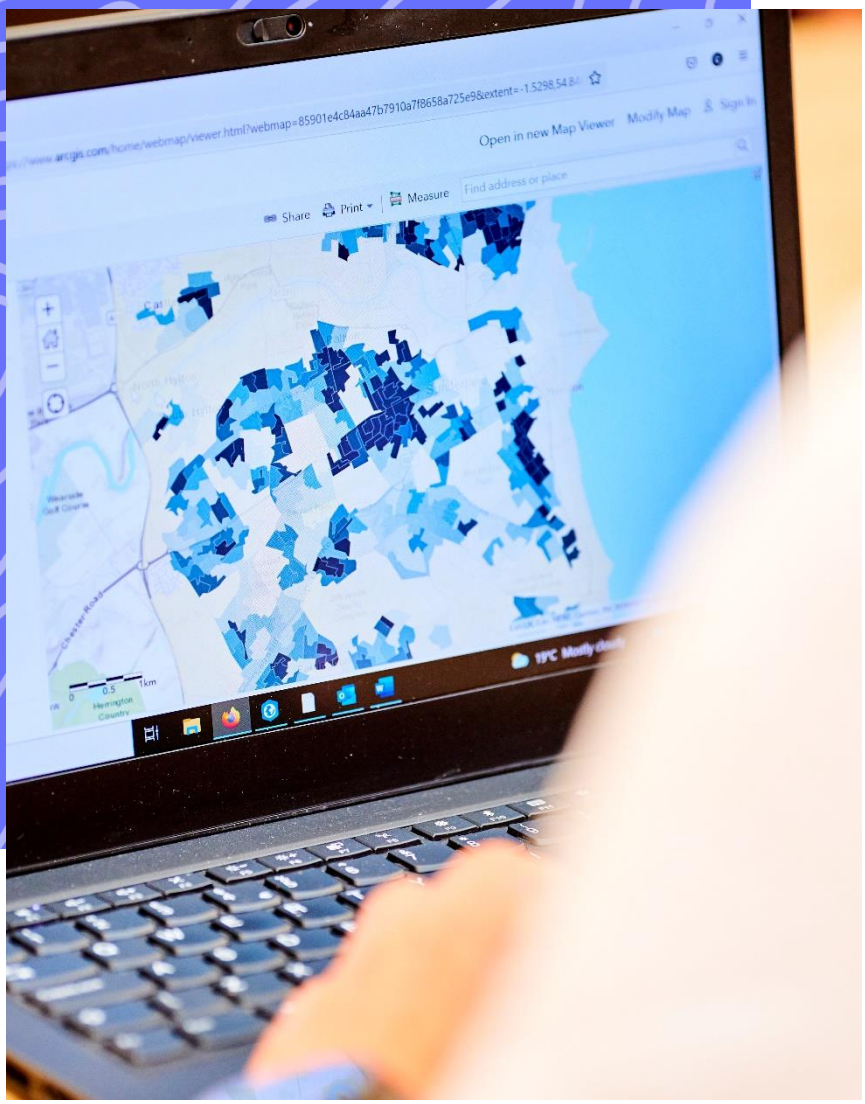
Geospatial UK



Introduction to ArcGIS Online

A guide on the basics of making maps in ArcGIS Online for use in the classroom, including accessing ArcGIS Online, creating basic maps, adding data, and sharing your maps

20 – 30 mins

Newcastle University

Introduction

This document acts as an introduction to using ArcGIS Online to make maps.

ArcGIS Online is a part of a range of geospatial apps and tools created by ESRI. The ESRI suite of products can be accessed for **free** by any UK school or Further Education college, however prior registration is required, and as such should be done at least a few days in advance of intended use.

ArcGIS Online is the most common and widely used web-based GIS platform. It allows users to create maps using geographic data from a wide range of sources. It also allows for the sharing and distribution of these maps as both traditional stationary maps and as interactive web maps.

GISGeography (2021) An Introduction to Esri ArcGIS Online (AGOL)

Learning Outcomes

In this practical, you will learn how to:

- Get a free ArcGIS account
- Access ArcGIS Online
- Create basic maps
- Adding data from various sources, e.g., Living Atlas, ArcGIS Online, websites and files
- Save and share your maps
- Additional sources of free GIS data

Contents

Section 1: Creating an ArcGIS Account 4

1.1. Sign Up 4

Section 2: Creating Your First Map 5

2.1. Sign In 5

2.2. Create a New Map 6

2.3. Changing the Basemap 7

Section 3: Adding Data 8

3.1. Adding Data from the Living Atlas 8

3.2. Adding Data from ArcGIS Online 10

3.3. Adding Data from Websites 13

3.4. Adding Data from A File 17

Section 4: Manipulating Layers 21

4.1. Viewing Layers 21

4.2. Changing Symbology 21

Section 5: Saving and Sharing Maps 27

5.1. Saving Your Map 27

5.2. Sharing Your Map 28

Section 6: Tips and Tricks 30

6.1. Multiple Layers 30

6.2. Confusing Names 30

Section 7: Summary 31

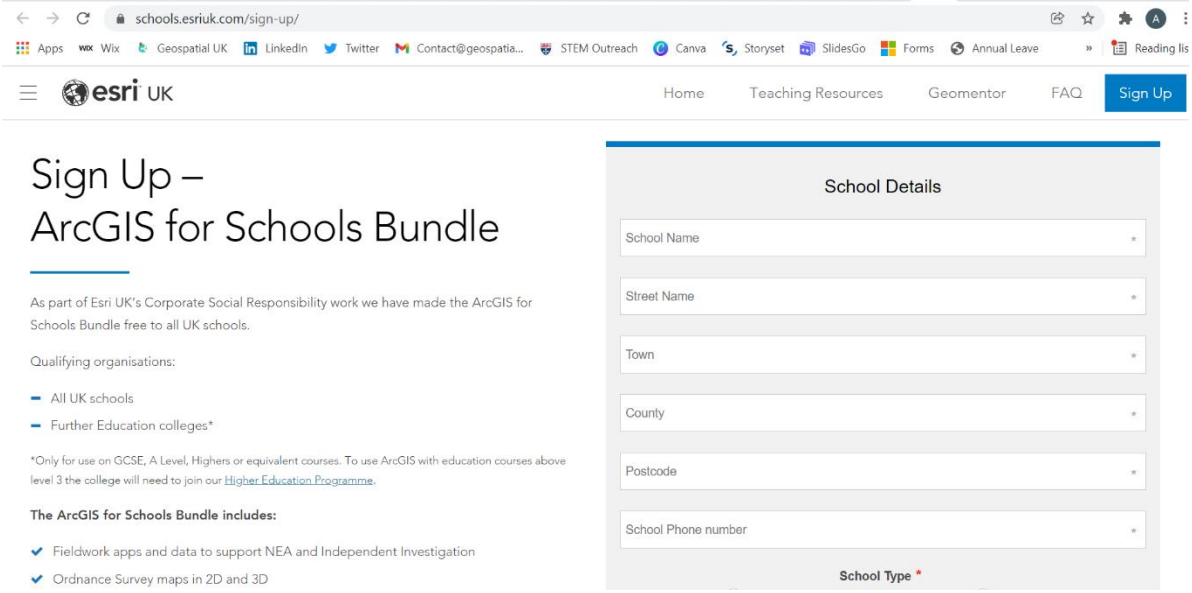
Section 1: Creating an ArcGIS Account

This section will step through obtaining ArcGIS Online Accounts. If you already have an ArcGIS account set up, please skip to Section 2 – Creating your first map.

1.1. Sign Up

a. Go to https://schools.esriuk.com/sign-up/ to sign up for an account for your school or college.

b. This requires filling in a signup form and should be done well in advance of the lesson or fieldtrip where Survey123 is required.



c. ESRI will issue a reply with instructions on how to set up accounts once a school or college has become registered. ESRI Australia have provided simple instructions to follow which may make the process smoother. ESRI will also provide support throughout the full process if required.

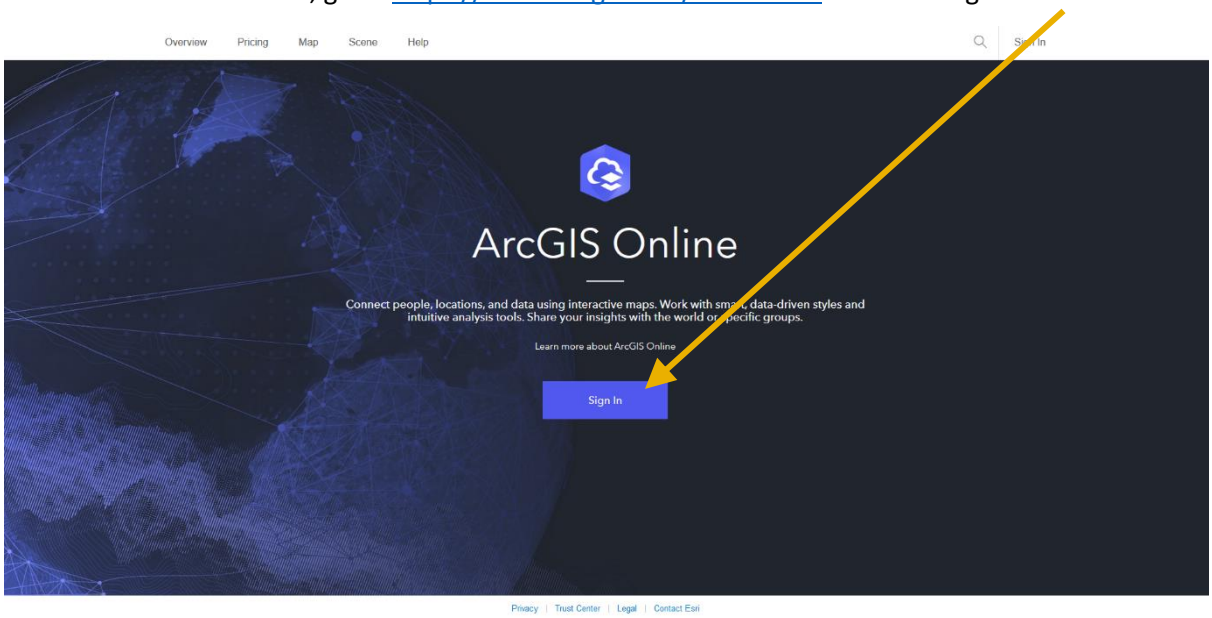
d. You may be required to contact your institutions IT technicians in order to safely create accounts for your students.

Section 2: Creating Your First Map

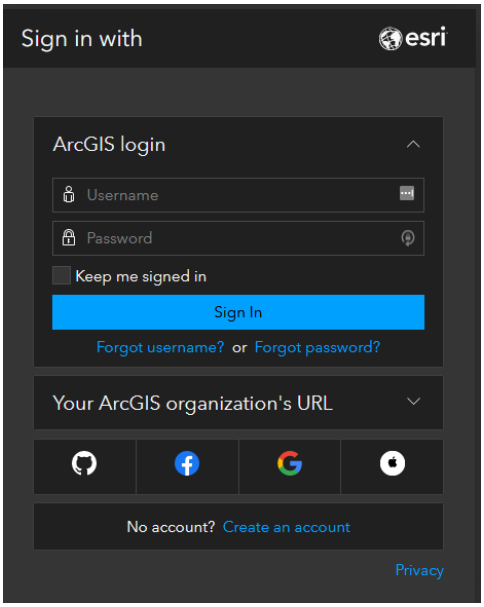
This section will introduce how to access and navigate basic maps in ArcGIS Online.

2.1. Sign In

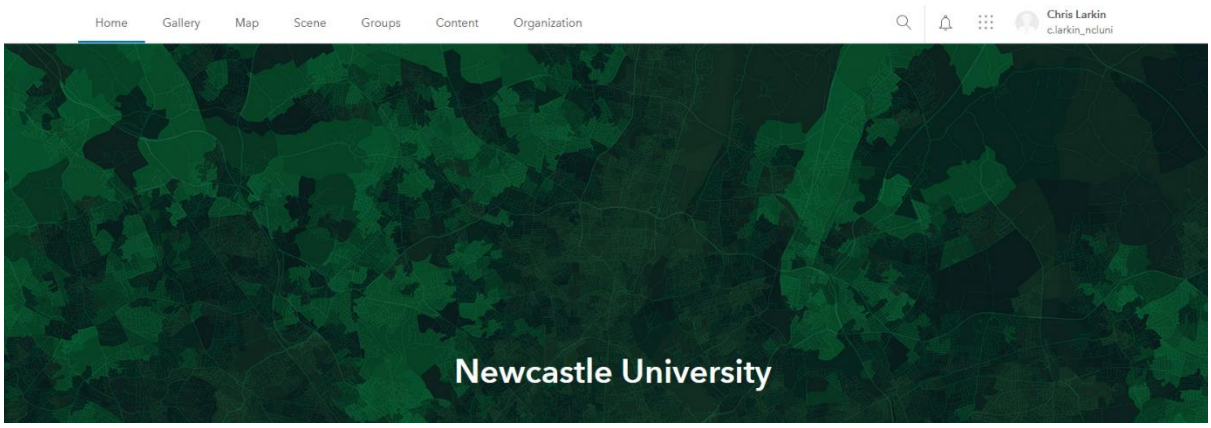
a. In a web-browser, go to https://www.arcgis.com/index.html and click 'Sign In'.



b. Sign in using your login details.

