Case Study: India's Megacities

Lesson Map: **http://esriaustralia.com.au/education/SpatialActivity23**

Engage

Imagine life with 10 million of your closest friends.

? What is a megacity?

A megacity is a city that exceeds more than 10 million people. There are currently 47 megacities across the globe.

? What is the relationship between urbanisation and megacities?

As more people flock to urban areas, and people living in those areas continue to reproduce, there has been an increase in megacities. The first megacities were New York and Tokyo in the 20th century, but now there are many more cities just like them.

? Complete the below table on the Top 10 Megacities. You will need to do some research on your own.

Rank	City	Country	Total Population
1	Tokyo	Japan	38,140,000
2	Shanghai	China	34,000,000
3	Jakarta	Indonesia	31,500,000
4	Delhi	India	27,200,000
5	Seoul	South Korea	25,600,000
6	Guangzhou	China	25,000,000
7	Beijing	China	24,900,000
8	Manila	Philippines	24,100,000
9	New York City	United States	23,756,354
10	Mumbai	India	23,600,000

? What do you notice about the distribution of the world's largest megacities? Where are they mostly located?

They are mostly located within Asia.

? What problems do you hypothesise these megacities may face in the future? Especially as they mostly belong to the same continent.

These cities will face threat of food and water insecurity, environmental degradation, traffic congestion and continual urban sprawl to meet population demands.

Explore

Location, location, location.

→ Click on the Lesson Map URL above to open the map. In the 'details' pane, under 'content', tick the first checkbox to turn on the layer 'Megacity Locations' Turn off all other layers. These are the locations of the top 30 megacities.

Time

30 minutes

Activity

Introduction to India's megacities.

Learning Outcome

Students will be able to:

- Identify key megacities across the world

- Identify key challenges that megacities face.

- Interact with some key data about India's living conditions.

- Investigate some of India's key slums.

ACARA Curriculum Link

Year 11 | Unit 2 | Sustainable Places

ACHGE039 | ACHGE045 | ACHGE050

Teacher Feedback:

To share your feedback on this, or any Spatial Activity, please contact education@esriaustralia.com.au

? Click on the layer name, then click on the table icon. Click on the column 'Growth',
then 'Sort Descending'. Which megacity had experienced the most growth?
Karachi, in Pakistan.

? Find India. What are the names of India's top 3 megacities?
Mumbai, Delhi and Kolkata.

→ This case study will focus on megacities in India as they face a variety of potential
future problems that could impact both the environment and human wellbeing.

→ Visit the Urban Observatory *. Under the cities tab, selected Mumbai and Dehli.

? What do you notice about the distribution of population density in each city?

Mumbai	The population in Mumbai is higher in North Mumbai. The growth of Mumbai is restricted by the ocean that borders the city. There is higher population density in the centre in Mahananda Bangaon.
Dehli	Urban sprawl is very clear in Delhi. The suburbs on the outside of the city have a higher population than those in the city centre.

→ Go back to the ArcGIS map. There are many areas in India that have high population
density. Click on the layer 'Population per sq. 1000km 2011' (Note: 2011 was the last
census date in India at time of writing this document). Observe places with high
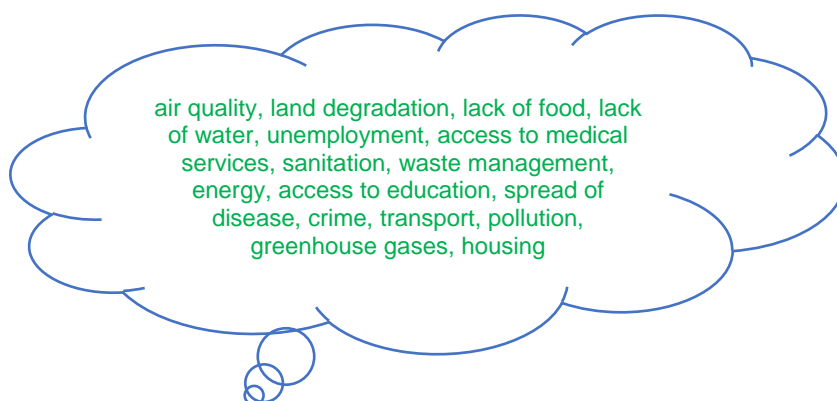population density, such as North India.

? The average population density for the whole of India in 2011 was 382 people per
square kilometer. For perspective, find the average population density of Australia.
Australia: 3.1 people per sq. km.

Explain

Challenges facing megacities.

? There are many challenges that megacities face in the future. Use the space below to
brainstorm some of these.

air quality, land degradation, lack of food, lack
of water, unemployment, access to medical
services, sanitation, waste management,
energy, access to education, spread of
disease, crime, transport, pollution,
greenhouse gases, housing

? Turn off all layers. Turn on the layer 'India Treated Drinking Water'. Where are the
areas with the least access to treated drinking water?
North India, the same areas with high population.

? Do any other layers show signs of challenges? Students own answer.

Expand

Slumming it.

→ There are many other layers that represent major problems in India. Take around 2 minutes to have a look at these layers.

? Turn on the layers 'Delhi and Mumbai Slums' and 'Slums per state'. Zoom in on Mumbai. Mumbai is currently home to the second largest slum. How many people are estimated to live in slums in Mumbai's home state, Maharashtra? (Note: there is no data for Delhi).

11,848,423 people are estimated to live in slums.

? Turn on the layers 'India Air Quality Jan 18'. What was the average air rating (data for pm10) in Mumbai? Note: by Australian standards, anything over 100 is toxic.

193.52, which was a grade of very poor.

? Complete the same as above for Delhi.

328.28, which was extreme.

? Why do you think these megacities have such poor air quality?

Students own answer.

? 2011 was the last year where a census ran. Why do you think there is so much time between censuses?

Students own answer.

? Do you think the data would look different in 2018? How?
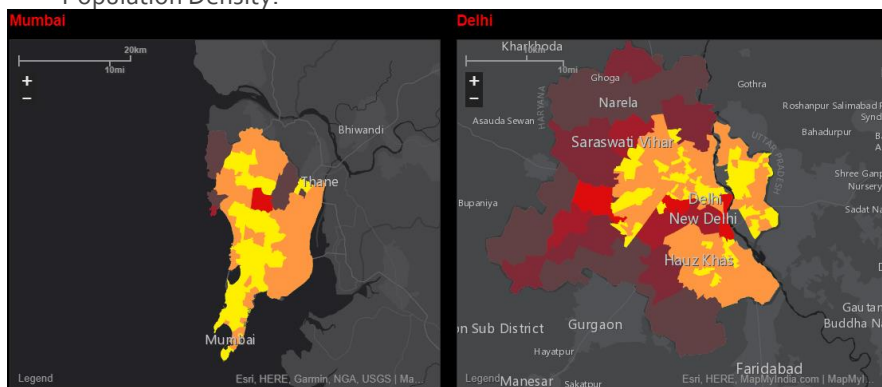
Students own answer.

Next Steps:

Request a free ArcGIS Online Account for your school:

Australian schools can request a free ArcGIS Online account as part of Esri Australia's Classroom GIS Initiative. A school subscription provides additional map layers, content, features and privacy. Learn more about ArcGIS Online, and apply for your ArcGIS Online School subscription at http://esriaustralia.com.au/education

*Websites Listed
http://www.urbanobservatory.org/compare/
Population Density:

Housing Density: