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NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Level 2 Geography 2020

91243 Apply geography concepts and skills to demonstrate understanding of a given environment

2.00 p.m. Friday 27 November 2020
Credits: Four

RESOURCE BOOKLET

Refer to this booklet to answer the questions for Geography 91243.

Check that this booklet has pages 2–14 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

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Relevant geographic concepts

Environments
May be natural and / or cultural. They have particular characteristics and features, which can be the result of natural and / or cultural processes. The particular characteristics of an environment may be similar to and / or different from another. A cultural environment includes people and / or the built environment.

Perspectives
Ways of seeing the world that help explain differences in decisions about, responses to, and interactions with environments. Perspectives are bodies of thought, theories, or worldviews that shape people's values and have built up over time. They involve people's *perceptions* (how they view and interpret environments) and *viewpoints* (what they think) about geographic issues. Perceptions and viewpoints are influenced by people's *values* (deeply held beliefs about what is important or desirable).

Processes
A sequence of actions, natural and / or cultural, that shape and change environments, places, and societies. Some examples of geographic processes include erosion, migration, desertification, and globalisation.

Patterns
May be spatial: the arrangement of features on the earth's surface; or temporal: how characteristics differ over time in recognisable ways.

Interaction
Involves elements of an environment affecting each other and being linked together. Interaction incorporates movement, flows, connections, links, and interrelationships, which work together and may be one- or two-way interactions. Landscapes are the visible outcome of interactions. Interaction can bring about environmental change, which can be either desirable and / or negative.

Change
Involves any alteration to the natural or cultural environment. Change can be spatial and / or temporal. Change is a normal process in both natural and cultural environments. It occurs at varying rates, at different times, and in different places. Some changes are predictable, recurrent, or cyclic, while others are unpredictable or erratic. Change can bring about further change.

Sustainability
Involves adopting ways of thinking and behaving that allow individuals, groups, and societies to meet their needs and aspirations without preventing future generations from meeting theirs. Sustainable interaction with the environment may be achieved by preventing, limiting, minimising, or correcting environmental damage to water, air, and soil, as well as considering ecosystems and problems related to waste, noise, and visual pollution.

THE GANGES RIVER

Sunset on the banks of the Ganges

Introduction: The Ganges River

The Ganges River is one of the world's largest rivers. It flows 2500 km from the Himalayas across India, through Bangladesh, and into the Bay of Bengal.

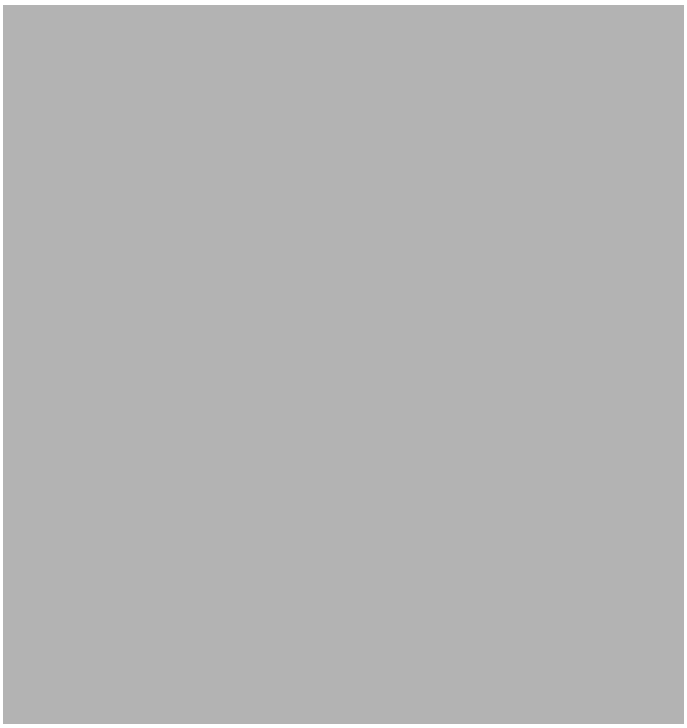
The Ganges – Ganga to Indians – is central to Hindu religious beliefs and to India's social traditions and economy.

To Hindus, the Ganges is a sacred goddess, and many millions of Hindus undertake annual pilgrimages to bathe in it. To bathe or have one's ashes scattered in the river provides salvation.

More than 500 million people live in the Ganges River basin and depend on the river for drinking water, industrial use, and irrigation for agriculture.

