

Option D: Geophysical hazards

1. Geophysical systems

Suggested teaching time 6–8 hours

Geographic inquiry	Geographic knowledge and understanding
How geological processes give rise to geophysical events of differing type and magnitude	<p>Mechanisms of plate movement including internal heating, convection currents, plumes, subduction and rifting at plate margins</p> <p>Characteristics of volcanoes (shield, composite and cinder) formed by varying types of volcanic eruption; and associated secondary hazards (pyroclastic flows, lahars, landslides)</p> <p>Characteristics of earthquakes (depth of focus, epicentre and wave types) caused by varying types of plate margin movement and human triggers (dam building, resource extraction); and associated secondary hazards (tsunami, landslides, liquefaction, transverse faults)</p> <p>Classification of mass movement types according to cause (physical and human), liquidity, speed of onset, duration, extent and frequency</p>

2. Geophysical hazard risks

Suggested teaching time 6–8 hours

Geographic inquiry	Geographic knowledge and understanding
How geophysical systems generate hazard risks for different places	<p>The distribution of geophysical hazards (earthquakes, volcanoes, mass movements)</p> <p>The relevance of hazard magnitude and frequency/recurrence for risk management</p> <p>Geophysical hazard risk as a product of economic factors (levels of development and technology), social factors (education, gender), demographic factors (population density and structure) and political factors (governance)</p> <p>Geographic factors affecting geophysical hazard event impacts, including rural/urban location, time of day and degree of isolation</p>

3. Hazard risk and vulnerability

Suggested teaching time 6–8 hours

Geographic inquiry	Geographic knowledge and understanding
The varying power of geophysical hazards to affect people in different local contexts	<ul style="list-style-type: none">• <i>Two contemporary contrasting case studies each for volcanic hazards, earthquake hazards and mass movement hazards (see guidance above)</i>• <i>For each geophysical hazard type, the case studies should develop knowledge and understanding of:</i>• geophysical hazard event profiles, including any secondary hazards• varied impacts of these hazards on different aspects of human well-being• why levels of vulnerability varied both between and within communities, including spatial variations in hazard perception, personal knowledge and preparedness

4. Future resilience and adaptation

Suggested teaching time 6–8 hours

Geographic inquiry	Geographic knowledge and understanding
Future possibilities for lessening human vulnerability to geophysical hazards	<p>Global geophysical hazard and disaster trends and future projections, including event frequency and population growth estimates</p> <p>Geophysical hazard adaptation through increased government planning (land use zoning) and personal resilience (increased preparedness, use of insurance and adoption of new technology)</p> <p>Pre-event management strategies for mass movement (to include slope stabilization), earthquakes and tsunami (to include building design, tsunami defences), volcanoes (to include GPS crater monitoring and lava diversions)</p> <p>Post-event management strategies (rescue, rehabilitation, reconstruction), to include the enhanced use of communications technologies to map hazards/disasters, locate survivors and promote continuing human development</p>

Synthesis (Sy), Evaluation (Ev) and Skills (Sk) opportunities

Geographic inquiry	Geographic knowledge and understanding
These suggestions can be integrated into the study of the above. No additional teaching time is required.	<p>How hazard risk is a function of spatial interactions between different human and physical processes [Sy]</p> <p>The varying spatial scale of the processes and challenges associated with different kinds of geophysical event and their aftermaths [Sy/Ev]</p> <p>Different perspectives on how geophysical hazard risks should be managed [Ev]</p> <p>How spatial patterns of risk and vulnerability can be represented graphically [Sk]</p>