to and select **Crime\_Incidents\_in\_2016\_July.csv**.
4. Add your initials to the end of the **Title** and add some appropriate tags.
5. Make sure **Publish this file as a hosted layer** is checked.
6. For **Locate featured by**, choose **Coordinates**.

File:

Crime\_Incidents\_in\_2016\_July.csv

Title:

Crime\_Incidents\_in\_2016\_July\_LA

Categories:

+ Assign Category ▾

Tags:

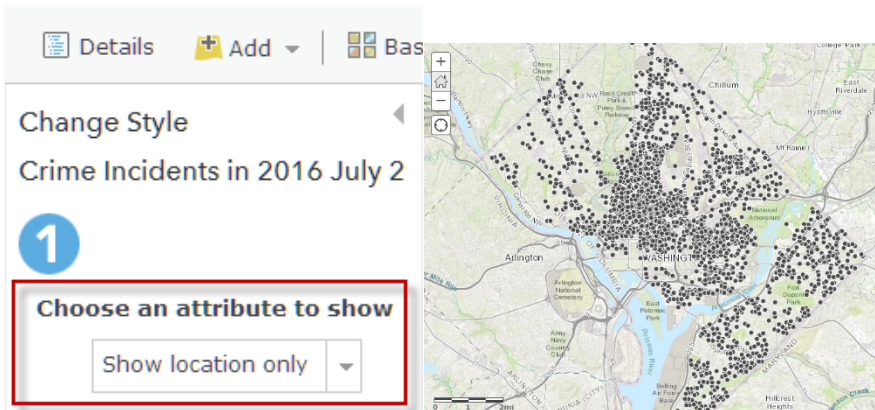
Add tags

Publish this file as a hosted layer. (Adds a hosted layer item with the same name.)

Locate features by:

Coordinates  Addresses or Places  None, add as table

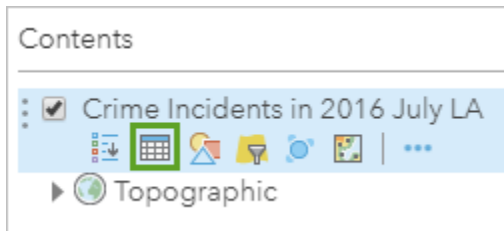
7. Click **Add Item**.
8. When the layer is available, click **Open in Map Viewer**.
9. In the **Change Style** pane, for **Choose an attribute to show**, choose **Show location only**.



10. Click **Done**.
11. Save the map.

## Step 4: Examine the attribute table

1. In the **Contents** pane, point to the **Crime Incidents in 2016 July** layer and click the **Show Table** button.

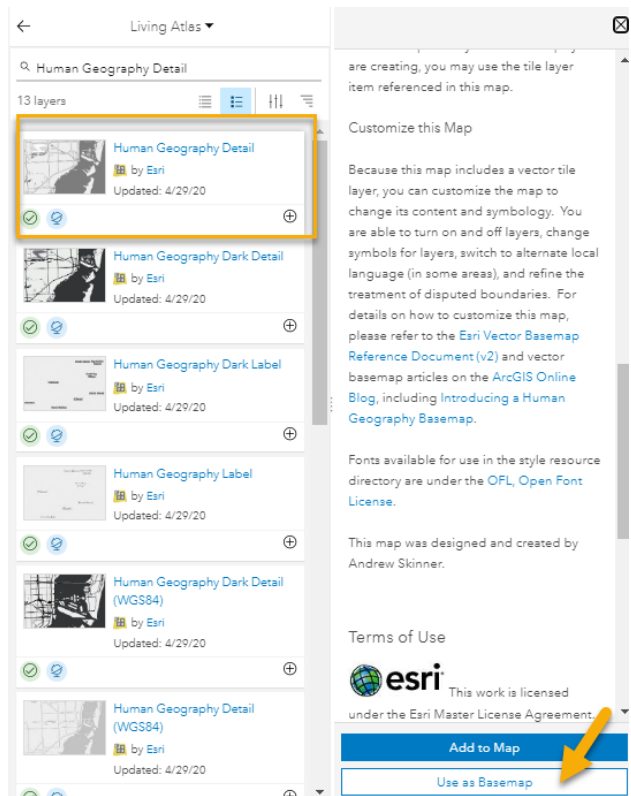


2. Examine the attribute table.  
*Q1. How many total crimes were there in July 2016?*  
*Q2. How many wards are there in Washington DC?*
3. Close the table by clicking the **X** in the top corner.

