

"These Quartet Cards have been developed by the Human Resources Development Agency for Energy and Mineral Resources (BPSDM ESDM) through the German Development Cooperation in the field of "Mitigation of Georisks" under the auspices of the Federal Ministry for Economic Cooperation and Development (BMZ), implemented by the Federal Institute for Geosciences and Natural Resources (BGR). You are invited to copy and distribute while referring to the source of origin. Any commercial use is prohibited."

Geological Hazards

EARTHQUAKE
VOLCANO
TSUNAMI
LANDSLIDE



Earthquakes are caused by the movement of the tectonic plates. Most of the strong earthquakes occur along the plate boundaries.

Geological Hazards

EARTHQUAKE
VOLCANO
TSUNAMI
LANDSLIDE



Volcanoes are usually located where tectonic plates meet. The area around the Pacific Ocean where over 75% of the volcanoes on Earth are found is called "The Ring of Fire".

Geological Hazards

EARTHQUAKE
VOLCANO
TSUNAMI
LANDSLIDE



Landslides are a movement of mass of rock, debris or soil down a slope under the direct influence of gravity. Landslide can be slow or fast and disastrous. They can speed up to 200 miles per hour.

Geological Hazards

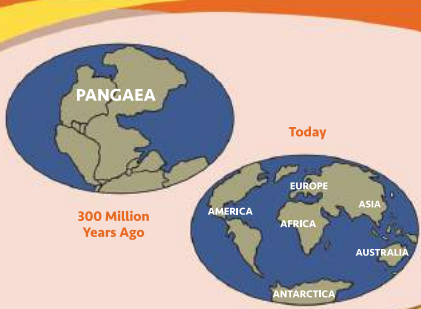
EARTHQUAKE
VOLCANO
TSUNAMI
LANDSLIDE



Tsunamis are triggered by undersea earthquakes. Tsunami means "harbor wave" in Japanese, which refers to the size and devastating force a tsunami can develop.

Earthquake

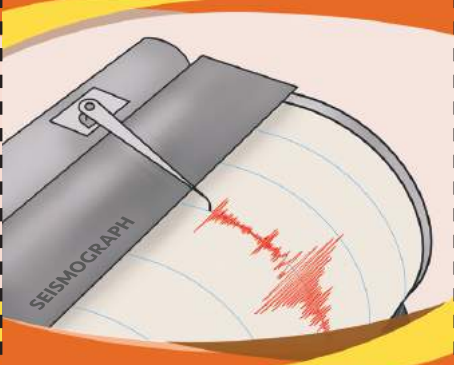
PLATE BOUNDARIES
EPICENTER
INTENSITY
CONTINENTAL DRIFT



The tectonic plates are drifting. The movement of the tectonic plates, including our continents is called Continental Drift.

Earthquake

PLATE BOUNDARIES
EPICENTER
INTENSITY
CONTINENTAL DRIFT



In seismology a scale of seismic intensity is a way of measuring or rating the effects of an earthquake at different sites.

Earthquake

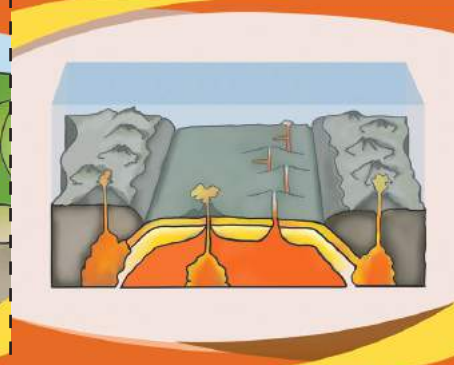
PLATE BOUNDARIES
EPICENTER
INTENSITY
CONTINENTAL DRIFT



The epicenter is the geographical location of the earthquake.

Earthquake

PLATE BOUNDARIES
EPICENTER
INTENSITY
CONTINENTAL DRIFT



There are 7 major tectonic plates drifting over the Earth. The type of plate boundary, where one plate slides under another plate is called Subduction Zone.