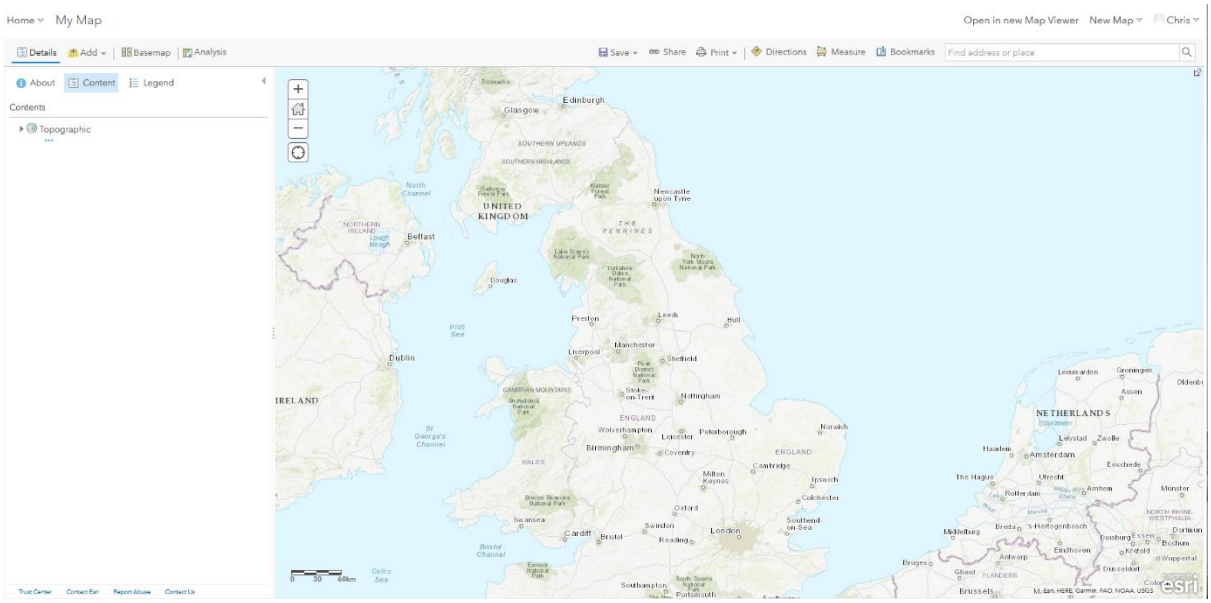


c. This should then bring you to your organisation's home page, which should look similar to the figure below:

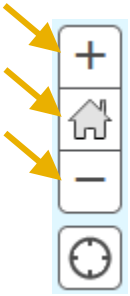


2.2. Create a New Map

a. Select "Map" from the tabs across the top of the screen. This will create a new map for you to start editing.



b. To move around the map, click and hold the mouse to drag to any location in the world. You can use the scroll wheel to zoom in or out of the map. If you prefer, you can use the on-screen zoom functions:

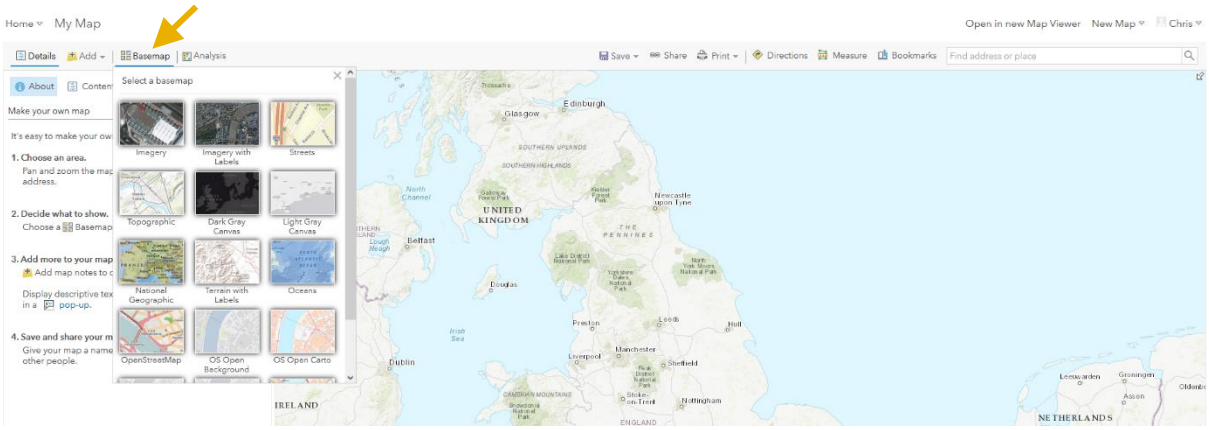


The plus and minus symbols can be used to zoom in and out respectively.

The Home symbol will reset the zoom to the same zoom at which the map opened at. This can be useful if you accidentally zoom in/out too far.

2.3. Changing the Basemap

a. Before you add any data to the map, it is worth considering the type of basemap you want displayed. To view the different basemap available, click the 'Basemap' tab:



b. You can click on any of the basemaps to view them. The basemap type you use will depend on the type of information you a planning on displaying.

For maps relating to physical geography, such as deforestation or glacial retreat maps, then Imagery often works best as a basemap.

For human geography issues, maps such as OpenStreetMap may be more appropriate, however there is no hard and fast rule for what the basemap should be.

It is easy to change at any point through the map-making process, so use whatever looks right to you!

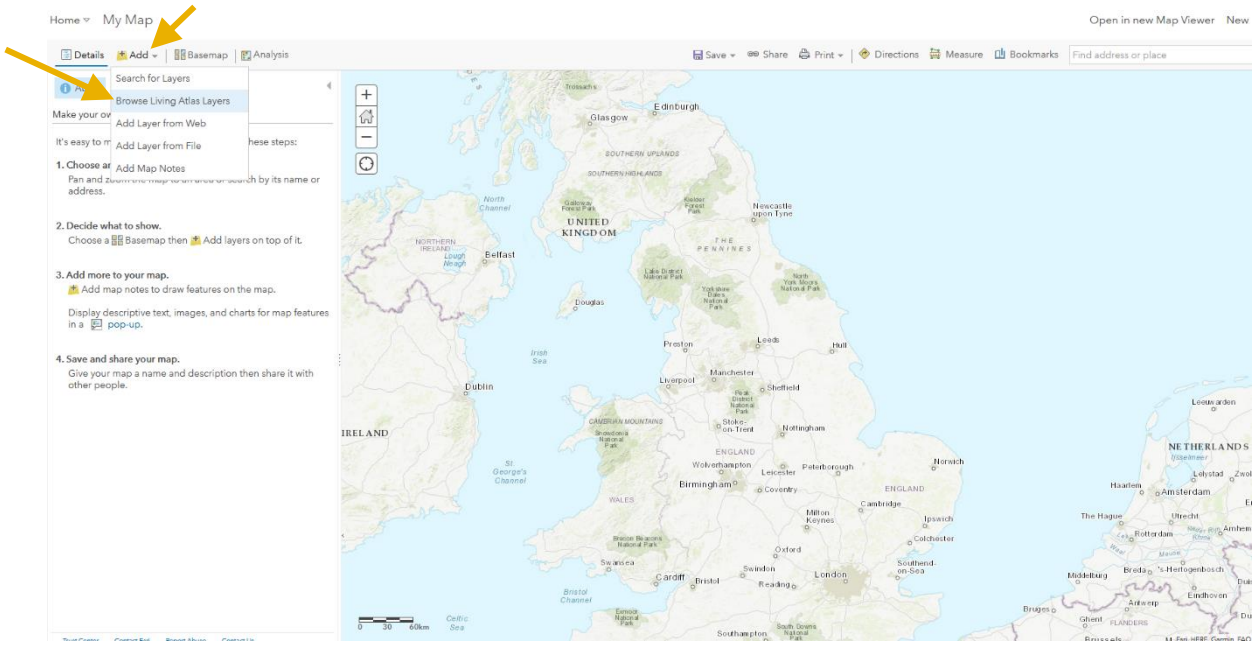
Section 3: Adding Data

This section will take you through the basics of adding data to the map. You will find out how to add data from multiple places including the Living Atlas, ArcGIS Online, websites and files.

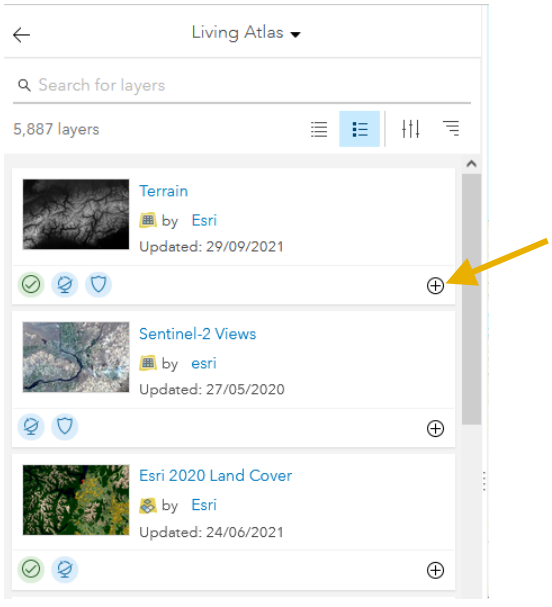
3.1. Adding Data from the Living Atlas

a. ESRI's Living Atlas is a collection of datasets selected by ESRI which are reliable and easy to use.

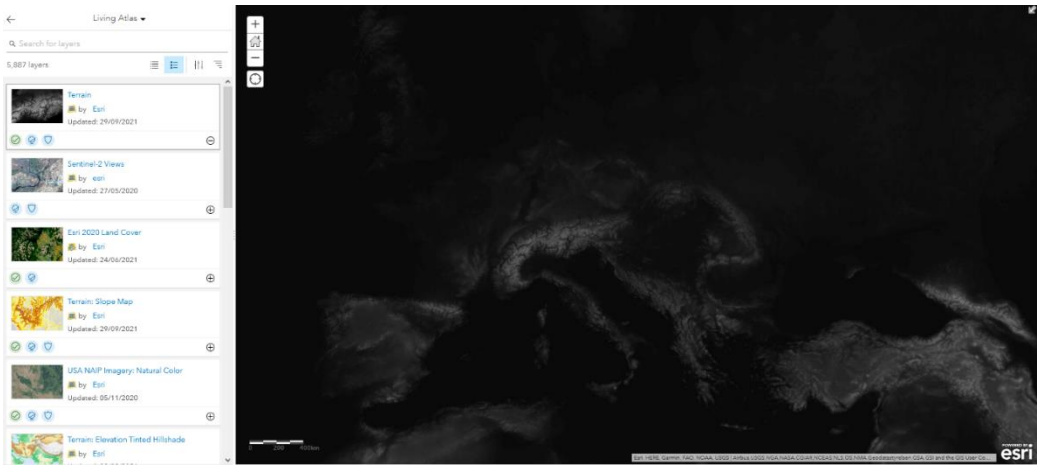
b. To first add data to the map, click the 'Add' button on the left-hand panel and select 'Browse Living Atlas Layers'.



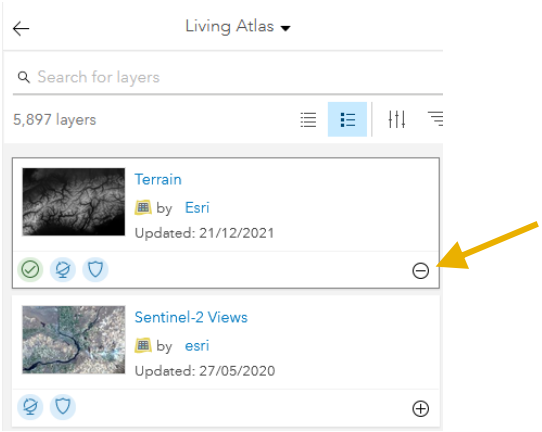
c. This will bring up the Living Atlas browser. In here we can search for data to add to our map. Search for 'Terrain' in the search bar. Then, click the '+' symbol.



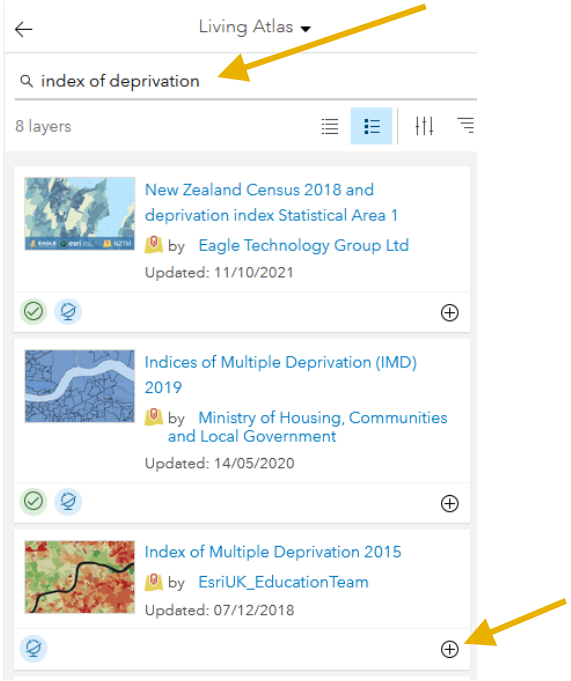
d. This will add a terrain map for the whole world to our map.