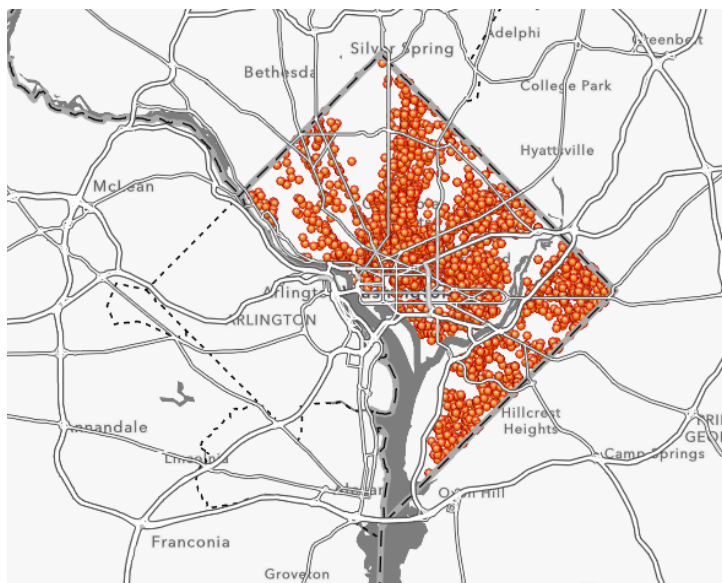
## Step 5: Change the basemap

1. On the ribbon, click **Add** and click **Browse Living Atlas Layers**.

2. Search for the **Human Geography Detail** basemap.
3. Click the item name and click **Use as Basemap**.



4. Click the back arrow to return to the **Contents** pane.

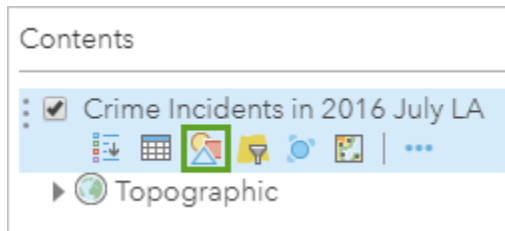


5. Save the map.

The Human Geography Detail basemap provides a monochromatic style with a detailed reference layer which includes administrative boundaries, roads, and highways.

## Step 6: Create a heat map of total crime in July 2016

1. Point to the **Crime incidents in 2016 July** layer and click the **Change Style** button.



2. On the **Heat Map** card, click **Select**.
3. Click **Done** and save the map.

*Q3. Write a description of where the crime is concentrated.*

*Q4. Why is a heat map effective for displaying this crime data?*

## Step 7: Produce multiscale maps of auto theft and burglary

For this section of the exercise you first want to isolate auto theft, which is represented in the attribute table as THEFT F/AUTO. After analyzing the auto theft map, you will then isolate burglaries.

1. For the **Crime Incidents in 2016 July layer**, click the **Filter** button.
2. Create the following filter: **OFFENSE is THEFT F/AUTO**. This will filter your crime data to show only auto thefts.

Create

+ Add another expression  Add a set

Display features in the layer that match the following expression

OFFENSE is THEFT F/AUTO

Value  Field  Unique

Ask for values

APPLY FILTER APPLY FILTER AND ZOOM TO CLOSE

3. Click **Apply Filter**.

4. Open the attribute table.

*Q5. How many crime incidents are auto thefts?*

*Q6. Where would you direct personnel to crack down on auto thefts?*

5. Change the filter expression to **OFFENSE is BURGLARY**.

The heat map may need to be reset for the new range of data.

6. Click the **Change Style** button and change the style to **Location (Single symbol)**.

7. Click **Done**. Then change the style back to **Heat Map**.

*Q7. How many crime incidents are burglaries?*

*Q8. Where would you direct personnel to crack down on burglaries?*

## Step 8: Produce maps for Ward 8 of auto thefts and burglaries

For this section of the exercise you are going to concentrate police efforts in Ward 8. This requires a double filter.

1. Change the filter to **WARD is 8**.

2. Click **Add another expression**. Add the expression **OFFENSE is THEFT F/AUTO**.

3. Click **Apply Filter**.



Filter: Crime\_Incidents\_in\_2016\_July >

View Edit + Add another expression  Add a set

Display features in the layer that match **All** of the following expressions

WARD is 8  Value  Field  Unique  Ask for values

OFFENSE is THEFT F/AUTO  Value  Field  Unique  Ask for values

APPLY FILTER APPLY FILTER AND ZOOM TO CLOSE

4. Change the style to **Location (Single Symbol)** and then back to **Heat Map**.

5. For the **Crime Incidents in 2016 July layer**, click the **Filter** button.

*Q9. How many auto thefts are there in Ward 8?*

*Q10. Where in Ward 8 are auto thefts most concentrated?*

6. Repeat steps 1 – 5 for burglary.

*Q11. How many burglaries are there in Ward 8?*

*Q12. Where in Ward 8 are burglaries most concentrated?*

7. Save the map.

In this exercise you have analyzed crime data using heat maps. You have examined both total crime and specific offenses as well as crime within a specific ward.

# Assessment

In the above exercise you looked at auto theft and burglary in ward 8. Pick another ward, run the analysis and compare.

## Exercise Answers

*Q1. How many total crimes were there in July 2016?*

A1. There are 3429 crimes.

*Q2. How many wards are there in Washington DC?*

A2. There are 8 wards.

*Q3. Write a description of where the crime is concentrated.*

A3. The crime is concentrated in the center with a streak going straight north.

*Q4. Why is a heat map effective for displaying this crime data?*

A4. It helps you find the area for the crime data quickly.

*Q5. How many crime incidents are auto thefts?*

A5. 1002 crimes are auto thefts.

*Q6. Where would you direct personnel to crack down on auto thefts?*

A6. There are pockets of increased auto theft around Columbia Heights, Dupont Circle, and University Heights.

*Q7. How many crime incidents are burglaries?*

A7. 109 crimes are burglaries.

*Q8. Where would you direct personnel to crack down on burglaries?*

A8. There are some concentrations of burglaries in the middle of the city. Burglaries are dispersed throughout the city except in the northern tip.

*Q9. How many auto thefts are there in Ward 8?*

A9. There are 70 auto thefts in Ward 8.

*Q10. Where in Ward 8 are auto thefts most concentrated?*

A10. There are concentrations around Washington Highlands and Douglas Dwelling; however, the thefts are also widely dispersed.

*Q11. How many burglaries are there in Ward 8?*

A11. There are 28 burglaries in Ward 8.

*Q12. Where in Ward 8 are burglaries most concentrated?*

A12. The burglaries do not have a discernable pattern in Ward 8.

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## About the author

This lesson was written by a K-12 educator with support from the Learn ArcGIS team at Esri.

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