QUARTET GEOLOGICAL HAZARDS

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GEOLOGICAL HAZARDS

Landslide

SLOPE
 DEFORESTATION

HEAVY RAINFALL
 MASS MOVEMENT



Heavy rainfalls trigger the destabilization of slopes. If you live in mountainous areas and observe long lasting heavy rainfalls, you should be aware of landslides.

Landslide

SLOPE
 DEFORESTATION

HEAVY RAINFALL
 MASS MOVEMENT



Forests protect the soil surface and therefore are important to keep slopes stable. Reforestation is a common measurement for landslide risk mitigation.

Landslide

SLOPE
 DEFORESTATION

HEAVY RAINFALL
 MASS MOVEMENT



Slope steepness and underlying soils are very important factors for landslide hazards.

Landslide

SLOPE
 DEFORESTATION

HEAVY RAINFALL
 MASS MOVEMENT



Mass movement, such as landslides or rockfalls, is the movement of surface material caused by gravity.

Disaster Impact

DESTROYED HOUSES
 RISK

VICTIMS
 ECONOMIC LOSS



Disasters do not destroy property only, but whole livelihood is lost due to secondary effects on our economic, environmental, and social values.

Disaster Impact

DESTROYED HOUSES
 RISK

VICTIMS
 ECONOMIC LOSS



The saddest impact of the disaster is the loss of lives. We can spare a lot of lives and our own with disaster preparedness.

Disaster Impact

DESTROYED HOUSES
 RISK

VICTIMS
 ECONOMIC LOSS



A disaster often leaves houses destroyed, due to weak construction and the location in disaster prone areas. To keep your house safe, follow the Building Code.

Disaster Impact

DESTROYED HOUSES
 RISK

VICTIMS
 ECONOMIC LOSS



People living in hazardous areas, coupled with the lack of prevention measures and the lack of coping capacity, are living in high risk.

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GEOLOGICAL HAZARDS

Volcanic Eruption

CRATER
 LAHAR
 ERUPTION
 EVACUATION



If you live downhill of a volcanic rift zone and an eruption happens, you will be ordered to evacuate to a safer place at the appropriate time.

Volcanic Eruption

CRATER
 LAHAR
 ERUPTION
 EVACUATION



When volcanic craters cool down after major eruptions, they often fill with water to form crater lakes. Some are cool, just filled by rain water, while others are warm or hot and remain connected to the volcanic plumbing.

Volcanic Eruption

CRATER
 LAHAR
 ERUPTION
 EVACUATION



Lahars are mudflows that originate on the slopes of a volcano. Mudflows contain so much rock debris they look like flowing wet concrete.

Volcanic Eruption

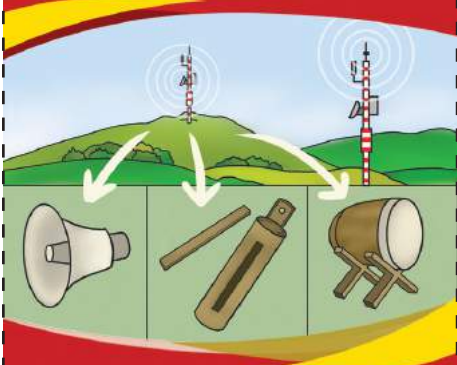
CRATER
 LAHAR
 ERUPTION
 EVACUATION



When a volcano erupts, it spews a huge amount of lava, ash, and steam from its vent. The Krakatau eruption in Indonesia in 1883 was one of the largest eruptions in recent time.

Disaster Mitigation

SPATIAL PLANNING
 SAFER SETTLEMENTS
 WARNING SYSTEMS
 COMMUNITY PARTICIPATION



Early warning is a major element of disaster risk reduction. It prevents loss of life and reduces the economic and material impact of disasters.

Disaster Mitigation

SPATIAL PLANNING
 SAFER SETTLEMENTS
 WARNING SYSTEMS
 COMMUNITY PARTICIPATION



Space is limited and locations have different characteristics, thus not all locations are suitable for every land use. Spatial planning helps us to find a suitable location for settlements.

Disaster Mitigation

SPATIAL PLANNING
 SAFER SETTLEMENTS
 WARNING SYSTEMS
 COMMUNITY PARTICIPATION



Community participation is an important element of effective disaster mitigation. It needs to be assured, that the population is prepared for disasters that might occur.