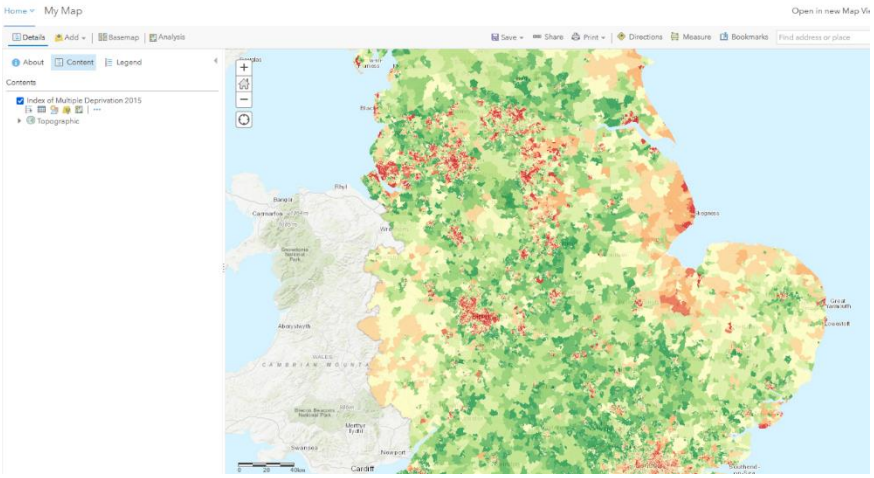
e. We can remove this data from out map by selecting the '-' symbol which has replaced the '+' from earlier.



f. The Living Atlas contains vast amounts of useful data. Using the search function, we can look for data which may be useful for us. Search for the 'Index of Deprivation' in the search bar.



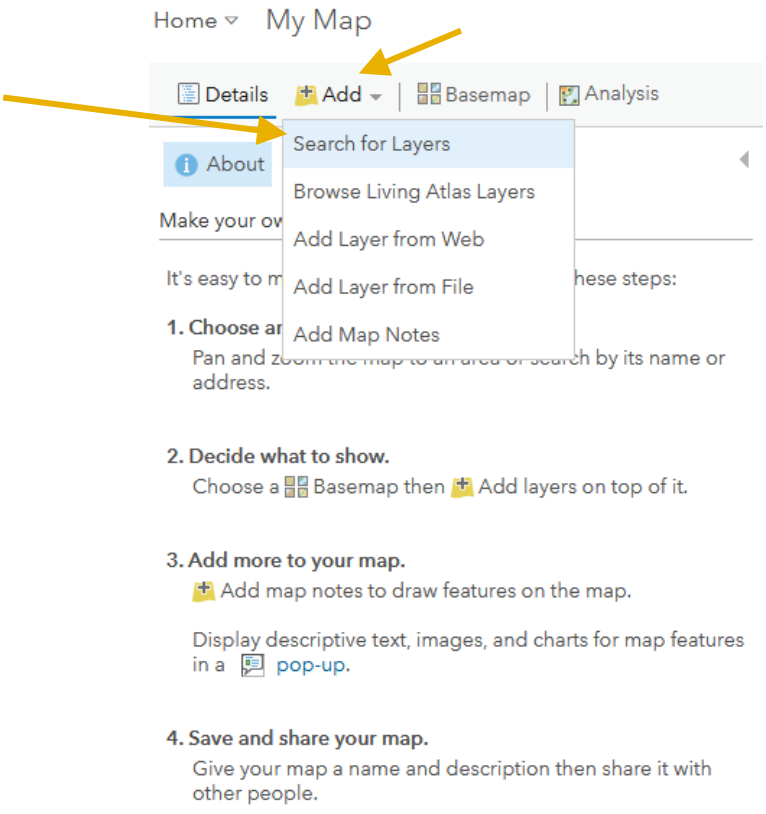
g. Add the 2015 Index of Multiple Deprivation 2015 to your map. This will bring up a map of England which should look like this:



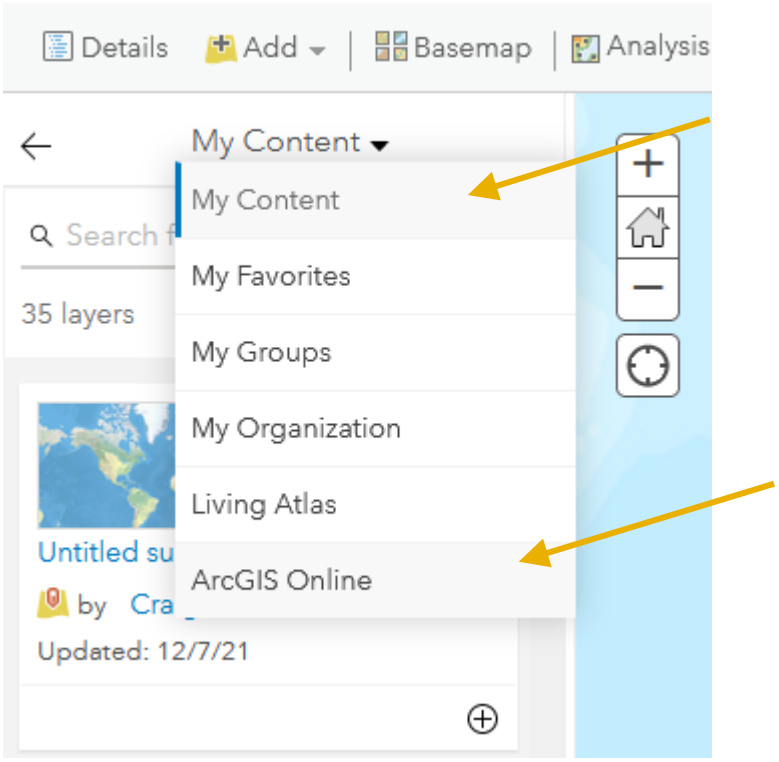
3.2. Adding Data from ArcGIS Online

a. The ArcGIS data catalogue contains datasets uploaded by users of ArcGIS Online. Any user with an ArcGIS Online account can publish to this data source, hence why the overall data quality is generally lower that the data in the Living Atlas. However, you are more likely to find the data you are looking for as with the large number of contributors comes a large range of content.

b. To add data from the ArcGIS data catalogue, click ‘Add’ and then ‘Search for Layers’.

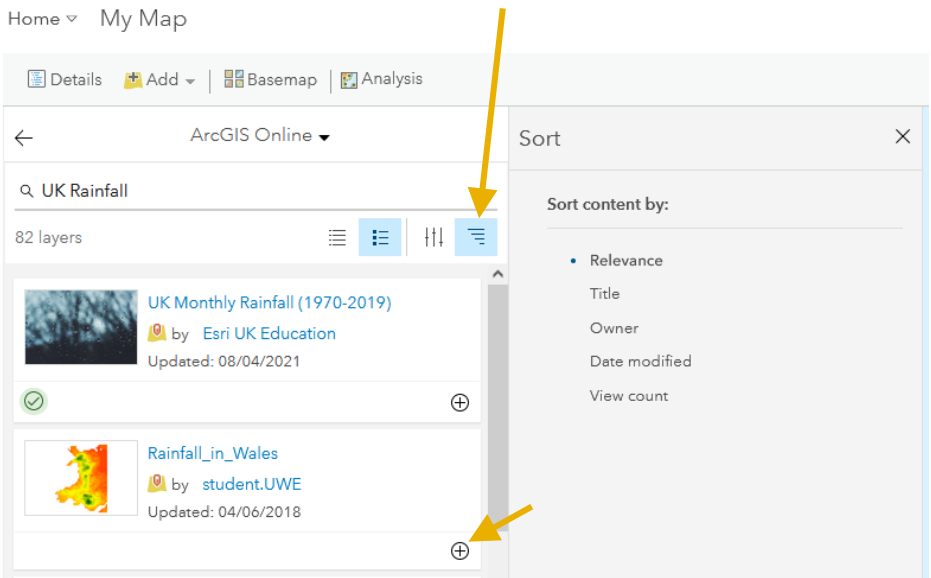


c. Click on 'My Content' and in the following drop-down menu select 'ArcGIS Online'.

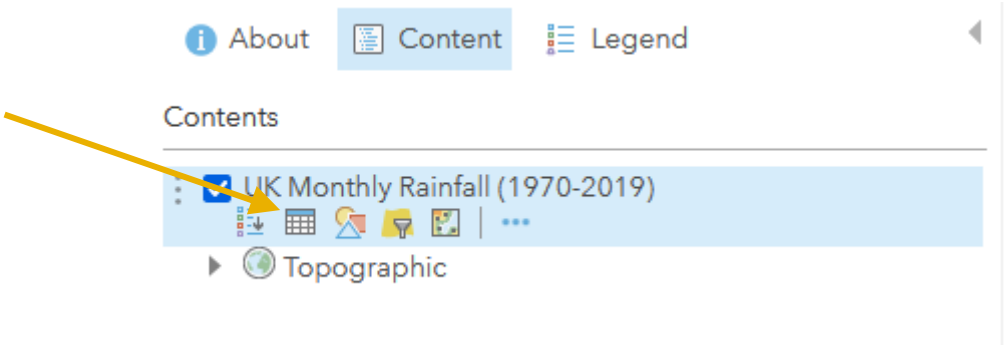


d. Use the search bar to find layers which you are interested in.

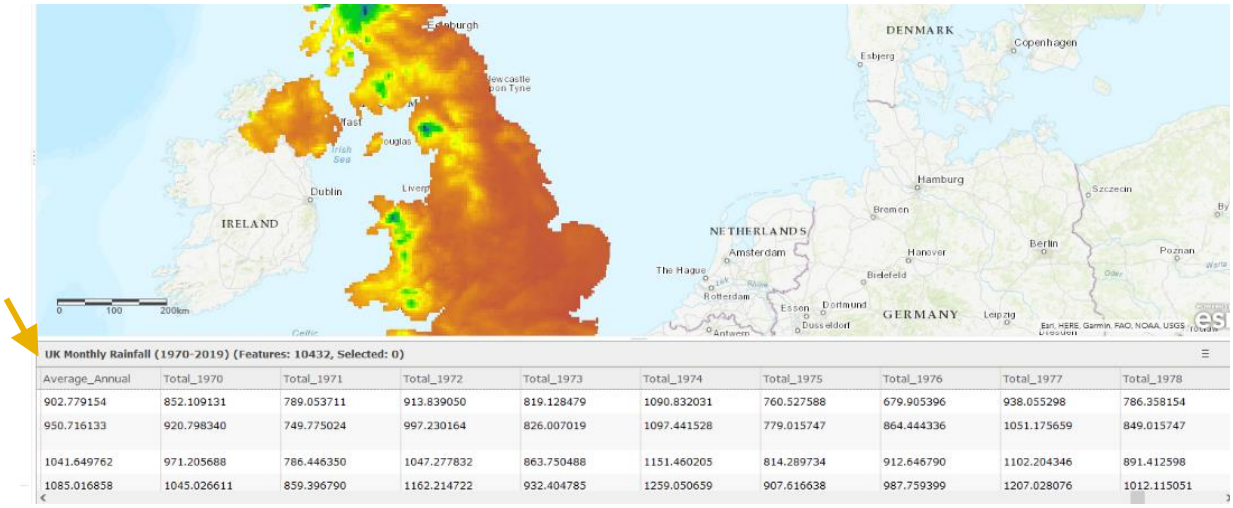
e. To ensure the search results are useful, it is usually preferable to have the content sorted by relevance. This can be chosen using the options under the sort menu, accessible through the last symbol in the opened pane/tab. Use the '+' symbol to add data to the map as previously shown.



f. To get a good idea of what the data in a given layer shows, it is often useful to inspect the attribute table. This is where the information a layer contains can be displayed. This can be views using the 'Show Table' button.



h. This opens the attributes table, where we can scroll through the various categories of data related to the dataset.



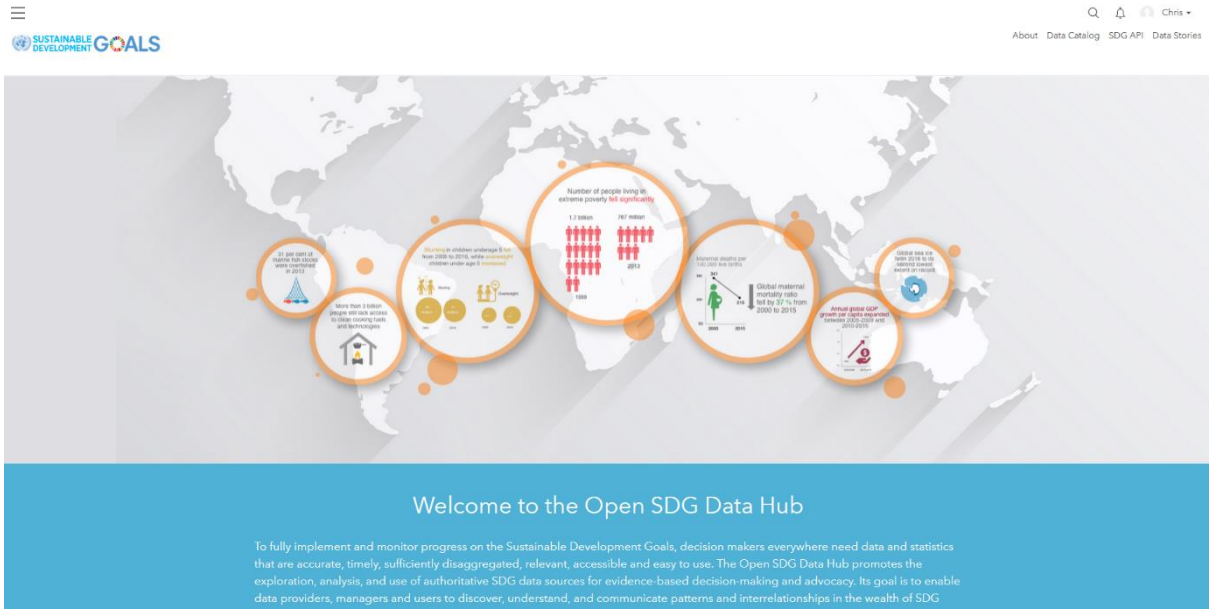
Average_Annual	Total_1970	Total_1971	Total_1972	Total_1973	Total_1974	Total_1975	Total_1976	Total_1977	Total_1978
902.779154	852.109131	789.053711	913.839050	819.128479	1090.832031	760.527588	679.905396	938.055298	786.358154
950.716133	920.798340	749.775024	997.230164	826.007019	1097.441528	779.015747	864.444336	1051.175659	849.015747
1041.649762	971.205688	786.446350	1047.277832	863.750488	1151.460205	814.289734	912.646790	1102.204346	891.412598
1085.016858	1045.026611	859.396790	1162.214722	932.404785	1259.050659	907.616638	987.759399	1207.028076	1012.115051

3.3. Adding Data from Websites

a. Not all data can be found through the ArcGIS Online catalogue or the Living Atlas. Fortunately, there are plenty of open data sources which can be found online. This section will show you how you can add data from other websites. Make sure you keep a tab open with ArcGIS so we can quickly switch between the data source and our map.

