

# Analyzing Nepal earthquake epicenters



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# Lesson Overview

The [Nepal Earthquake Epicenters map](#) shows epicenters of the earthquakes that occurred in and around Nepal. The year of the earthquake, its epicenter, and its magnitude can be viewed by clicking the points on the map. The points are also symbolized by the magnitude of the earthquake. The district divisions can be seen on the map as outlines. In this lesson you will see how the data can be displayed differently by changing the symbolization of the map, which will allow the viewer to visualize and observe even more information.

The [United Nations Disaster Assessment and Coordination \(UNDAC\)](#) team members need an emergency response system map to respond to the Nepal earthquake. They have seen the original Nepal Earthquake Epicenters map and are impressed. However, for their immediate need, they have asked that the map be altered to show the following:

- The epicenters of the 2015 earthquakes must be seen at all scales
- All 75 districts should be shown by population density
- All recorded earthquakes with a magnitude of 5 and above should be shown. On the Richter scale, earthquakes above 5 can be felt by everyone and can cause slight damage to all buildings.

## Builds skills in

- Opening and modifying an existing online map
- Changing transparency
- Changing style to unique values
- Change style to Counts and Amounts
- Changing size and color of symbols

## Software Requirements

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

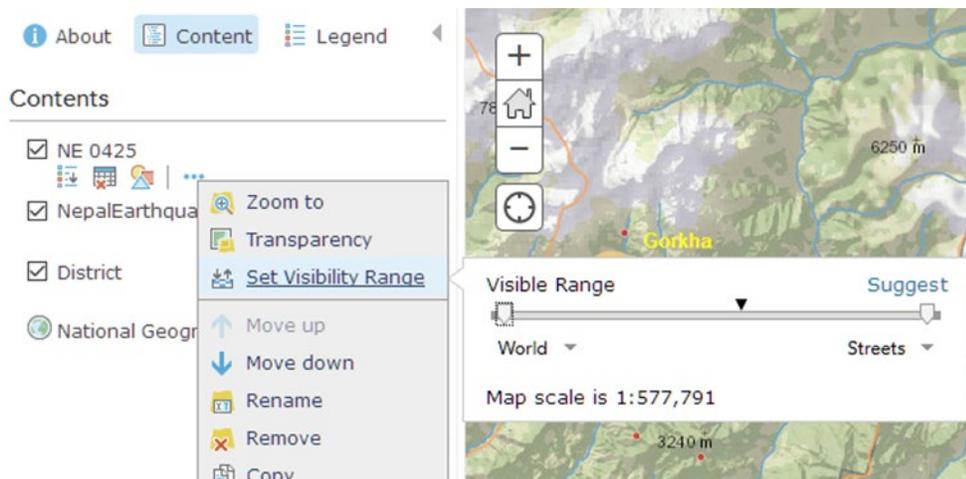
## Estimated Time

- Under 30 minutes

# Exercise

## Step 1: Map population in Nepal

1. Go to the [Nepal Earthquake Epicenters map](#).
2. At the top of the page, Click **Sign In** and sign into your ArcGIS account.
3. On the side panel, click **Content**.
4. On the ribbon, click **Save** and **Save As**.
5. Add the appropriate documentation and click **Save Map**.
6. Zoom in and out on the map and observe that the Nepal Earthquake 2015 layer appears and disappeared according to the scale of the map. The [UNDAC](#) always wants this layer visible. This layer shows the epicenters of the earthquakes.
7. Click the three dots at the end of the **NE 0425** layer and click **Set Visibility Range**.
8. Move the slider to the left until the label says **World**. This makes this layer visible at all scales.



9. In the search bar, type *Nepal* and press Enter.

The map zooms to the extent of Nepal and displays the country's 75 districts. All of the districts are drawn in the same way, with orange outlines. This means they are classified on the map as location only. When you classify or style data, you have many options. The Change Style menu is your gateway to changing the look of your data.

