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91243R

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# Level 2 Geography 2022

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

Credits: Four

RESOURCE BOOKLET

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

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

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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. People's actions can alter the characteristics and features of the natural and / or cultural environment. 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 process is a sequence of natural and / or cultural actions that shapes and changes 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.

### 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.

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## RESOURCE A: The Dead Sea

The Dead Sea, a saltwater lake, lies within the Jordan Rift Valley located between Israel and Jordan. The valley was formed by earthquake activity and is below sea level – the Dead Sea is 430 metres below sea level and its shore is the Earth's lowest point. Since 1930, the surface area of the Dead Sea has been shrinking, due to water being taken for a variety of uses. The lake level is falling by a metre a year and it is now divided into two basins. The Northern Basin is still a lake, while the Southern Basin is now reduced to a number of ponds in which salt water is collected and then evaporated, leaving salt that is harvested.

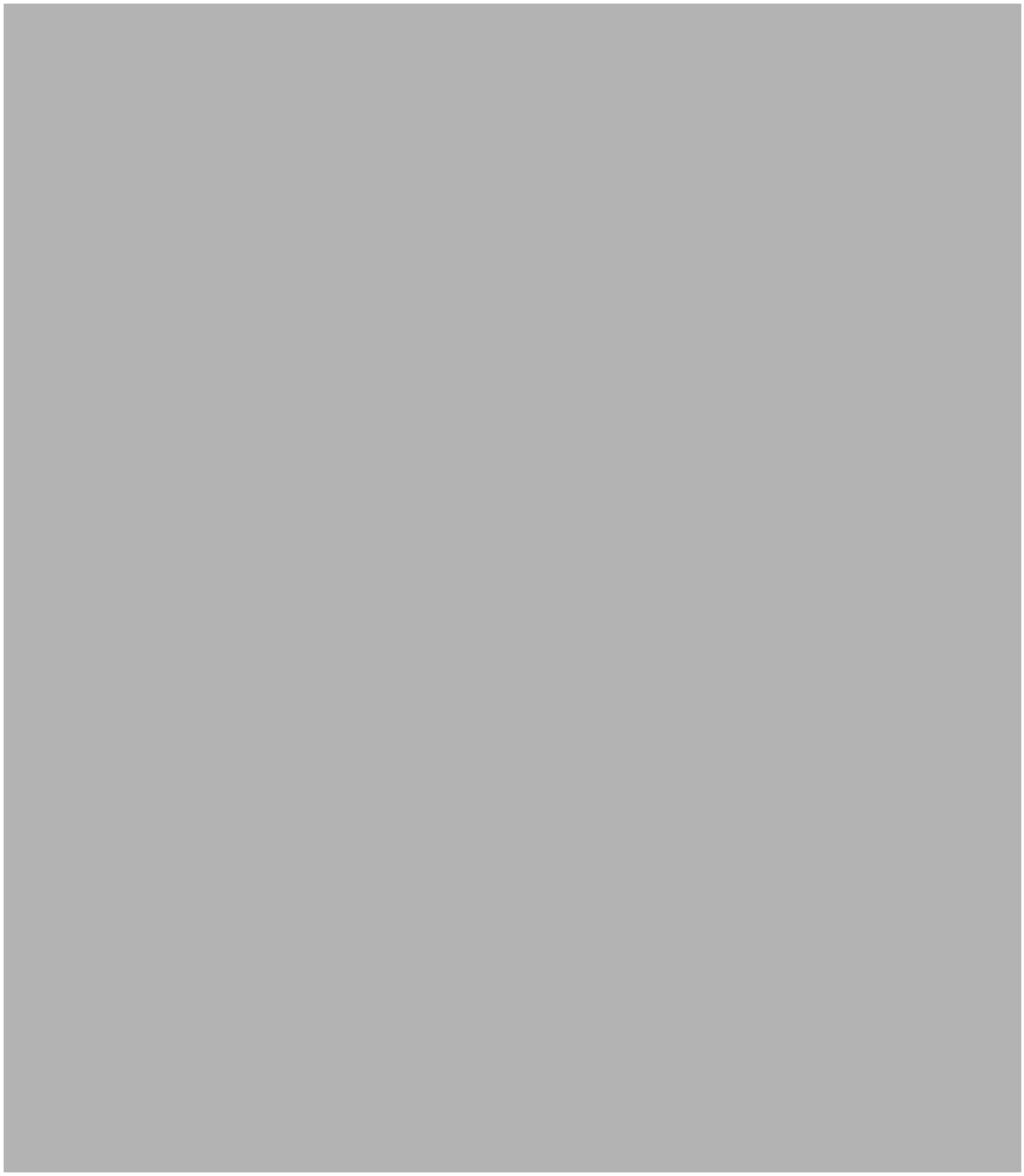

**Figure 1:** Satellite image of the present-day (2022) extent of the Dead Sea

**Figure 2 (left):** 1931 topographic map of the Jordan Rift Valley, showing the former extent of the Dead Sea

**Figure 3:** Main features of the Jordan Rift Valley and the Dead Sea

**Figure 4:** Shrinkage of the Dead Sea 1931–2070, showing separation into two basins

## RESOURCE B: Climate and the Dead Sea environment

Although below sea level and with no outlet, the Jordan Rift Valley does not fill up with water. This is due to the arid (dry) climate, with low rainfall and high evaporation. The high evaporation rate results in the Dead Sea having an extremely high concentration of salt – ten times that of ordinary sea water.

**Figure 5:** The arid landscape and salt deposits around the shoreline of the Dead Sea

**Climate statistics for Sedom and Wellington**

| Climate | | | Sedom (Dead Sea) | Wellington (New Zealand) |
|---|---|---|---|---|
| **Temperature** | Record high | ℃ | 47.0 | 30.3 |
| | Daily mean | ℃ | 26.1 | 12.7 |
| **Precipitation** | Average annual rainfall | mm | 42 | 1,250 |
| | Average annual rain days | no. | 16 | 124 |
| | Average humidity | % | 32 | 82 |
| **Sunshine** | Annual mean | hours | 3,520 | 2,058 |