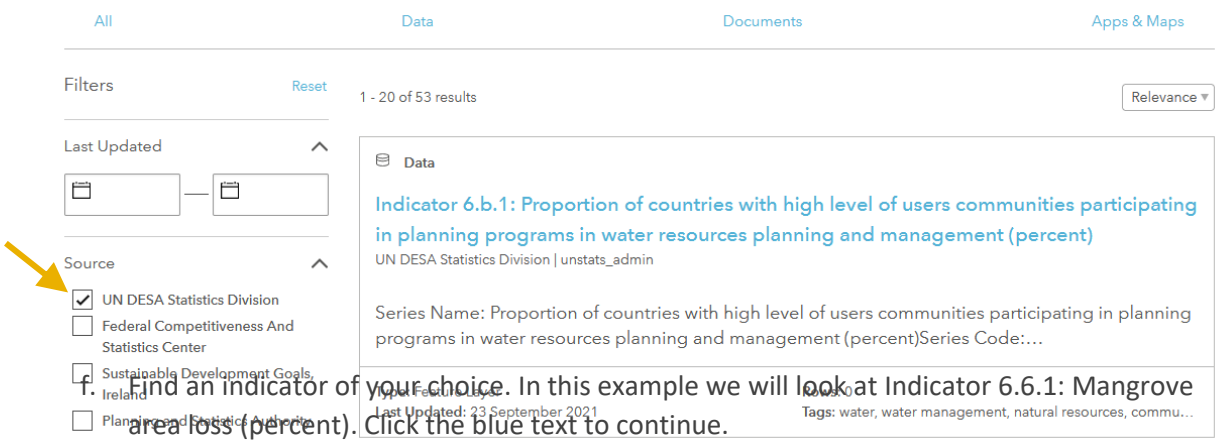
b. In this example, we will show you how to add data about the Sustainable Development Goals.

c. Go to the UN SDG Open Data Hub: https://unstats-undesa.opendata.arcgis.com/. The website will look similar to this:

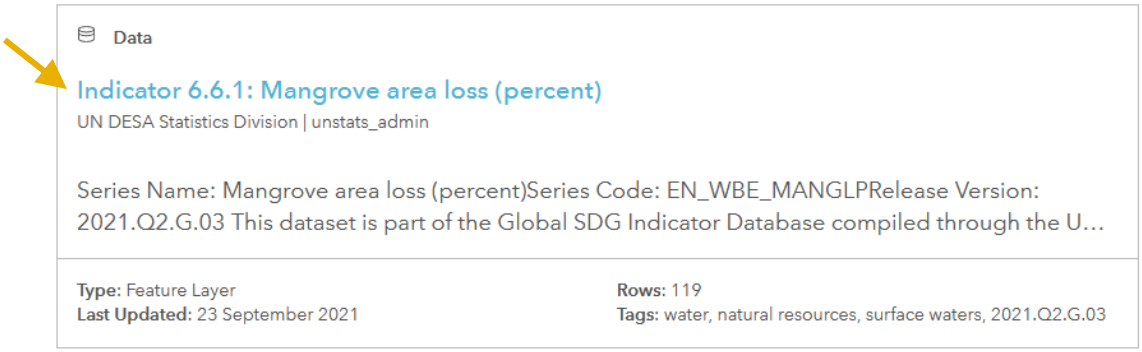


d. Scroll down to find these tiles. For this example, we will be adding data relating to Goal 6: Clean Water and Sanitation. Click the tile:

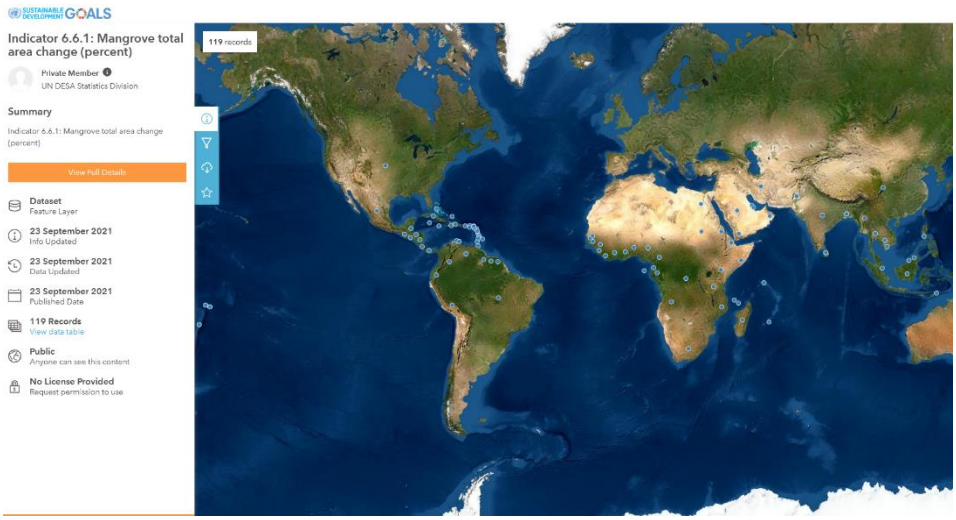
e. This page shows all of the individual indicator datasets. Ensure that the data source is exclusively the UN DESA Statistics Division by checking the box.



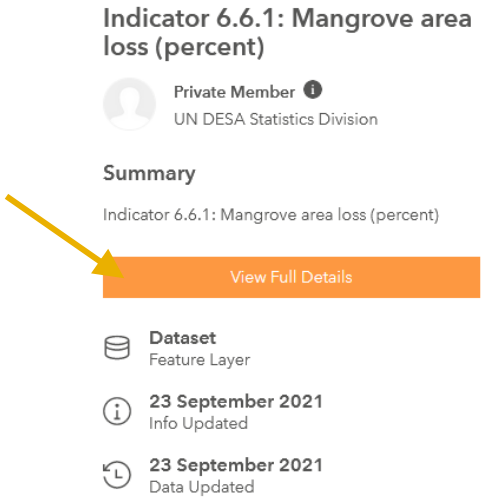
f. Find an indicator of your choice. In this example we will look at Indicator 6.6.1: Mangrove area loss (percent). Click the blue text to continue.



g. This will bring you to a map which should look similar to this:

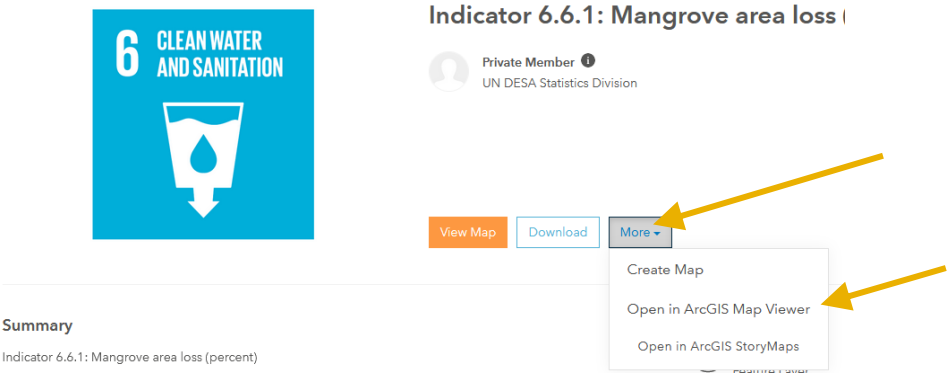


h. Click ‘View Full Details’ from the menu on the sidebar:

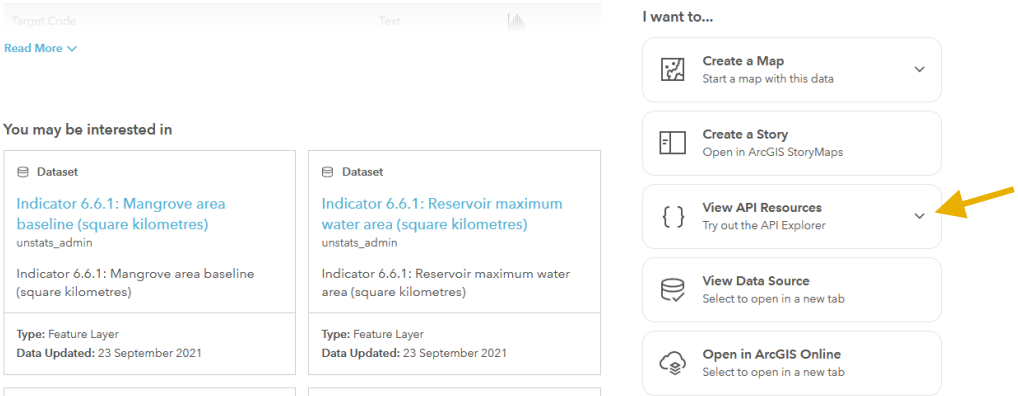


i. On the following page we have several options we can take to load this data into an ArcGIS Online map. We will explore several methods, as not every website will have the same level of flexibility for data sharing as the UN SDG Data hub.

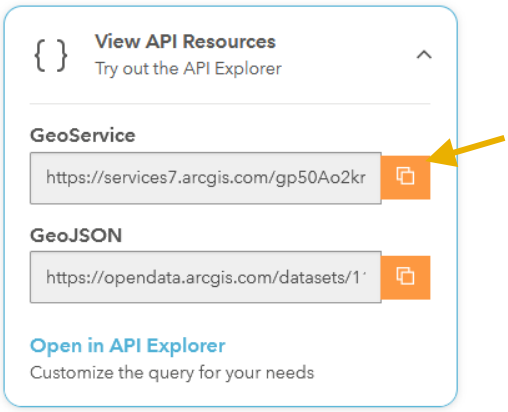
j. The easiest method to add data is using the ‘More’ button and clicking ‘Open in ArcGIS Map Viewer’.



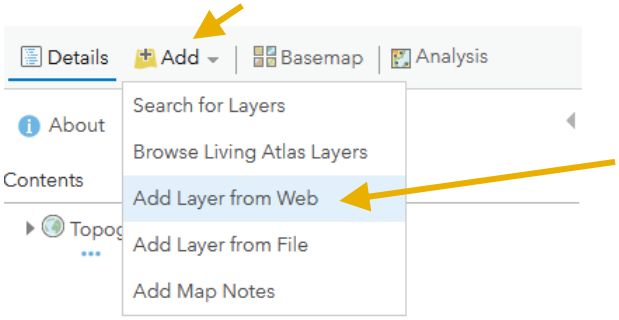
k. Another method is to connect the data via a GeoService link. Scroll down the page to find ‘View API Resources’.



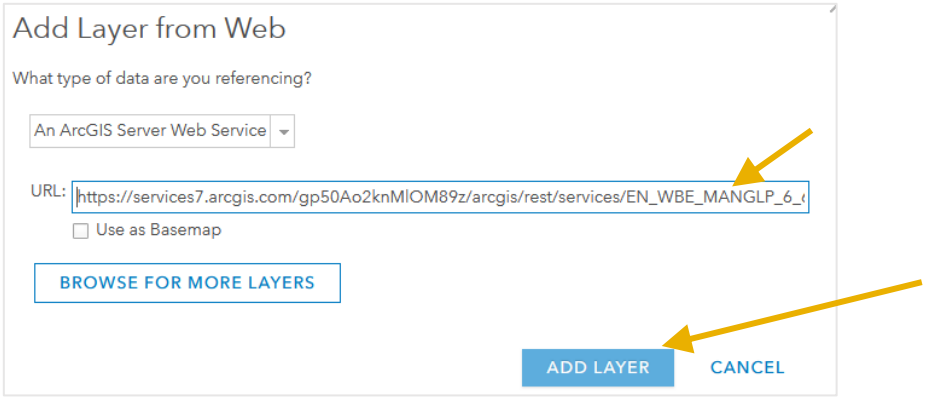
l. Click the button to expand, and then copy the GeoService link.



m. Now back on ArcGIS Online, select the 'Add' tab, and click 'Add Layer from Web'.



n. Paste the link you copied into the URL box, and then click 'Add Layer'. This will add the data to your map.