10. Under the **District** layer, click **Change Style**.



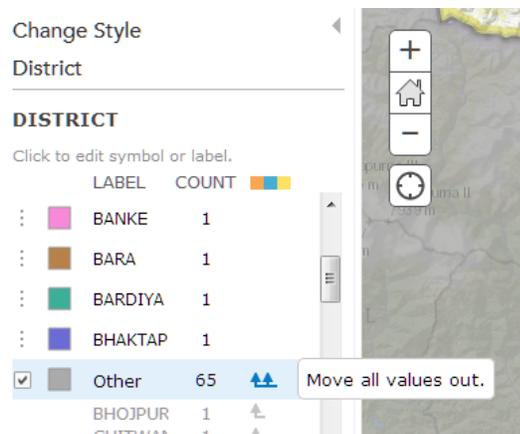
The individual districts can be seen more distinctly if you choose DISTRICT as the attribute. A single symbol will give you a unique symbolization by the district name.



All districts are not displayed in a unique color on the map.

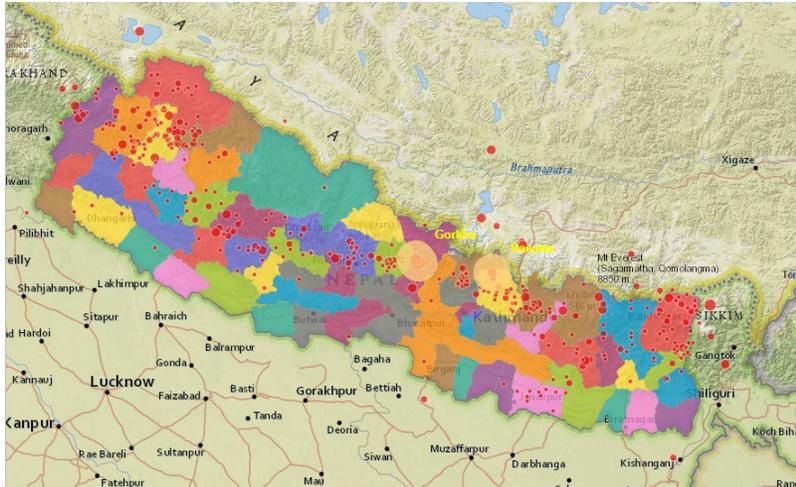
11. On **Types (Unique symbols)**, click **Options**.

12. Scroll down and click the double arrow button next to the gray **Other** symbol class.



Now all the districts are displayed on the map and in the Contents pane as unique values. It is now much easier to see the unique districts.

13. Click **OK** and click **Done**.



You have displayed the districts by a unique value, using the District name field; however, the UNDAC wants the districts displayed by population. Seeing the districts displayed in a choropleth map by population would provide the responders with information about districts that would need the most resources during an earthquake. Numeric data can be displayed with counts and colors that display the features on the map as a color gradient.

14. Point to **District** and click **Change Style**.

15. For **Choose an attribute to show**, choose **POP\_91**. Notice that the display changes from unique symbology for each district to a range of colors representing the population. Darker colors mean a higher population and lighter colors mean a lower population.

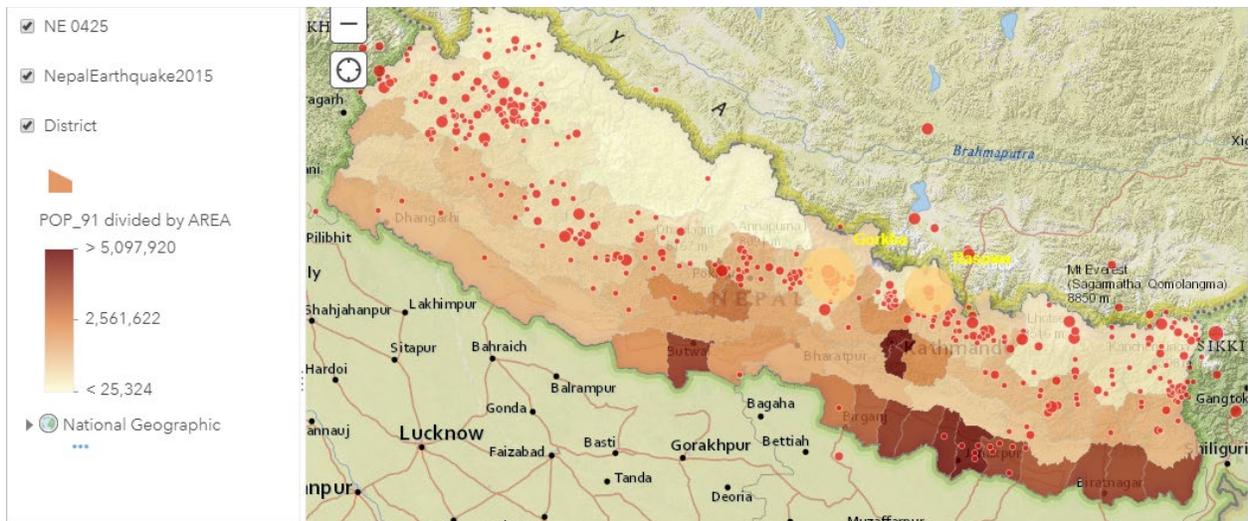
Because the districts are all different sizes, this map would make more sense if it mapped population *density* instead of population totals. The same number of people in a small space has a higher density than in a large space.