**Figure 6:** Comparison of the climate of Sedom (Dead Sea) to Wellington, New Zealand

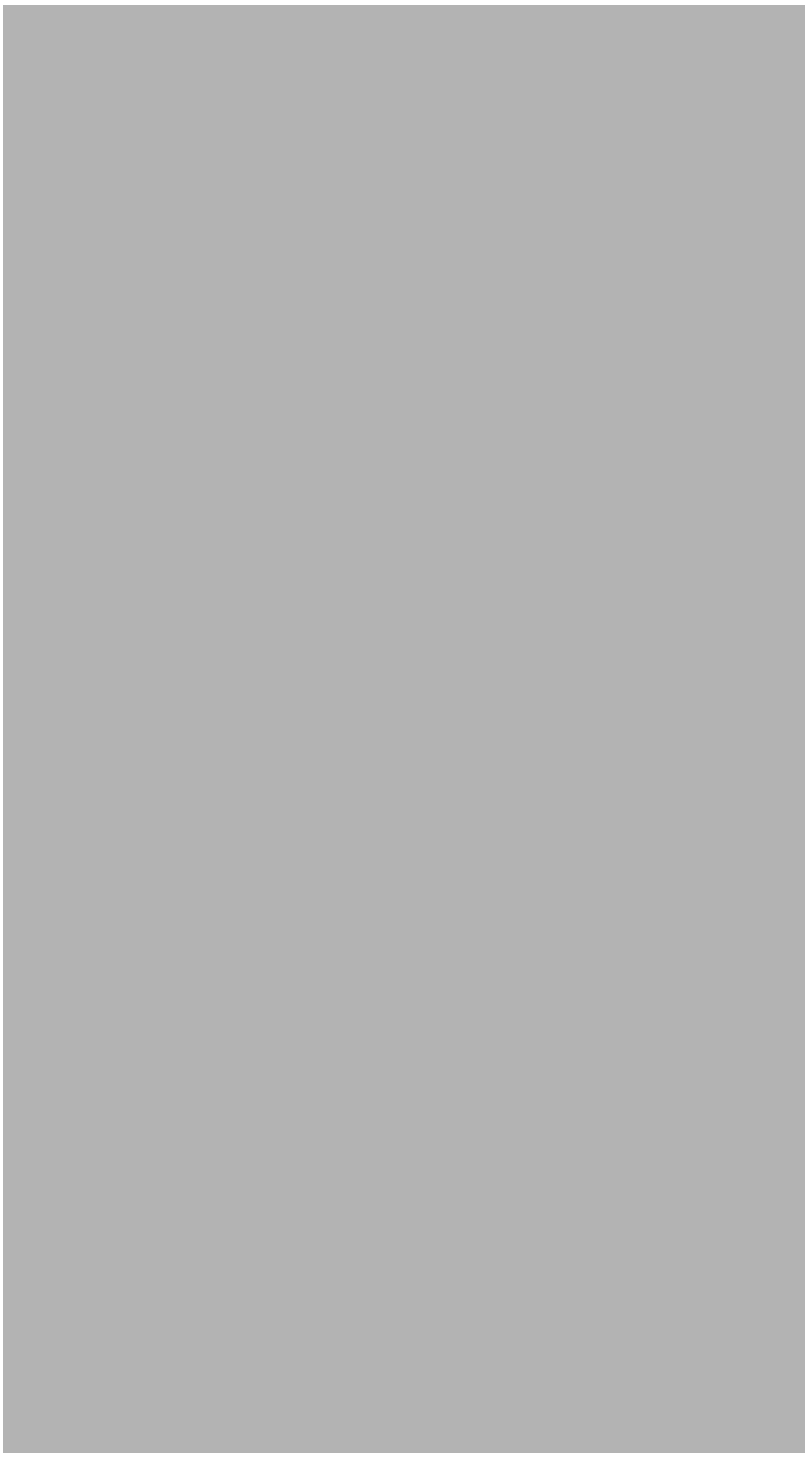

**Figure 7:** Distribution of rainfall (mm) within the Dead Sea catchment (drainage area, shown in grey shading). The Jordan River flows from the north to the Dead Sea in the south.

## RESOURCE C: Shrinkage of the Dead Sea

In 1930, the first dam was built on the Jordan River. Today, there are more than 50 dams and water schemes diverting water from the Jordan River and its tributaries.

**Figure 8:** Level of the Dead Sea 1900 to 2012

**Figure 9:** Water diverted out of the Jordan River by purpose and country.
Note: Potash plant = salt extraction

**Figure 10:** Annual Dead Sea water budget

## RESOURCE D: People and the Dead Sea

The Dead Sea provides a water supply, and is important to the major economic activities of tourism, agriculture, and salt production.

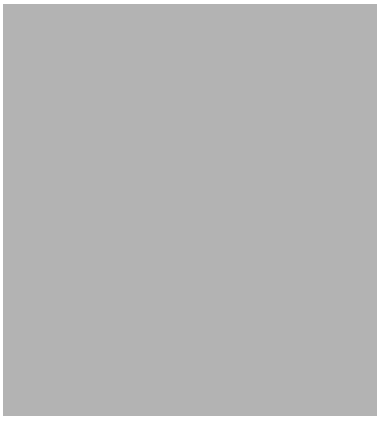

**Figure 11:** Tourists enjoying the salt-rich water in front of their hotel

**Figure 12:** The Dead Sea provides water for irrigation

**Figure 13:** A Dead Sea salt works

**Figure 14:** Desalination plant for drinking-water and agriculture

### Issues

The level of the Dead Sea is falling by a metre a year, and as hotels become further away from the shoreline, they lose their appeal.