The Ganges is also one of the world's most polluted rivers due to raw sewage, industrial toxins, and nitrates from agricultural run-off. In many parts of the river, levels of pollutants are many thousands of times higher than safe drinking and bathing limits.

The Ganges River is important for religious beliefs (right), agriculture (below left), and drinking water, despite being heavily polluted (below right).



RESOURCE A: Varanasi, a holy city

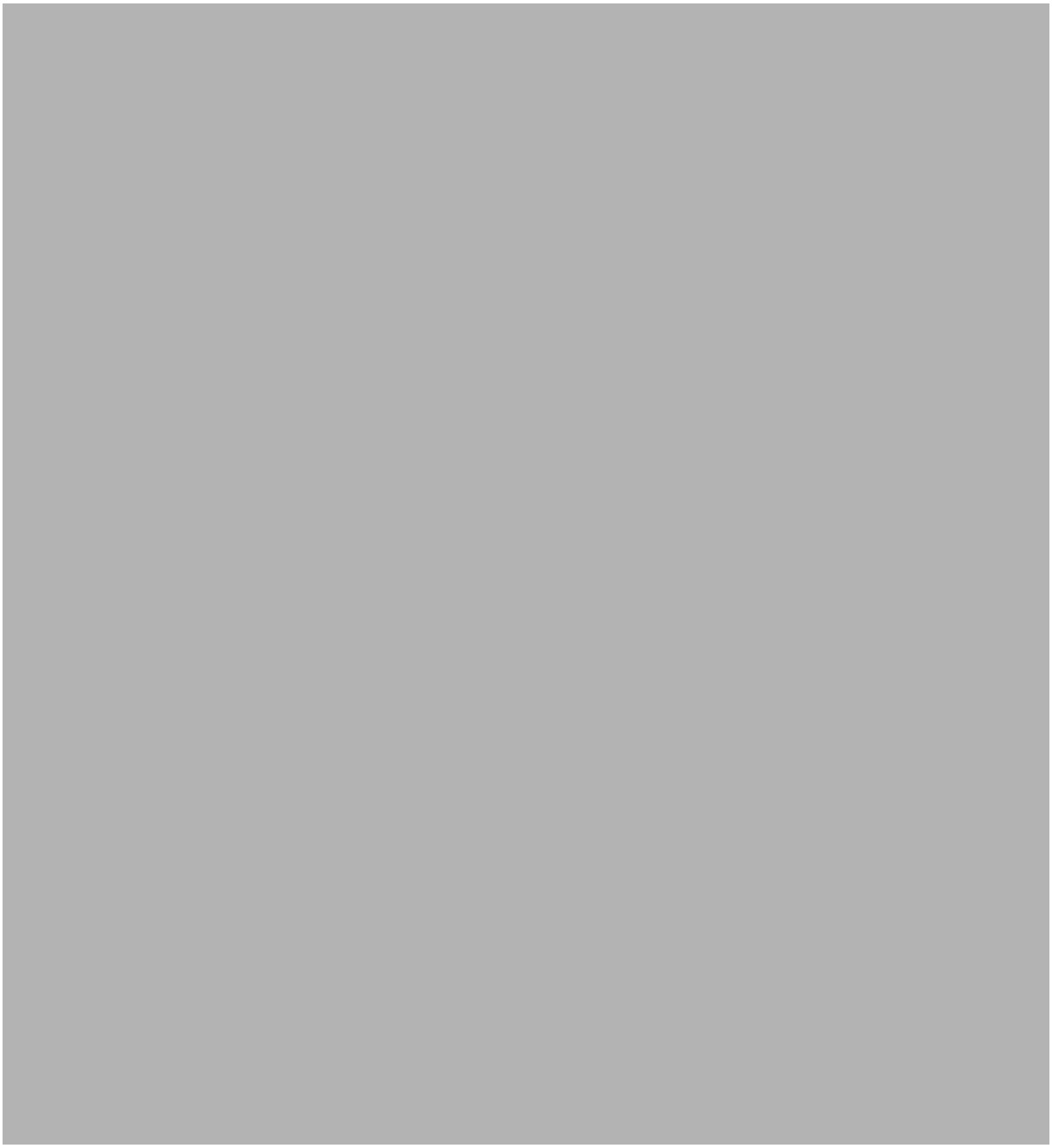


Figure 1: Satellite image of Varanasi during the dry season, with low river flow and level.

Figure 2: Ghat (steps) (left) and temple (right).

Figure 3: Varanasi map.

