Year 12 Science: Sea-level rise in Aotearoa: an issue and its sources

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Auckland's sea level rose 2.54 mm a year from 1961 to 2020. How much is that over the 60 years, in centimetres?

2. Dunedin's rate rose from 0.69 to 1.76 mm a year. How many times faster is the later rate, to one decimal place?

3. The ocean near a town rises 3 mm a year, and the land there is being pushed up by 1 mm a year. What relative rise does the town's tide gauge record?

4. Which is more valid evidence of the national trend: 120 years of tide-gauge records, or a homeowner's two photos of a beach 30 years apart?

5. Give one Earth and Space Science point against a nationwide ban on new coastal homes.

6. What lifts a Merit position to Excellence?

Fix the mistake

7. Correct this statement: "Stats NZ is valid because it is a government website."

8. Correct this statement: "Melting sea ice is a main cause of sea-level rise."

9. Correct this statement: "I only included evidence for my side so my position looks stronger."

10. Correct this statement: "The sea is rising the same amount everywhere in New Zealand."

Answer key (for parents and tutors)

1. Auckland's sea level rose 2.54 mm a year from 1961 to 2020. How much is that over the 60 years, in centimetres?
   2.54 × 60 = 152.4 mm ≈ 15 cm.
2. Dunedin's rate rose from 0.69 to 1.76 mm a year. How many times faster is the later rate, to one decimal place?
   1.76 ÷ 0.69 = 2.55, so about 2.6 times faster.
3. The ocean near a town rises 3 mm a year, and the land there is being pushed up by 1 mm a year. What relative rise does the town's tide gauge record?
   3 − 1 = 2 mm a year, because the rising land cancels part of the rise.
4. Which is more valid evidence of the national trend: 120 years of tide-gauge records, or a homeowner's two photos of a beach 30 years apart?
   The tide-gauge records: measured to fractions of a millimetre over a long time, with a stated method, while photos depend on the tide and season when each was taken.
5. Give one Earth and Space Science point against a nationwide ban on new coastal homes.
   Some coasts are being pushed up by as much as 5 mm a year, which cancels much of the rise there, so the risk differs from town to town.
6. What lifts a Merit position to Excellence?
   Justifying it: weighing evidence from both sides with numbers, and saying how the validity of each source affects how much weight it gets.
7. Correct this statement: "Stats NZ is valid because it is a government website."
   Say why the information is valid: long-term measured data, a stated method and uncertainty, and agreement with other sources.
8. Correct this statement: "Melting sea ice is a main cause of sea-level rise."
   Floating sea ice already displaces its own weight of water; the rise comes from warming water expanding and from ice melting on land.
9. Correct this statement: "I only included evidence for my side so my position looks stronger."
   Report the science on both sides, then explain why the evidence for your position outweighs the rest.
10. Correct this statement: "The sea is rising the same amount everywhere in New Zealand."
    Tide gauges measure the sea against the land, and the land is sinking in some places and rising in others.