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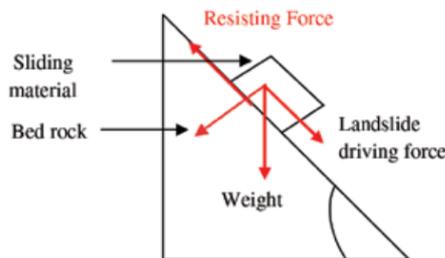
Answers

Quiz: Mass movements and landslides

This short quiz could be used as a brief introductory activity to begin discussion about mass movement and landslides. It's designed to help students understand the causes of these events and the range of types of mass movement. The correct answers are given below, along with some additional information.

1 The correct answer is C, downslope movement of rock/soil. 'A' is a definition of weathering and 'B' erosion. Mass movements move material downslope in a similar way to erosion, but the material is not entrained (transported in) a medium such as water, ice or air (wind).

2 The correct answer is gravity. Landslides occur when the force of gravity exceeds the resisting forces (friction, cohesion) on a slope:



3 The correct answer is C, a rockfall i.e. a vertical failure. The British Geological Survey classifies landslides into falls, topples, slides and flows based on the type of failure:
<https://www.bgs.ac.uk/discovering-geology/earth-hazards/landslides/how-to-classify-a-landslide/>

4 The correct answer is D, heavy rain. Rain contributes to slope loading and reduction in soil strength, as well as eroding slope material. 80-90% of landslides have rainfall as a component of slope failure.

5 The correct answer is D, rockfall. Mass movements are often classified according to velocity (speed) of failure. Some, such as soil creep, are extremely slow (a few mm/cm per year) whereas others are very rapid (seconds/ minutes). Slides (rotational, translational) sit in the middle taking days or weeks to fail.

6 The correct answer is A, a lahar or volcanic mudflow. Lahars are particularly violent debris flows that on steep slopes can exceed 150 km per hour and affect very large areas. Areas with active stratovolcanoes that generate large quantities of volcanic ash (which mixes with heavy precipitation) are especially at risk.

7 The correct answer is a tsunami. Coastal landslides and volcanic island flank collapses can both trigger very large tsunami waves — but these tsunami do not travel as far as tsunami caused by submarine earthquakes.

8 The correct answer is B. Landslide risk is highest in mountainous areas with steep and unstable slopes e.g. the Alps, Himalaya and Andes. There is also a strong link with tectonic plate boundaries (subduction zones, collision zones) because mountains and volcanoes are formed in these areas. Geologically young and volcanically active mountains are the most unstable.

9 The correct answer is 1,500. In 2010 a mudslide in Gansu Province, China, took the lives of around 1,500 people. It was triggered by heavy rain but fundamentally was caused by decades of widespread deforestation. It left an area 5 km by 300 m buried up to 5 m deep in mud.

10 The correct answer is 'Yes'. Landslides often occur on the continental slope where shallow continental shelf waters transition into deep ocean waters. Mud and debris flow down the continental slope as a turbidity current. They can generate tsunami and break submarine cables, such as fibre optic cables.

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