Earthquakes: Shifting Foundations

Learning objective: To understand the causes of earthquakes and their impact on the Earth's crust.

Read each question carefully and use your knowledge of tectonic plates and natural processes to provide detailed, scientific explanations.

Finn the dolphin has been exploring the ocean floor near deep underwater trenches. He has noticed that the Earth's outer layer is not one solid piece, but is broken into massive sections that are constantly, yet slowly, moving. When these sections rub against each other or get stuck, energy builds up. When that energy is suddenly released, it causes the ground to shake, which we call an earthquake.

Word bank: Tectonic plates · Crust · Epicentre · Seismograph · Magnitude · Friction · Fault line · Tremor

1. Explain why tectonic plates do not move smoothly past one another. Refer to the concept of friction in your answer. (2 marks)

2. What is the difference between the focus of an earthquake and the epicentre? Use a scientific diagram or description to justify your answer. (3 marks)

3. Compare and contrast how a scientist might use a seismograph versus how they might use a historical report to measure the strength of an earthquake. (3 marks)

4. Justify why buildings in earthquake-prone regions are often constructed with flexible materials and deep foundations. (2 marks)

5. What might happen if the tectonic plates stopped moving entirely? Predict the long-term impact on the Earth's landscape. (3 marks)

6. If an earthquake measuring 7.0 on the magnitude scale occurred, explain why the damage might be different in a rural village compared to a dense city. (2 marks)

Draw: Draw a cross-section of the Earth's crust showing two tectonic plates pushing against each other. Label the 'Fault Line' and use arrows to show the direction of the plate movement.

Extension challenge: Research the 'Ring of Fire' in the Pacific Ocean. Write a short report explaining why this specific area experiences such a high frequency of earthquakes and volcanic activity compared to the rest of the world.