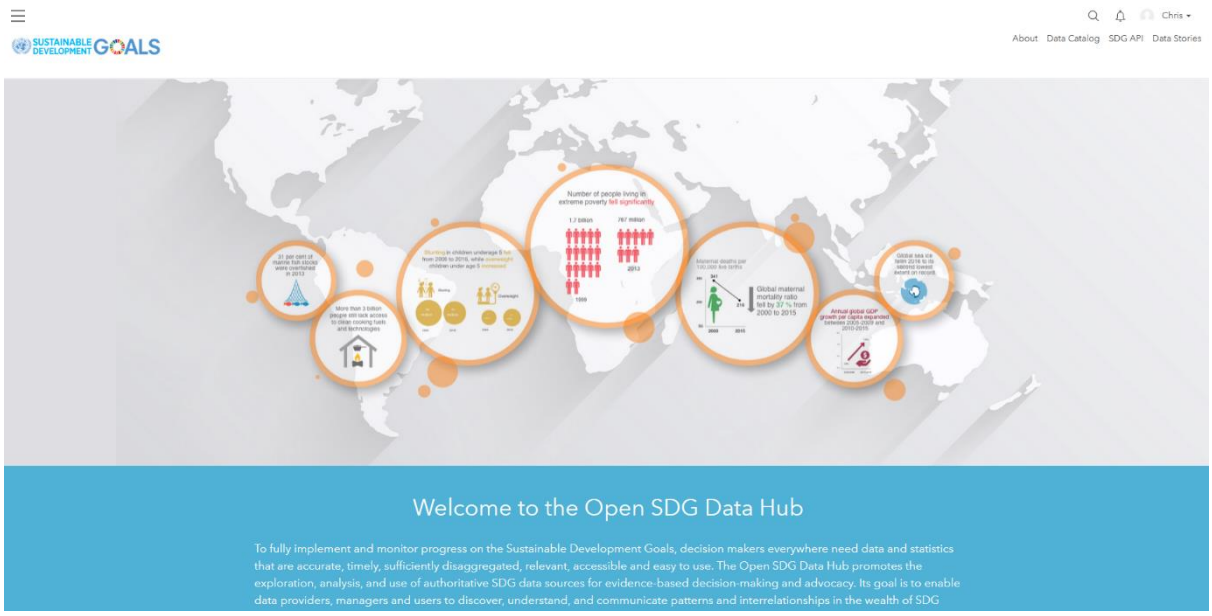


When using any of the options presented here to add data from the web to your map, the data is linked directly to the host website. This still allows you to style the data as you like. However, if the website moves, or the data is removed by the data owners, you will lose the data from your map without warning – this is unlikely to happen often, but is worth checking prior to using the map with an audience!

3.4. Adding Data from A File

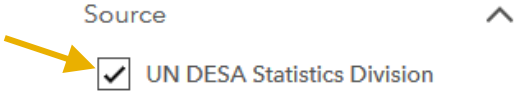
a. The final common method of getting data is to upload the data from a file. We will again use the UN SDG Open Datahub for this example, however many sites will have CSV files or shapefiles (a common GIS data type) available for download.

b. Go to the UN SDG Open Data Hub: https://unstats-undesa.opendata.arcgis.com/. The website will look similar to this:

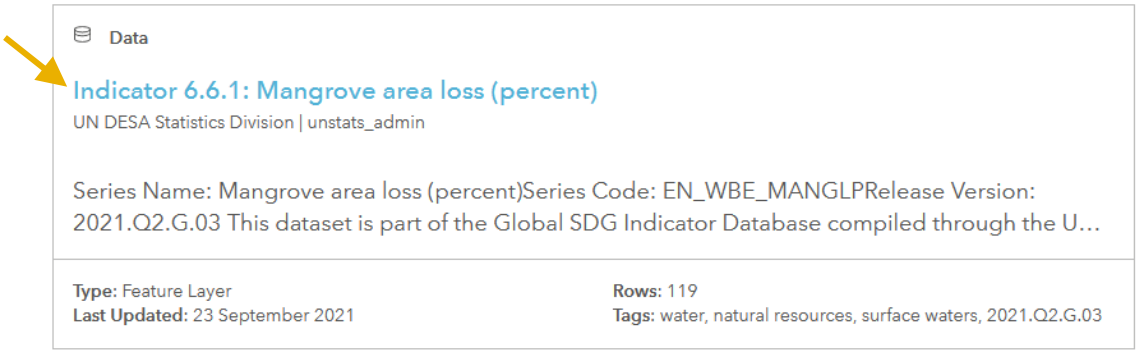


c. Scroll down to find these tiles. For this example, we will be adding data relating to Goal 6: Clean Water and Sanitation. Click the tile:

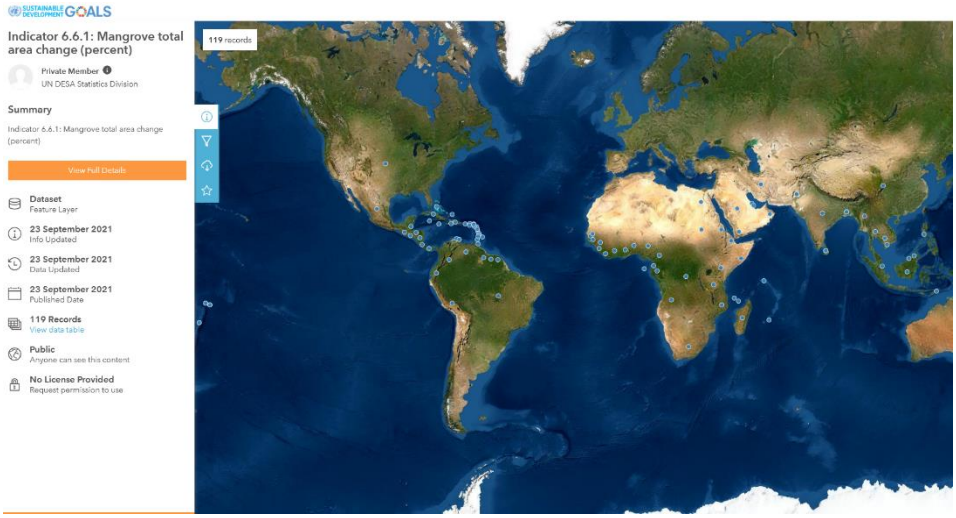
d. This page shows all of the individual indicator datasets. Ensure that the data source is exclusively the UN DESA Statistics Division by checking the box.



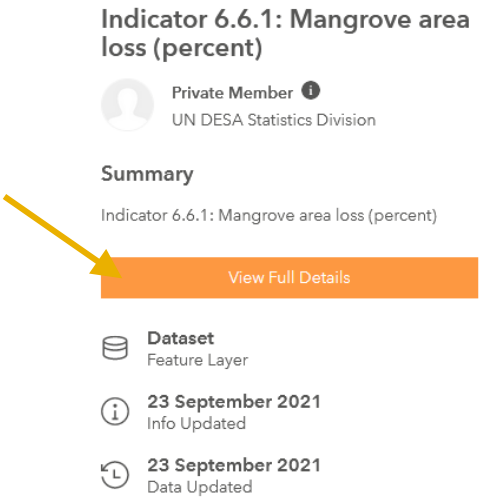
e. Choose an indicator to investigate. In this example, we will use Indicator 6.6.1: Mangrove Area Loss (percent) again. Click the blue text to continue.



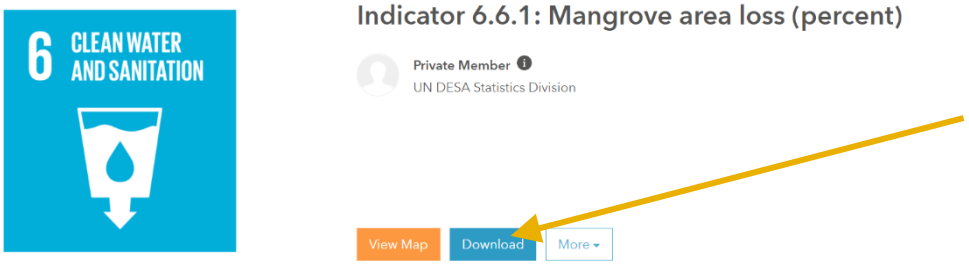
f. This will bring you to a map which should look similar to this:



g. Click 'View Full Details' from the menu on the sidebar:



h. Navigate to the data summary page again and click ‘Download’.



i. This will now show a selection of methods to download the data. Two of the most common file types to find when searching online are CSV files and Shapefiles. You can download either. Save them to an appropriate folder on your computer.

Shapefile:

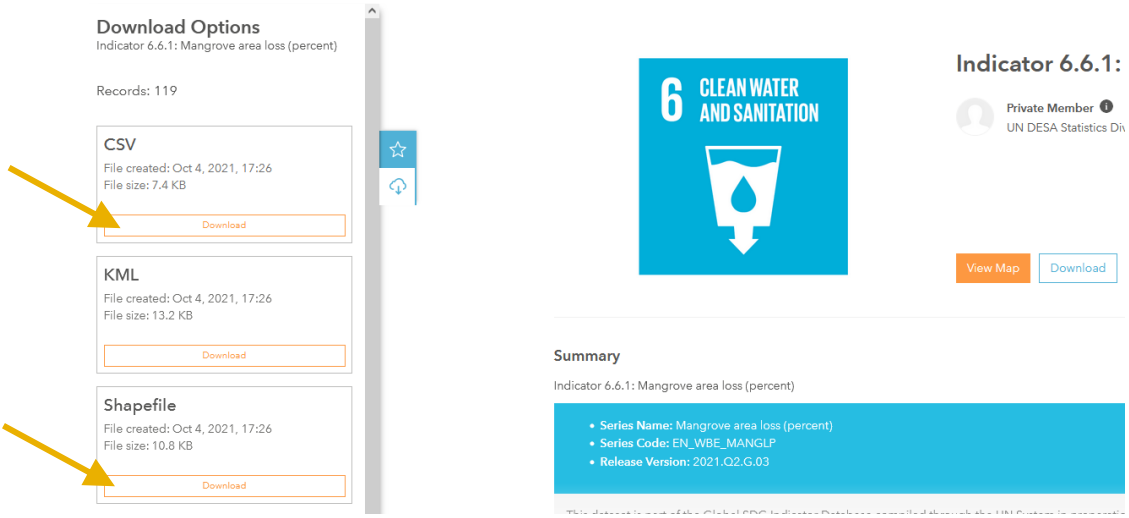
A file type for spatial data which contains the data as well as the location and can be loaded directly onto a map in GIS tools.

CSV:

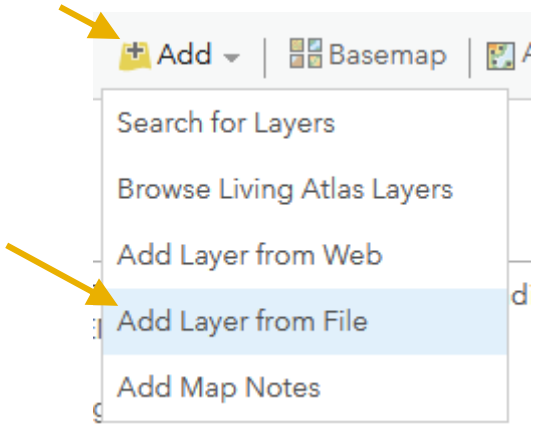
A CSV (comma separated values) file stores data in text format. To load onto a map extra steps are required to convert location values (coordinates) so the data draws onto the amp.

Other datatypes:

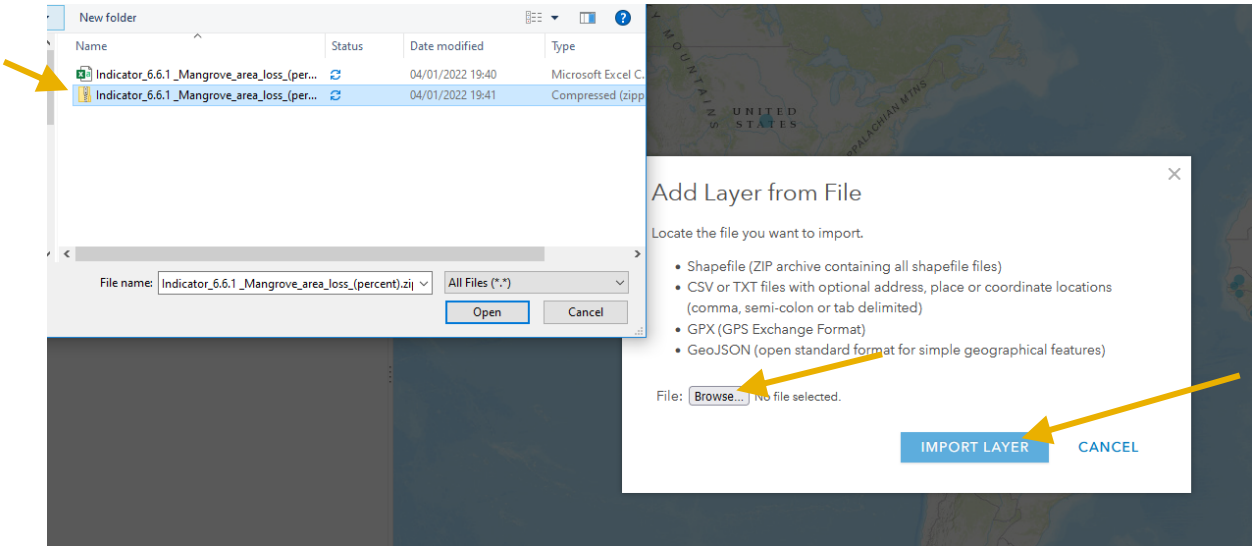
There are many other file types used for spatial data which you may come across, including GeoPackages , KML and GeoJSON. Images will often be stored in formats such PNG and GeoTIFF, the later including the location of the image so maps easily.



j. Back in ArcGIS Online, select ‘Add’ and ‘Add Layer from File’.



k. Select ‘Browse’ and find the file you downloaded. Then click ‘Open’, and ‘Import Layer’.