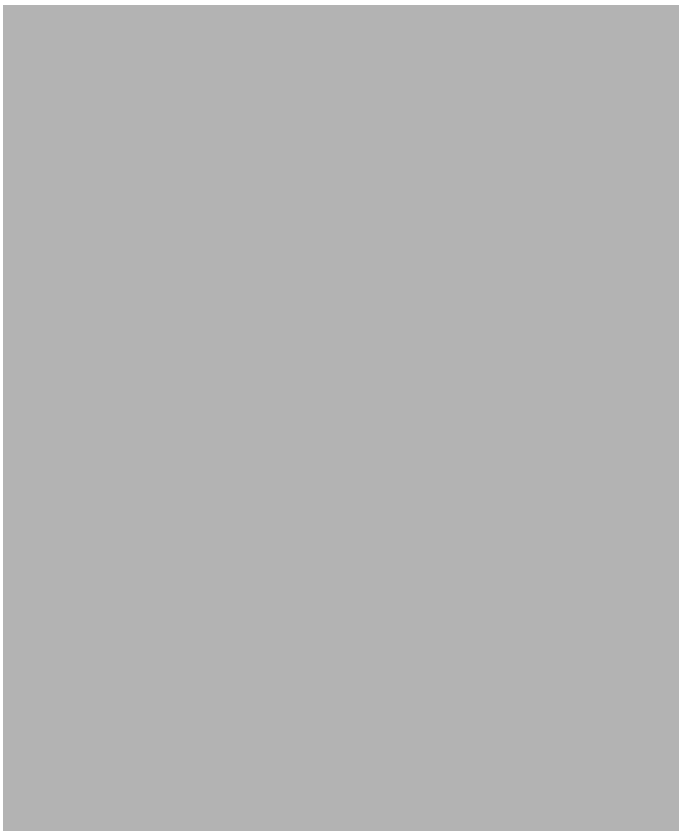


Figure 4: Location of temples and shrines in Varanasi.

RESOURCE B: Interaction

India's dependence on the Ganges River

The Ganges is important in the Hindu religion. In Hindu tradition, the river is a sacred goddess, and the waters are considered spiritually pure. Ritual bathing in the holy river is believed to bring good fortune and purify sins.

Funerals are often held on the banks of the Ganges, so that the cremated ashes of dead loved ones can be scattered in the river, purifying and liberating the spirits of the departed. Many Hindus make pilgrimages to the Ganges to bathe in the water to cleanse their sins.

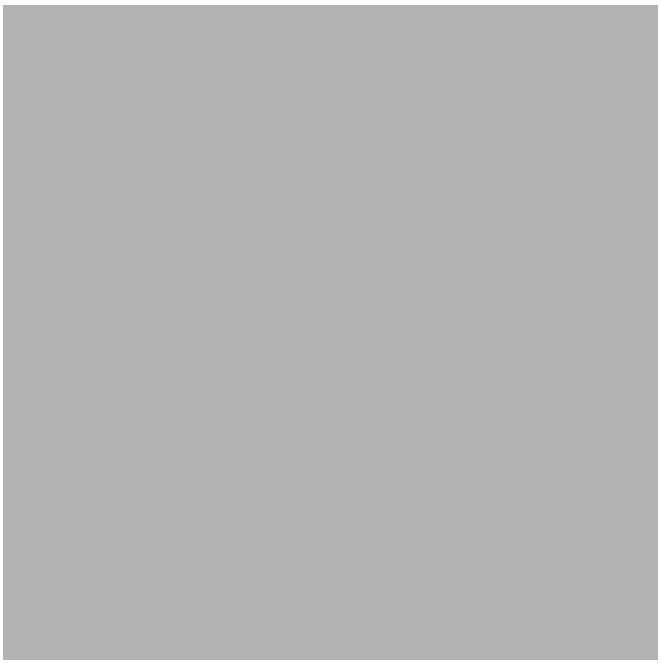
The Ganges is an essential source of water for agriculture and industries. There are 784 dams, 66 canals, 92 weirs, and 45 lift-schemes taking water out of the Ganges.

Irrigation is particularly important for rice production. Water from the Ganges enables an additional crop in the dry season.

The Ganges supplies most of the water required by the over 50 cities along the river. A 90-kilometre-long canal takes water to New Delhi – India's capital city.

The Ganges provides a natural shipping route for inland centres up to 2000 km inland. Leather products from Kanpur – over 1000 km inland – are exported directly by ship to other parts of Asia and Europe.