Disaster Mitigation

SPATIAL PLANNING
 SAFER SETTLEMENTS
 WARNING SYSTEMS
 COMMUNITY PARTICIPATION



In Indonesia, disaster prone areas are conservation zones. These areas are not allowed to be developed.

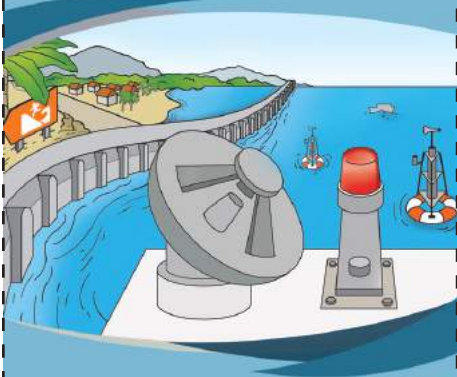
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QUARTET
GEOLOGICAL HAZARDS

Disaster Risk Reduction

MITIGATION
 DISASTER RESPONSE

RECOVERY
 PREPAREDNESS



Structural and non-structural mitigation measures are undertaken to limit the adverse impact of natural hazards.

Disaster Risk Reduction

MITIGATION
 DISASTER RESPONSE

RECOVERY
 PREPAREDNESS



Planning ahead of a disaster can prevent a bad situation from becoming worse. Knowing how to react and having the right supplies at hand in case a disaster strikes can help to keep you safe.

Disaster Risk Reduction

MITIGATION
 DISASTER RESPONSE

RECOVERY
 PREPAREDNESS



Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the affected community.

Disaster Risk Reduction

MITIGATION
 DISASTER RESPONSE

RECOVERY
 PREPAREDNESS

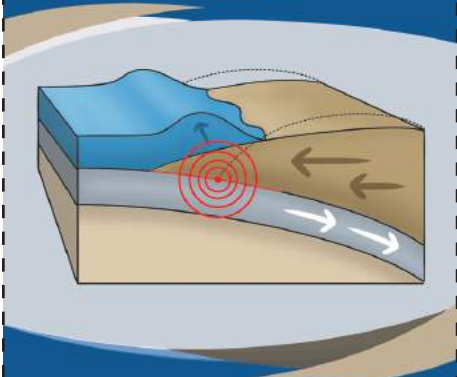


The primary aims of disaster response are rescue from immediate danger and stabilization of the physical and emotional condition of survivors.

Tsunami

OCEAN
 SUBMARINE EARTHQUAKE

EVACUATION ROUTE
 BEACH



A submarine or underwater earthquake is the leading cause for tsunamis.

Tsunami

OCEAN
 SUBMARINE EARTHQUAKE

EVACUATION ROUTE
 BEACH



The evacuation route takes you fastest to the nearest safe place from a Tsunami. Just follow the signboards.

Tsunami

OCEAN
 SUBMARINE EARTHQUAKE

EVACUATION ROUTE
 BEACH



In deep ocean waters a tsunami wave may only be a foot high, but when the wave reaches shallower water near a coastline it rises sometimes up to 100 feet.

Tsunami

OCEAN
 SUBMARINE EARTHQUAKE

EVACUATION ROUTE
 BEACH



Beaches, lagoons, bays, estuaries, tidal flats and river mouths are the most dangerous places to be if a tsunami occurs. It is rare for a tsunami to penetrate more than a mile inland.

HOW TO PLAY

(2 to 4 players)



There are 8 categories with 4 cards each (Quartet).

The purpose of this game is to complete as many sets (4 cards of one category) as possible.

- 1. Shuffle all cards.**
- 2. Distribute 4 random cards to each player.**
- 3. Place the rest of the cards piled in the center (upside down).**
- 4. Look at the cards that you have and choose the category that you want to collect and ask one player for a card from this category. That player has to give you the requested card. If she/he does not have it, you are required to take one card from the pile of cards in the center.**
- 5. Then the next player is allowed to request a card from any other player.**
- 6. If you have collected a complete set of cards (Quartet), place it on the table openly and take 4 new cards from the pile again.**
- 7. The game continues until all the cards of the pile are distributed. The player who completed most Quartet sets is the WINNER!**