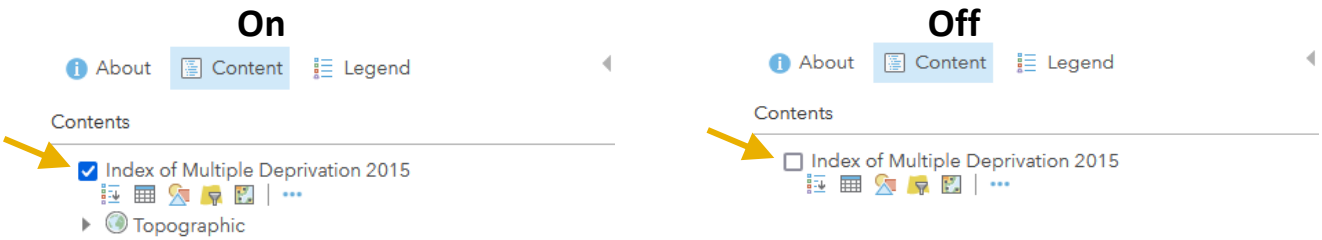
l. Your data will now have been added to the map.

Section 4: Manipulating Layers

This section will demonstrate how we can change what is displayed on the map, and how the visualisation of layers can be edited. We will use the Index of Multiple Deprivation layer from the previous section throughout this example – for instructions on how to add this see section 3.

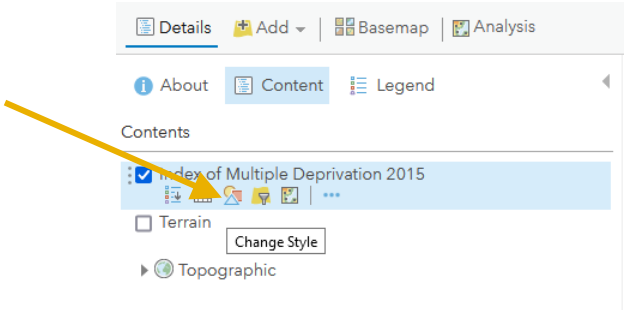
4.1. Viewing Layers

a. We can view layers by turning them 'on' and 'off'. To do this, tick or untick the box in the Contents section which corresponds to the layer you want to view or not view.

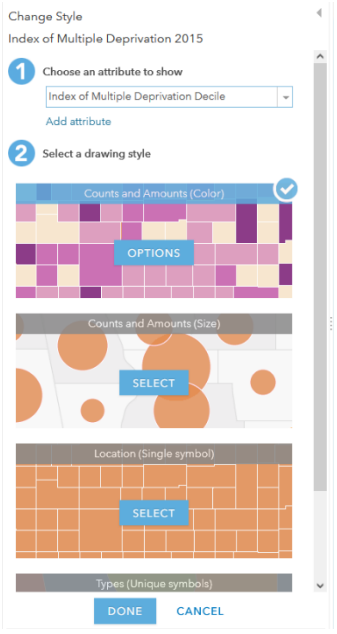


4.2. Changing Symbology

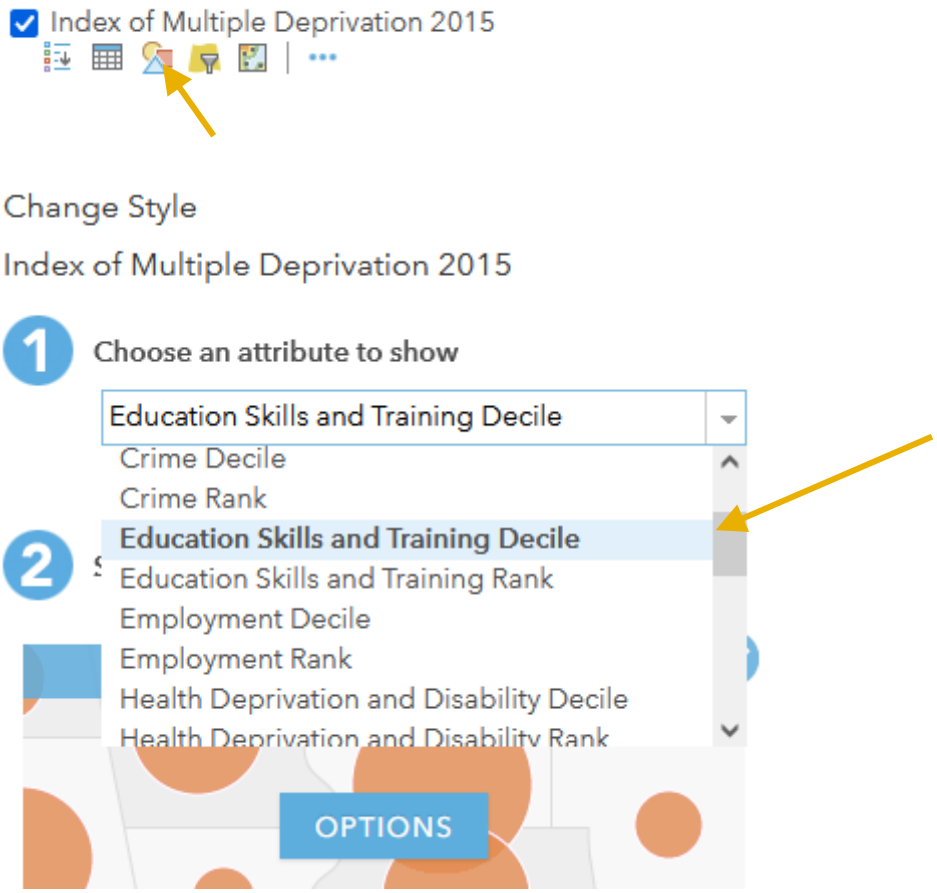
a. To change the visual style of the layer, click on the 'Change Style' symbol.



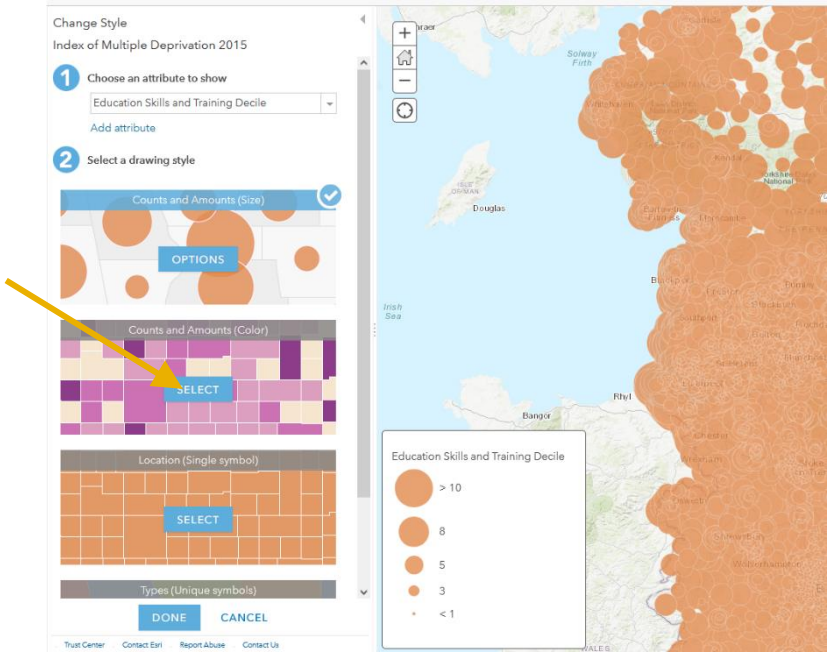
b. This will open the symbology menu. Here we can change what type of data is displayed and how that data is represented through the drawing style.



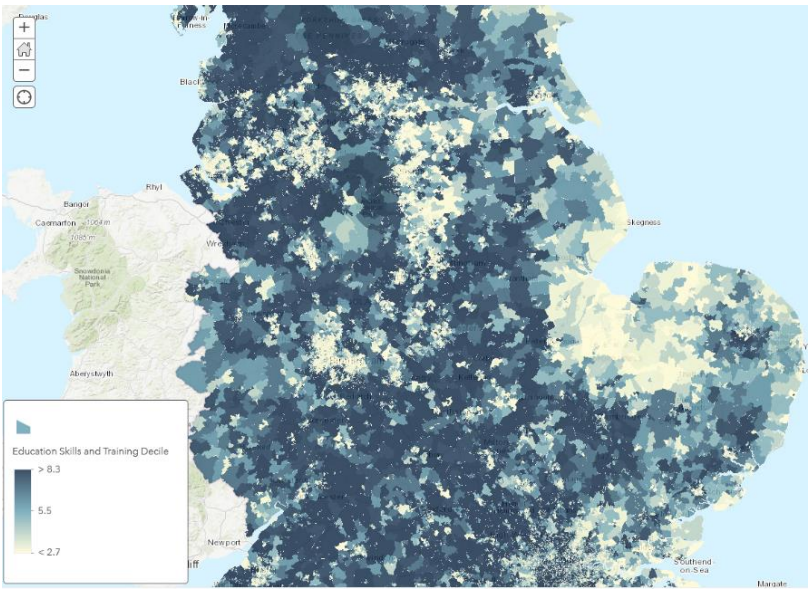
c. First, let's change what type of data the map is showing. From the drop-down list, choose a new attribute to display. For this example, we have chosen to use 'Education Skills and Training Decile' from the 'Index of Multiple Deprivation 2015'.



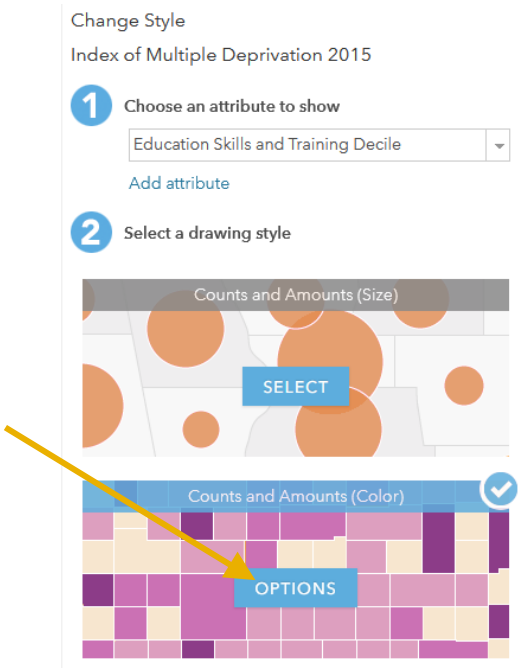
d. The new attribute will automatically be drawn as proportional circles. To change this to a more traditional symbology, click 'Counts and Amounts'.



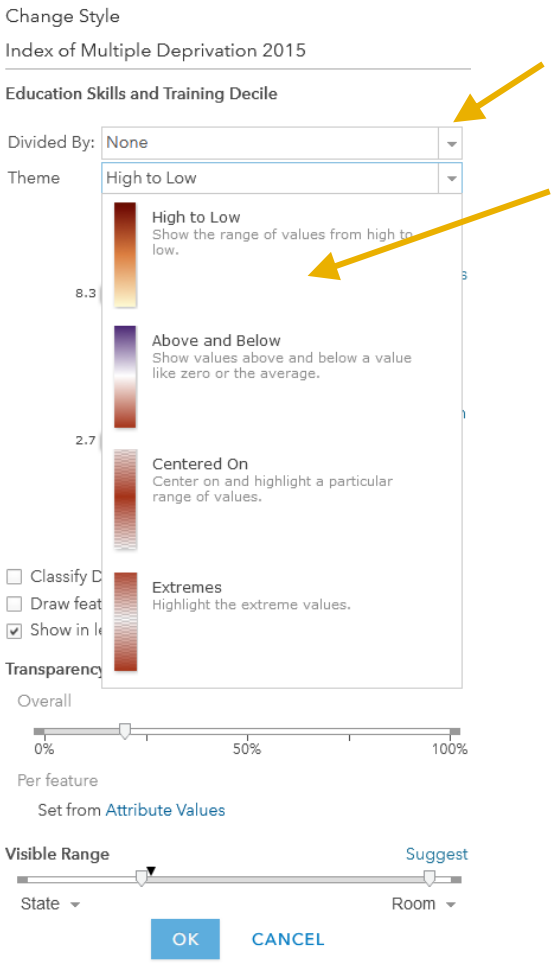
e. This redraws the map to look something like this:



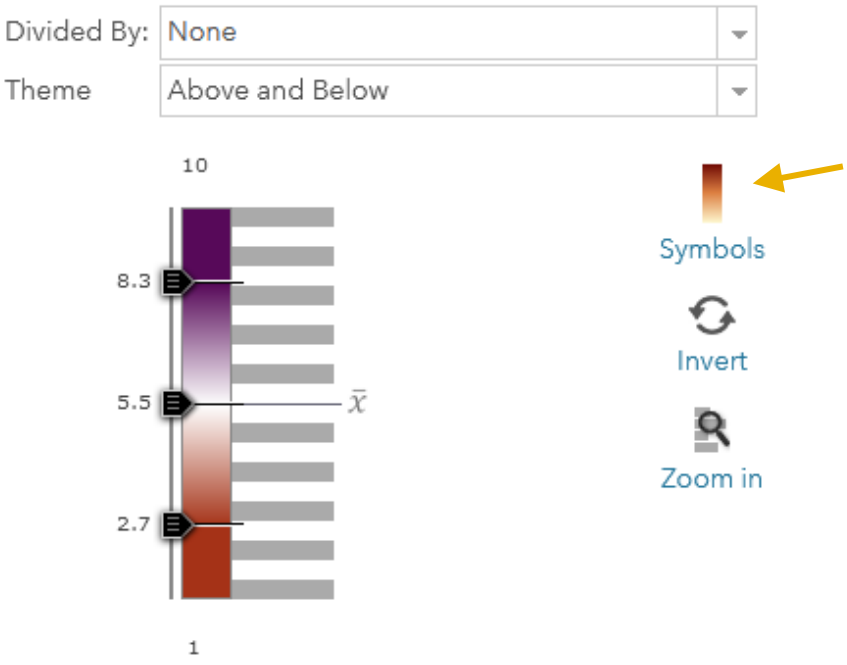
f. We can change the colours of this new representation to better demonstrate the differences. To do this, select 'Options' under 'Counts and Amounts' in the symbology menu.