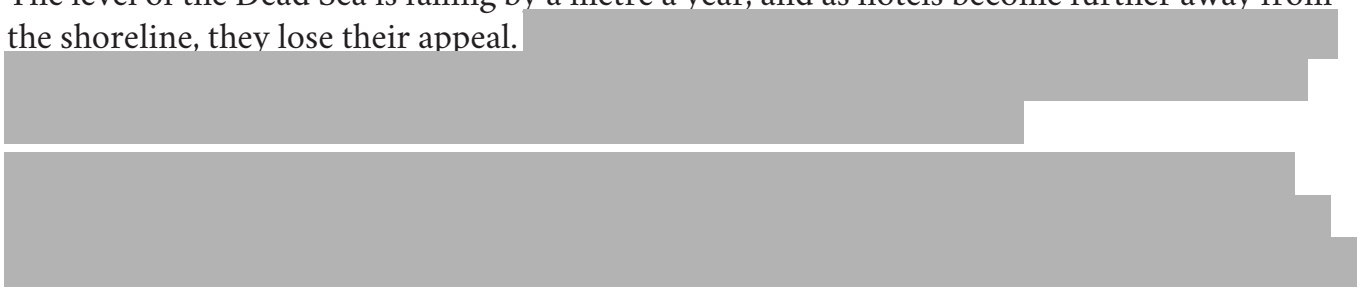

**Figure 15:** Sinkholes appear as the Dead Sea recedes and rainfall, although minimal, dissolves the underlying salt layers

**Figure 16:** A water park complex abandoned due to the receding shoreline and sinkholes

## Possible solution

For over twenty years, there has been a $15 billion proposal – the Red Sea Dead Sea (RSDS) project – to pump sea water from the Red Sea to the Dead Sea.

**Figure 17:** Map showing the proposed RSDS pipeline to pump water from the Red Sea to the Dead Sea

**Figure 18:** The possible result of the RSDS project on the level of the Dead Sea

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

**Page 4**
Satellite image: https://earth.esa.int/documents/257246/1735113/Dead_Sea_Israel_Landsat-8_27102014.jpg

**Page 5**
Map: https://www.researchgate.net/figure/1-A-Mean-annual-precipitation-in-mm-over-the-drainage-area-of-the-Dead-Sea-grey_fig1_291383773
Cross section: https://traveltalesoflife.com/10-cool-dead-sea-facts/
Figure 4: https://www.researchgate.net/figure/Shrinkage-of-the-surface-area-of-the-Dead-Sea-as-a-result-of-the-decline-in-its-water_fig4_339044303

**Page 6**
Image: https://www.technologynetworks.com/genomics/news/ancient-dna-from-dead-sea-scrolls-decoded-in-seven-year-study-335600
Climate data: https://en.wikipedia.org/wiki/Dead_Sea#Climate https://en.wikipedia.org/wiki/Wellington#Climate

**Page 7**
https://www.researchgate.net/figure/1-A-Mean-annual-precipitation-in-mm-over-the-drainage-area-of-the-Dead-Sea-grey_fig1_291383773

**Page 8**
https://www.researchgate.net/figure/Dead-Sea-water-level-from-1900-to-2012-Between-1913-1927-gaps-in-the-data-collection_fig4_313403242

**Page 9**
Flow chart and water budget data: https://saltworkconsultants.com/blog-salty-matters/?p=dead-sea-brine-levels-and-sediment-styles
Map: https://commons.wikimedia.org/wiki/File:Dead_Sea_terrain_location_map.jpg

**Page 10**
Figure 11: https://stayclosetravelfar.com/10-dead-sea-tips/
Figure 12: https://www.nbcnews.com/news/world/dead-sea-dying-1-5-billion-plan-aims-resurrect-it-n926066
Figure 13: https://www.nrdc.org/onearth/could-water-red-sea-help-revive-dead-sea
Figure 14: http://www.bizisrael.com/business/saving-dying-dead-sea/
Figure 15: https://www.dailymail.co.uk/sciencetech/article-2424549/Will-Dead-Sea-eaten-sinkholes-Huge-chasms-appearing-region-rate-day.html
Figure 16: https://www.dailymail.co.uk/sciencetech/article-2897538/Slow-death-Dead-Sea-Levels-salt-water-dropping-one-metre-year.html

**Page 11**
Satellite map: https://www.nrdc.org/onearth/could-water-red-sea-help-revive-dead-sea
Graph: https://www.researchgate.net/figure/Predicted-Dead-Sea-levels-for-different-intake-volumes-26_fig1_328927425