The Ganges and its tributaries have a hydroelectric potential of 13 million kilowatts, two-fifths of which lies in India, with the rest in the Ganges tributaries in Nepal. The increasing hydroelectricity production is aiding economic development and improved living standards, as well as being vital to telecommunications.



Bathing in the Ganges is an important religious ritual in Hinduism.

Canal taking water supplies from the Ganges. The Himalayas are visible in the background.

Water from the Ganges is critical for rice production.

The death of the Ganges

Over 3 billion litres of sewage are pumped into the Ganges River daily. Of this, 2 billion litres are raw, untreated sewage (i.e. what is flushed down the toilet). As a result, the faecal coliform bacteria count for much of the Ganges is over 300 times the government's safe limit for bathing.

Leather production is an important industry in Kanpur. There are over 400 tanneries (leather factories) pumping 300 million litres of contaminated water, containing chromium and other toxins, into the Ganges each day.

The amount of water taken from the Ganges during the dry season affects the flow and river levels. In the dry season, water demands are higher, but flows are low. At the same time, climate change is reducing the Himalayan glaciers, an important supply of water during the dry season.

River-flow levels in the dry season have fallen noticeably, and the river has become shallower in many areas, meaning that parts of the Ganges are becoming sluggish and stagnant.

At the delta, the reduced flows are resulting in greater sedimentation (deposits of silt). Tides bring in seawater, causing the water to become more saline (salty).

Rubbish is often dumped into the Ganges for the river to take it away. The Ganges is a major source of plastics in ocean pollution.

Each year, 6 million tons of chemical fertiliser and 9000 tons of pesticides enter the water through runoff from farms. Fertiliser promotes algae growth, which negatively affects the river's ecosystem by blocking sunlight and depriving fish and other aquatic life of oxygen. 140 fish species and 90 native amphibian species are threatened. The rare Ganges river dolphin – one of only four freshwater dolphin species in the world – has had its numbers reduced by a quarter over the past 15 years.

Untreated (raw) sewage flowing into the Ganges.

An open drain clogged with sewage and rubbish.

RESOURCE C: Pollution

Faecal coliform bacteria (*E. coli*) can cause disease. High *E. coli* levels can also indicate the presence of other disease-causing organisms, such as those responsible for typhoid fever, hepatitis, gastroenteritis, dysentery, and ear infections.

Safe drinking limits for *E. coli* are 100 per 100 mL. For bathing, safe limits are 550 per 100 mL.

The main source of bacteria in the Ganges is from human and animal faeces. Two billion litres of raw sewage is dumped into the Ganges each day.