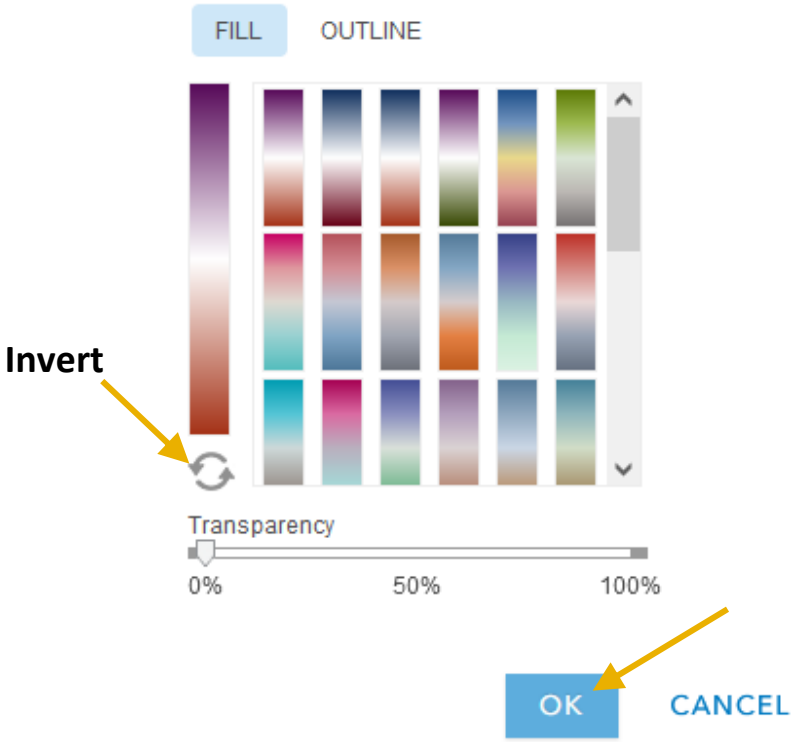
g. This brings up the 'Change Style' menu. This allows a high level of customisation of the map. First, we will set the theme to 'Above and Below' so that we can view relative 'hot' and 'cold' spots on the map.



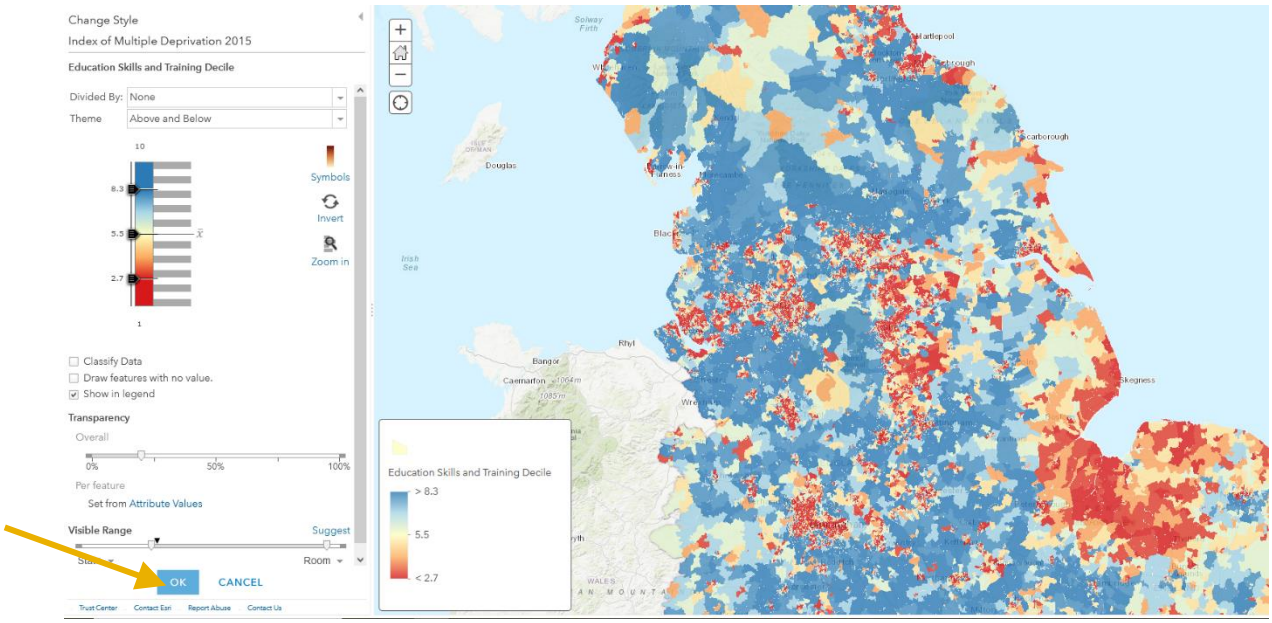
h. We can set the colours to something other than purple and red. To do this, select 'Symbols'.



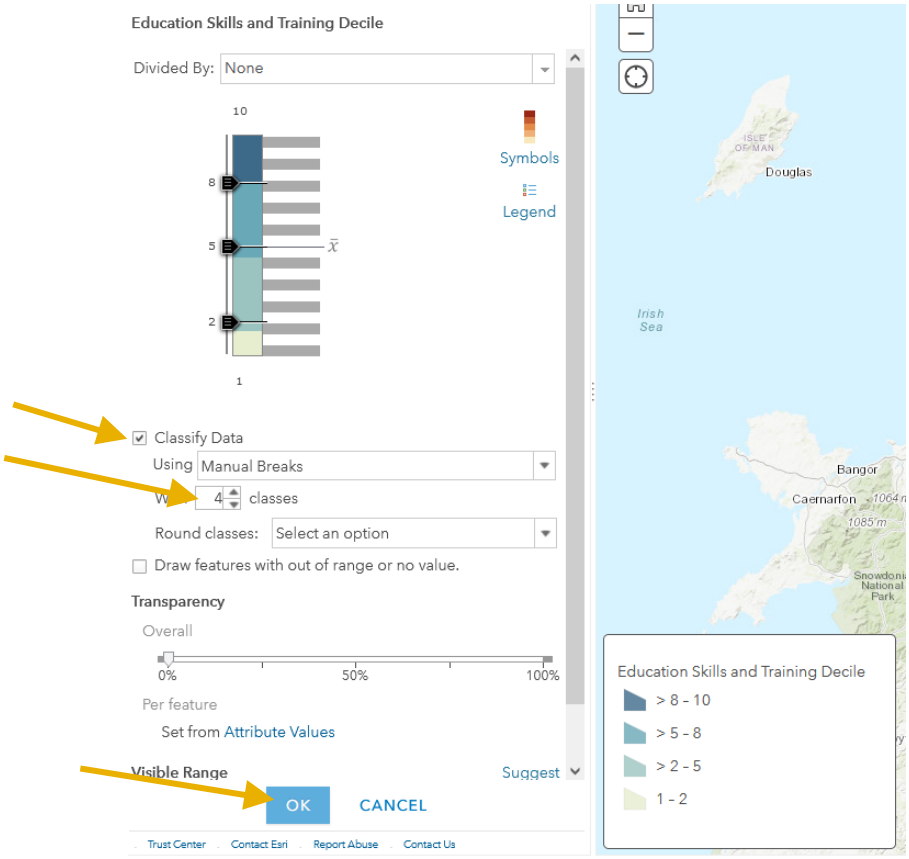
i. This will bring up a menu of colour ramps from which we can choose. We can also invert any colour ramps with this toggle. Click on a colour scheme you like and then click 'OK'.



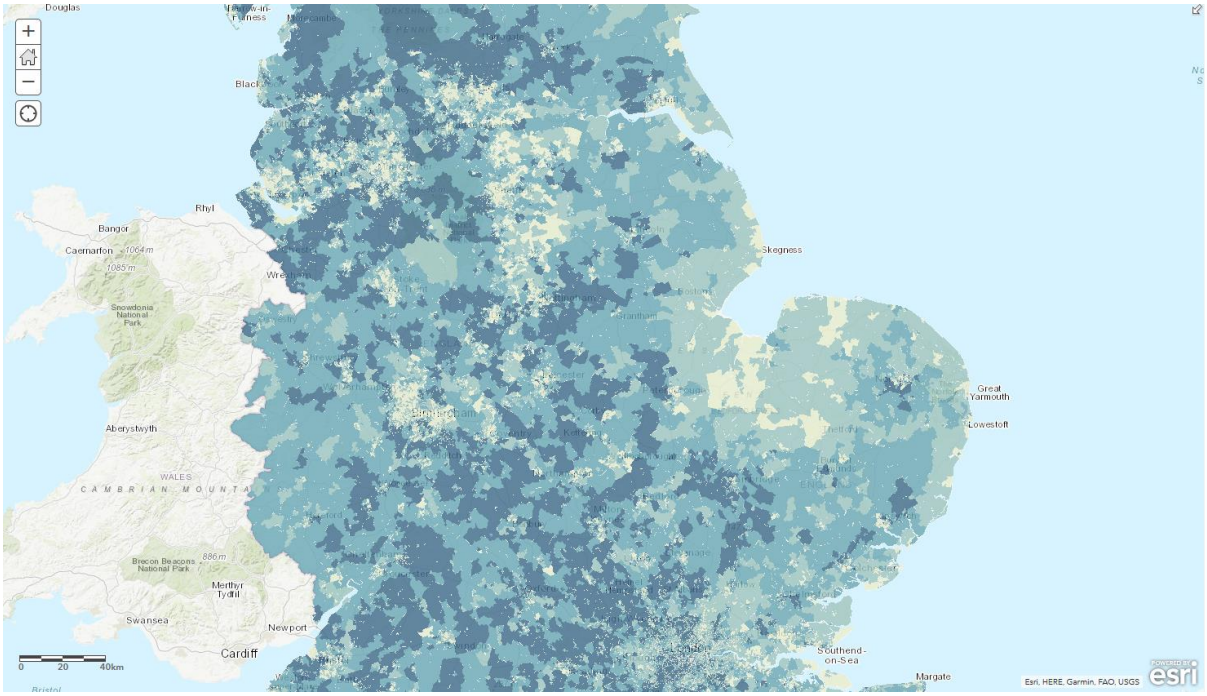
j. Once you a happy with the visualisation, click 'OK' at the bottom of the Style menu to save the symbology to the map.



k. You may want to group the data into classes. To do this, in the 'Change Style' menu, we can choose 'Classify Data'. This will split the data in a number of bands (which we can determine). We can also determine how the data is split. We can split the dataset into quarters by using four classes, as shown below:



l. The data will look something similar to this map which has been split.

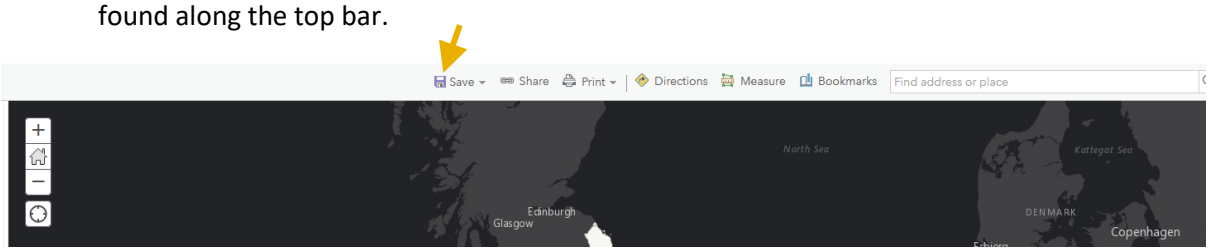


Section 5: Saving and Sharing Maps

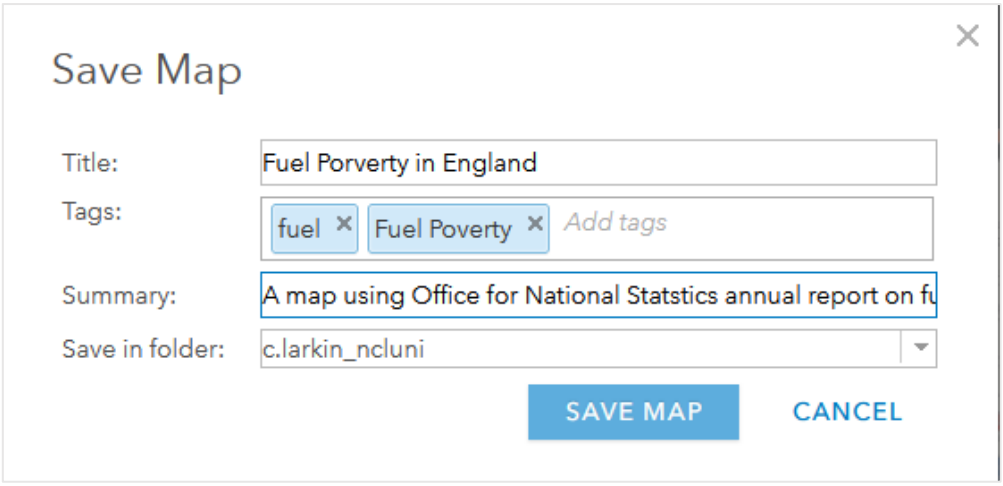
So far, we have covered how get the data we need into a map, and how we can change how this data looks. This section will cover how we can save the map and then share it.