16. On **Counts and Amounts (Color)** click **Options**.

17. For **Divided By**, choose **AREA**.

18. Click **OK** and click **Done**.

19. Point to the **District** layer and click the **Show Legend** button.



Q1. Write a brief explanation of how the legend helps you understand the map.

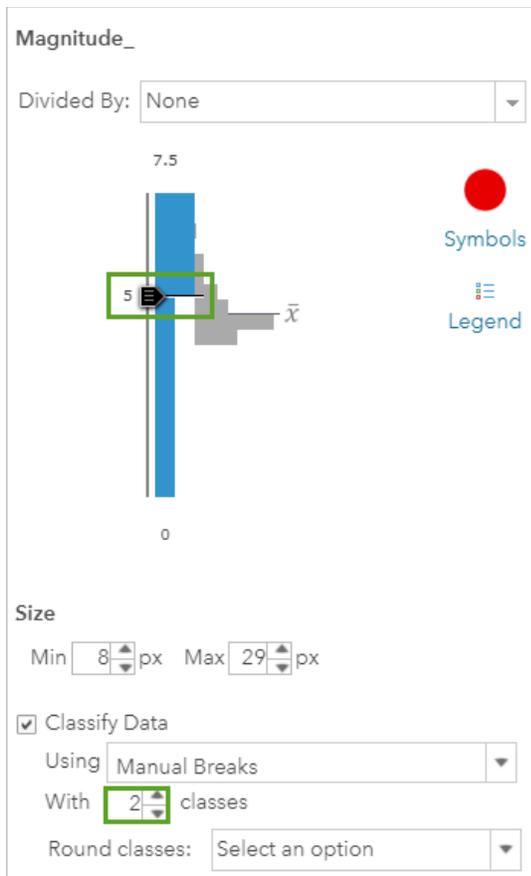
A1. \_\_\_\_\_

Q2. What does the legend show about the population?

A2. \_\_\_\_\_

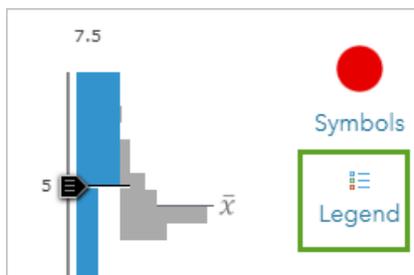
## Step 2: Map earthquakes

1. Point to the **NepalEarthquakes2015** layer and click **Change Style**.
2. **Choose an attribute to show** is already set to **Magnitude\_**. For **Counts and Amounts (Size)**, click **Options**.
3. Change the number of classes to **2**.
4. Move the slider to **5**.



This shows values 0 to 5 in one class and values higher than 5 in another class.

5. Click **Legend**. (You may need to expand the pane to see the Legend button.)

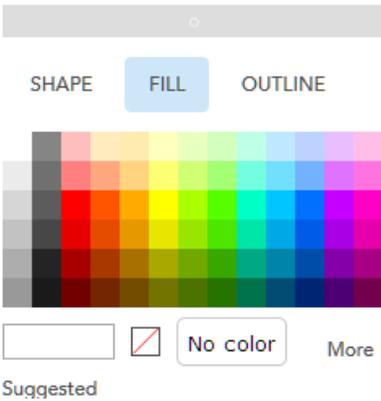


6. On the legend, click the symbol next to **0 – 5**.

7. Click **Fill** and choose **No color**.

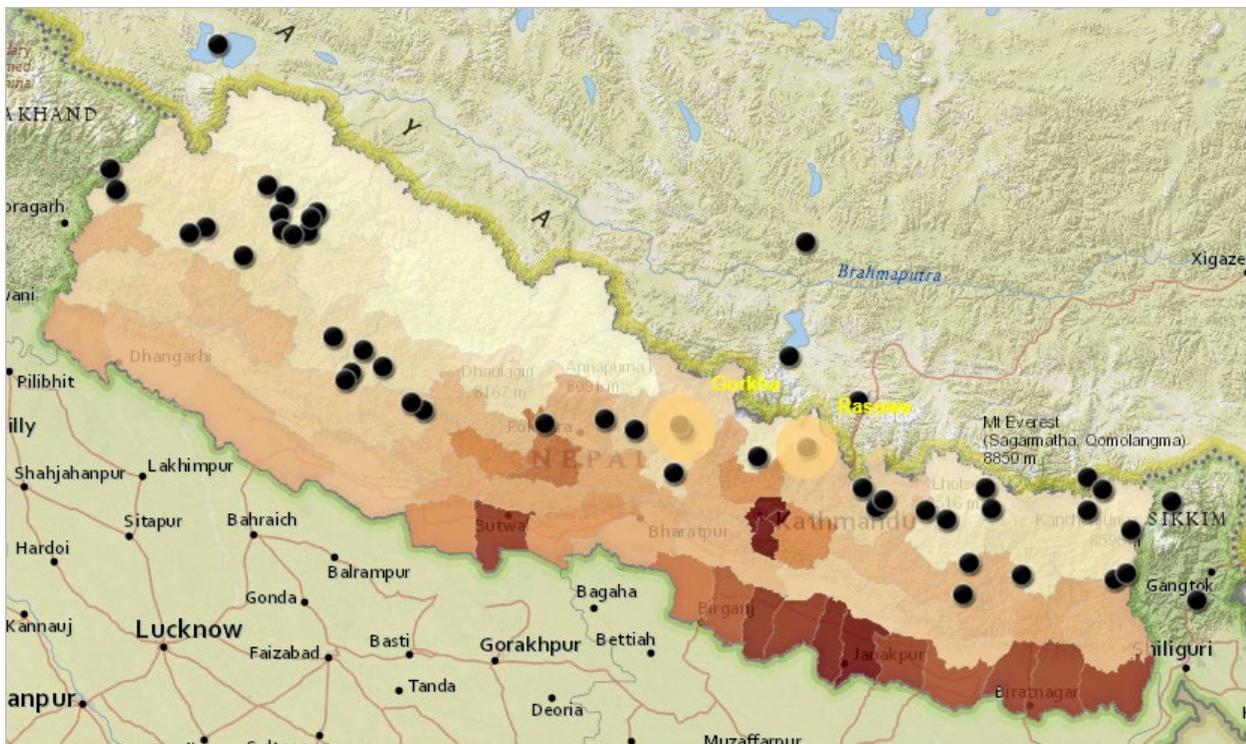
8. Click **Outline** and choose **No color**.

9. Click **OK**.



This leaves only the earthquakes with a magnitude of above 5 shown on the map.

10. Click the symbol next to **5 – 7.5**.
11. Click a new symbol and change its size to 30.
12. Click **OK**.
13. Scroll down on the pane and change **Transparency** to **0%**.



14. Click **OK** and click **Done**.
15. Save the map.

In this lesson you learned how to classify data by unique values, counts, and amounts. You have learned how to change transparency and change the size and color of symbols for better cartographic display.

Notice that different labels appear or disappear as you zoom in and out. Multiscale maps allow you to view geographic data across a range of scales, also known as zoom levels, from buildings to the entire globe. Specifying at what zoom levels content is drawn is known as setting the visibility range.

## Exercise Answers

*Q1. Write a brief explanation of how the legend helps you understand the map.*

A1. A map legend is a key, or a visual explanation of the symbols used on the map.

*Q2. What does the legend show about the population?*

A2. The legend shows the population in a color gradation, with the darker shades indicating more densely populated areas and lighter shades indicating more sparsely populated areas. The most populated districts are on the southern edge of Nepal.

*Q3. Where on the map are the earthquakes with a high magnitude in relation to a district with a high population?*

A3. Most of the earthquakes are to the north of Nepal, and the population is heavier in the south.

*Q4. What would make rescue efforts difficult in the northern districts?*

A4. The terrain is rough.

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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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