Figure 5

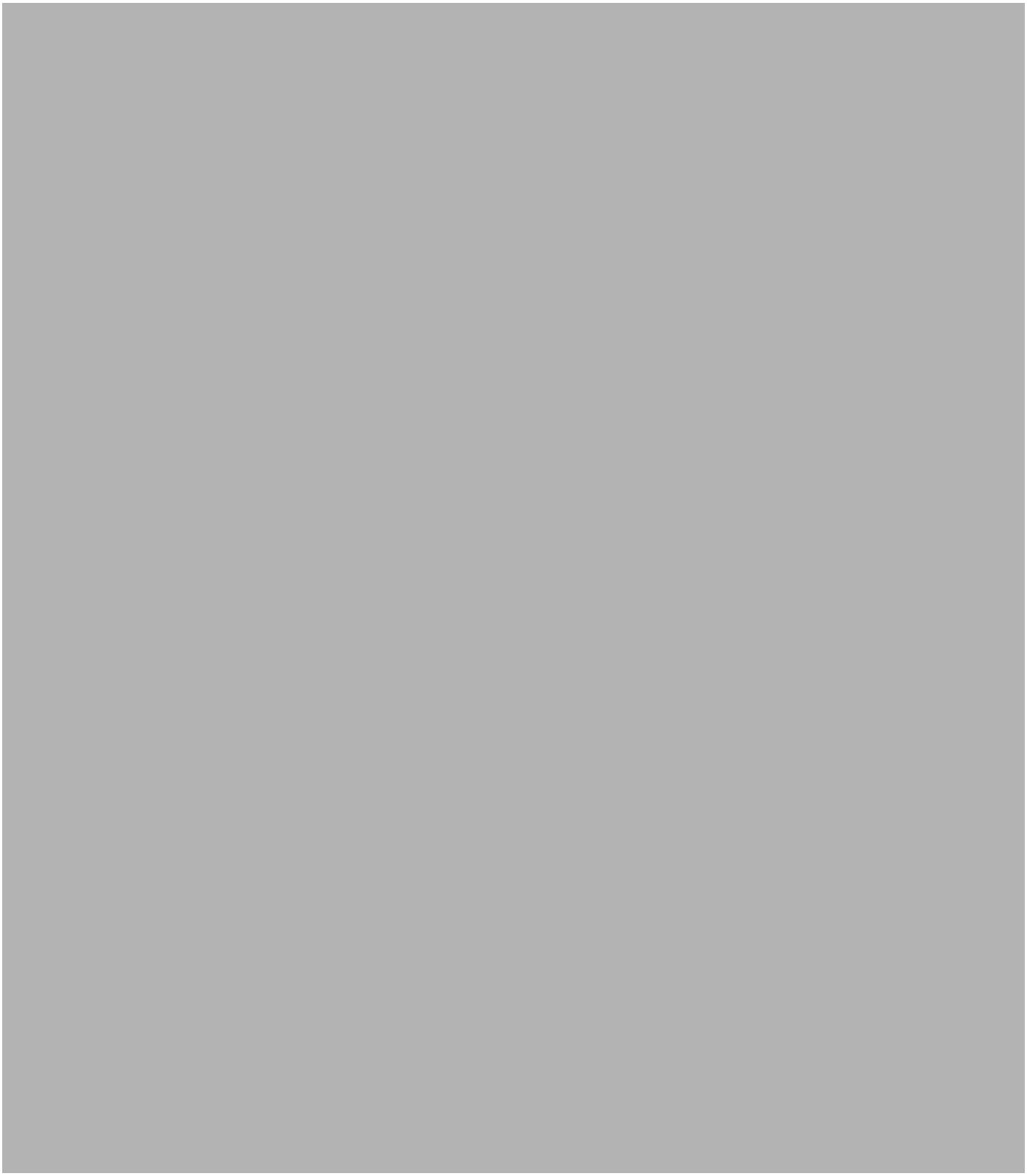
Figure 6

Note 1
Faecal coliform bacteria don't survive in water indefinitely, so even without water treatment, *E. coli* levels in rivers start to reduce naturally as the bacteria decay.

Note 2
Over the past 30 years, new sewage treatment stations have been built to treat sewage from cities along the Ganges.

Figure 7

RESOURCE D: Perspectives



Acknowledgements
Material from the following sources has been adapted for use in this examination:

Page 4
Satellite image: Google Earth
Image (sunset): https://hipwallpaper.com/view/rPLDTl

Page 5
Images (top to bottom):
https://s27363.pcdn.co/wp-content/uploads/2017/01/Bathing-in-the-Ganges.jpg.optimal.jpg
https://delta.umn.edu/content/ganges-brahmaputra-meghna-gbm-delta
https://www.theguardian.com/environment/2019/aug/05/plastic-poverty-and-paradox-experts-head-to-the-ganges-to-track-waste

Page 6
Figure 1: Google Earth
Figure 2 (ghat): https://www.mouthshut.com/product-reviews/Kedar-Ghat-Varanasi-reviews-925752603
Figure 2 (temple): https://commons.wikimedia.org/wiki/File:New_Vishwanath_Temple_inside_Banaras_Hindu_University,_Varanasi_-_IRCTC_2017_(21).jpg

Page 7
Top map: http://www.hotelinvaranasi.com/map-of-varanasi.html
(mortarboard icon) https://www.vecteezy.com/vector-art/347865-vector-graduation-cap-icon
(train icon) https://www.freepik.com/free-vector/train-icons-set_3887349.htm
Lower map: https://journals.openedition.org/samaj/4524

Page 8
Images (top to bottom):
https://graphics.reuters.com/INDIA-RIVER/010081TW39P/index.html
https://wanderthehimalayas.com/2016/03/23/is-roorkee-ganges-canal-mountain-view-for-real/.
https://meelsathesnowqueen200211.weebly.com/652-india.html

Page 9
Images (left to right):
https://graphics.reuters.com/INDIA-RIVER/010081TW39P/index.html
https://www.thethirdpole.net/en/2016/09/19/ganga-disappears-in-west-bengal/

Page 10
Map and graph: http://www.bbc.co.uk/news/resources/idt-aad46fca-734a-45f9-8721-61404cc12a39

Page 11
Graph: https://cdn.downtoearth.org.in/dte/userfiles/images/3L.jpg

Pages 12 and 13
Based on: http://www.bbc.co.uk/news/resources/idt-aad46fca-734a-45f9-8721-61404cc12a39