5.1. Saving Your Map

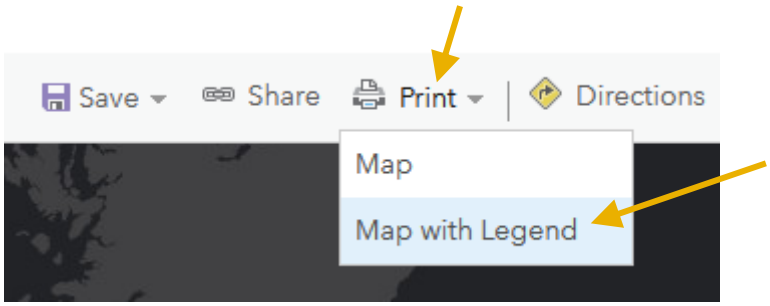
a. Once you are happy with your map, saving and sharing is simple. The save function can be found along the top bar.



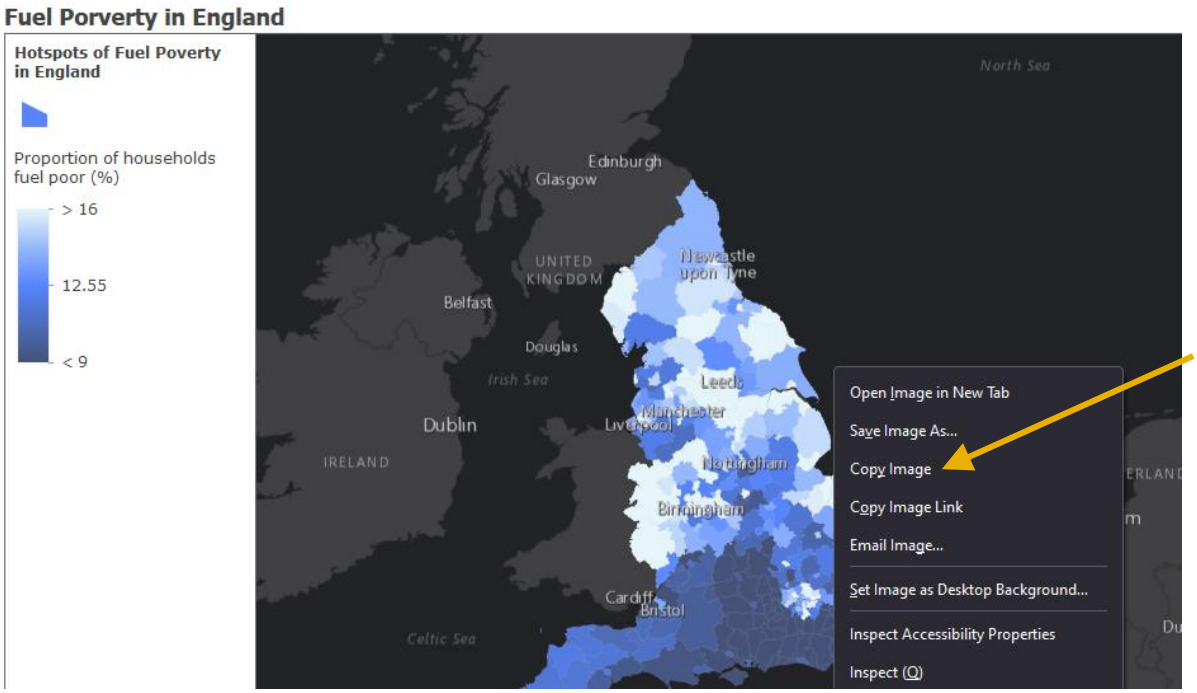
b. This will allow you to save the map in its current state (including symbology and current level of zoom).



c. You can download the map as an image using the 'Print' function. You can choose to save the map as either a standalone map or with a legend.

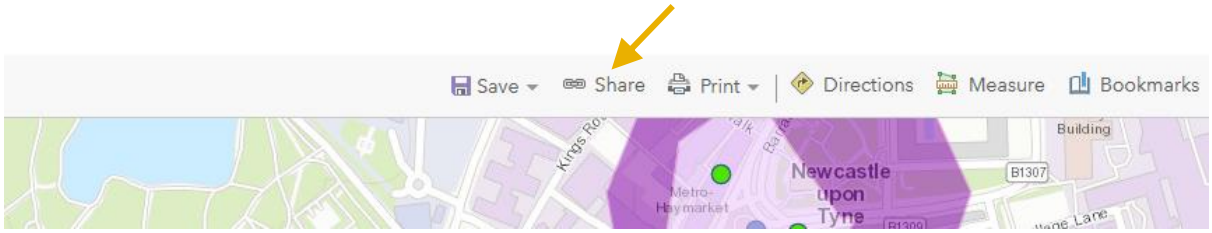


d. Once loaded, you can simply right click the map and copy it to move it into a Word document or PowerPoint presentation.

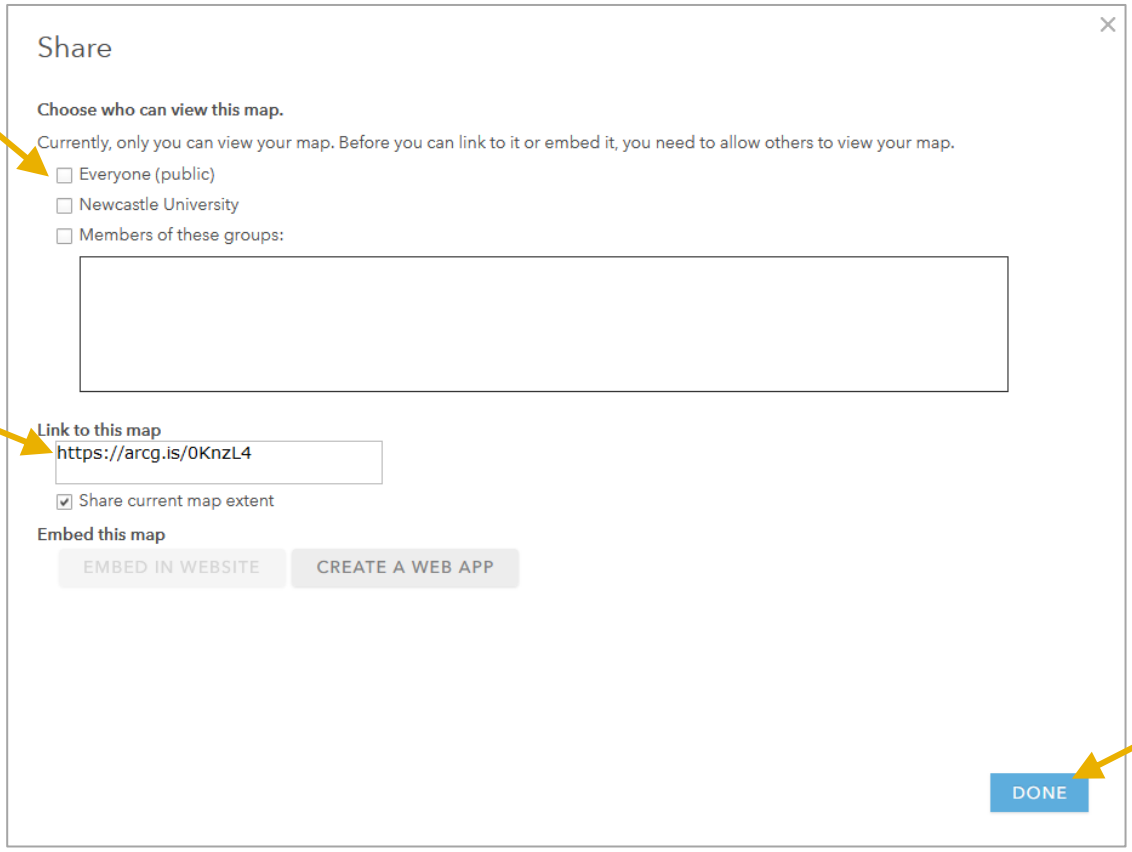


5.2. Sharing Your Map

a. You can also share your maps as a web link, which will allow students to interact with your map. To do this, you can use the “Share” function. Click the Share button from the top ribbon:



b. This brings up the sharing menu. From here you can choose who to share the map with. If your school has ArcGIS accounts for your students, it is recommended to share only with your institution. However, you can also share with the general public (everyone).



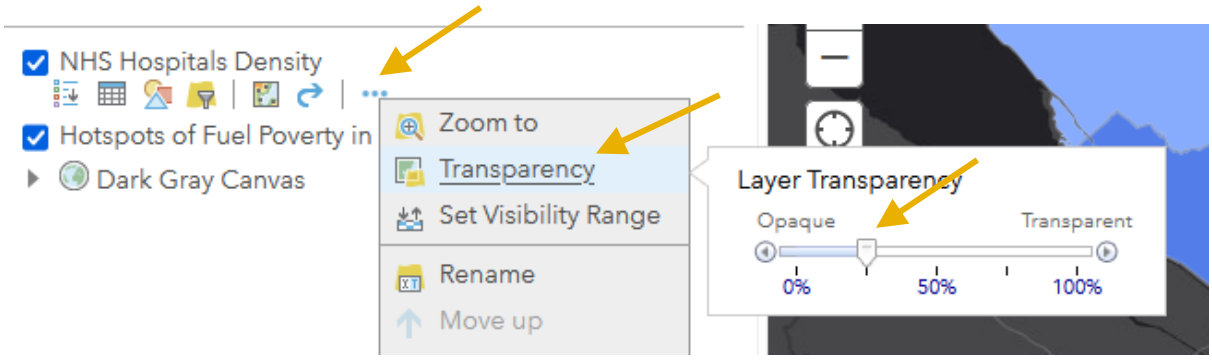
c. Copy the link to the map to share directly with students and other users. Once completed click 'Done'.

Section 6: Tips and Tricks

This section includes a few hints for any future activities you may want to make a map for.

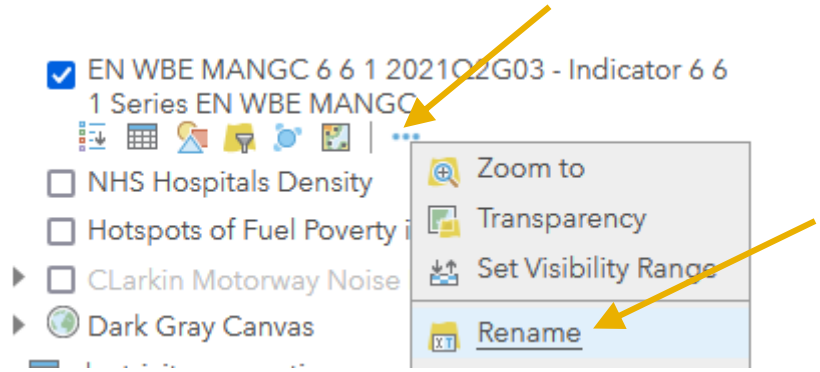
6.1. Multiple Layers

a. Your layer isn't showing up? It could be that the layer you want to view is hidden below another.
b. When using multiple layers, the order in which the layers are drawn on the map can be altered by dragging the layers above or below each other in the 'Content' menu to change which layer as priority. Those towards the bottom will be drawn first, with those at the top drawn above those below.
c. It can also be useful to make layers slightly transparent, so the layer below can be seen. You can make layers transparent by clicking on the three dots, then on 'Transparency'. Use the slider to adjust what level of transparency you wish.



6.2. Confusing Names

a. Data often comes with long and confusing names. You can rename layers to make maps easier to understand.
b. Click on the layer you want to rename, and then through the menu brought up by the button on the far right choose 'Rename'.



Section 7: Summary

This document has guided you through the basics of making maps in ArcGIS Online for use in the classroom.

You will now be able to access ArcGIS Online and create your own map. You will also be able to add datasets from various sources to your map, e.g., Living Atlas, ArcGIS Online, websites and files. You should also be able to manipulate the layers to change symbology, change colour scheme and classify data. This document also provides instruction on how to save and share your completed map.

If you wish to complete further map analysis with ArcGIS Online, please try our other exercises available on the Resources page of the Geospatial UK website. Each activity teaches you a new GIS skill, so try them all to improve your GIS proficiency.

When searching for data online, often the best sources of data are Government organisations, particularly for shapefiles.

- British Geological Survey
- Data.Gov.uk – Find Open Data

This concludes the exercise.

Geospatial UK

This activity was created by Newcastle University on behalf of Geospatial UK.

For more resources or activities, visit

www.geospatialuk.org

Newcastle University