JAG01K Unit 2 Earth Processes

Task 1 Speaking: A geologist´s superhero

In pairs, think of a superhero for geologists. What is his/her superpower? Who is their arch-enemy? What costume do they wear in action? What is their daytime job?

EARTHQUAKES

Task 2 True or false? Discuss the following statements:

1. *An earthquake is a motion, trembling, or vibration of the ground caused by the release of stress that has slowly been building up in the Earth´s core.*
2. *Earthquakes are common along active fault zones.*
3. *Certain types of earthquakes are associated with volcanic activity.*
4. *Earthquakes can be caused by huge waves in the ocean called tsunami.*
5. *Scientists can predict in a general way where earthquakes are most likely to occur.*

Task 3 Earthquakes – vocabulary

Can you guess the word?

1. a scientist who studies earthquakes: _____
2. a device that measures and records the strength of an earthquake: _____
3. a number that characterises the relative size of an earthquake: _____
4. the point or area on the Earth´s surface directly above the focus or the point of origin of an earthquake: _____
5. a transverse wave – the particle motion is perpendicular to the direction in which the wave is moving: _____
6. a longitudinal wave (also called a compressional wave) – the particles of material move in the same direction that the wave is travelling: _____
7. the system giving an official measurement of the strength of an earthquake (each of the numerical steps represents a ten-fold increase in the amount of energy released): _____

(adapted from Addison-Wesley, *Earth Science.* Addison-Wesley Publishing Company, 1987.)

Task 4 Scales

A) Put the adjectives in the order of intensity, starting with the weakest ones:

terrified petrified startled afraid panicky shocked scared

B) Now put the descriptions from the simplified Richter magnitude scale in the order of magnitude:

- *felt by very few people*
- *large cracks in walls*
- *most buildings collapse*
- *noticed by many people, windows and doors rattle*
- *detected by seismic instruments only*
- *severe damage or collapse to all buildings, heavy damage extends to distant locations*
- *damage to a moderate number of well-built structures*
- *cracks to plaster, objects fall off shelves*

Task 5 Earthquake damage

Fill in the gaps with the words below:

amount bedrock build epicentre experiencing flexibility sewer slip suffer

The amount of damage caused by an earthquake depends on several factors.

- The (1) …….. of energy in the earthquake waves
  a) Usually the damage is greatest at the (2) …… and becomes less severe as the earthquake waves get farther away
  b) In areas where fault movement is fairly frequent, earthquakes are usually not strong enough to cause severe damage. On the other hand, in the areas where the movement along a fault is rare, stresses in the earth may (3) ……. up to such a strength that, when the earth does (4) ……, a great amount of energy is released and can cause heavy damage.
- The type of rock or sediment through which the earthquake waves are moving. Soft sediments will allow more damage than a solid (5) …… such as granite.
- The type of building materials and the type of construction used in the area that is (6) …… an earthquake (wood frame buildings, for example, may (7) …….. less damage than buildings made of materials that are cemented together). In an earthquake, some (8) …… within the individual structures is desirable. In some cases, the earthquake-caused breaking of water and (9) …….. pipes is a greater threat to a community than is the initial shock damage.

(adapted from Addison-Wesley, *Earth Science.* Addison-Wesley Publishing Company, 1987.)

Task 6 Giving advice: What to do in an earthquake

A) Give your friend advice using some of the following:

- **Use a modal verb** (You should…; You ought to…; You have to…)
- **Ask a question** (Why don´t you…?; How about…?)
- **Use conditional II** (If I were you, I would…)
- **Make a suggestion** (I would suggest…)

B) Use the following tips in sentences, adding a negative where appropriate.

If you are indoors during an earthquake,
- stay in bed and cover your head with a pillow
- take cover by getting under a sturdy table
- use elevators

If you are outdoors during an earthquake,
- look for shelter in a building
- stay away from utility wires

If you are trapped under debris,
- cover your mouth
- light a match
- shout

(https://www.ses.vic.gov.au/get-ready/quakesafe/what-to-do-in-an-earthquake)

Task 7 Modal verbs

Transform the sentences using modal verbs and keeping the meaning of the original sentences.

1. It is not necessary for you to wear a helmet on the site.
   You …… .
2. It is a good idea to bring your laptop to the workshop.
   You …… .
3. Do you mind if I leave earlier today?
   …… ?
4. Smoking is prohibited here.
   You …… .
5. We are allowed to use all the facilities on the campus.
   We …… .
6. It was necessary for them to use a different measurement in the experiment.
   They …….. .
7. I regret using this type of measurement.
   I …….. .
8. I am sure they used a different measurement in the experiment.
   They …… .
9. Maybe they used the other method.
   They …….. .

VOLCANOES

Task 1 Speaking. In groups, discuss which of the natural disasters listed below deserve most attention of scientists. Support your claim with reasons.

earthquakes volcanoes hurricanes wildfires tsunamis landslides avalanches

Task 2 Vocabulary

Match the words below with their descriptions:

vent chamber crater cone

- *a hill formed by (solidified) lava and pyroclastics*
- *an opening at the Earth´s surface or the passage through which volcanic materials are extruded during an eruption*
- *an almost circular depression at the summit of a volcano where volcanic materials are released*
- *a large pool of liquid rock beneath the surface of the Earth*

Task 3 Reading

A) Scan the text below. What are the main effects of volcano hazards? What do they depend on?

Effects of Volcano Hazards

Many kinds of volcanic activity can endanger the lives of people and property both close to and far away from a volcano. Most of the activity involves the explosive ejection or flowage of rock fragments and molten rock in various combinations of hot or cold, wet or dry and fast and slow. Some hazards are more severe than others depending on the size and extent of the event taking place and whether people or property are in the way. And although most volcano hazards are triggered directly by an eruption, some occur when a volcano is quiet.

Volcanic eruptions are one of Earth´s most dramatic and violent agents of change. Not only can powerful explosive eruptions drastically alter land and water for tens of kilometres around a volcano, but tiny liquid droplets of sulphuric acid erupted into the stratosphere can temporarily change the planet´s climate. Eruptions often force people living near volcanoes to abandon their land and homes, sometimes forever. Those living farther away are likely to avoid complete destruction but their cities and towns, crops, industrial plants, transportation systems, and electrical grids can still be affected.

B) In the text above find one word for each definition:

Small pieces or parts, especially when broken from something whole: ……

Causing great pain, damage, worry, etc., very serious: …….

In a way that does not last for long or for ever: ……..

To leave a place, thing or a person, usually for ever: ……..

Systems of wires through which electricity is connected: ……..

C) Study the cause and effect relationship in the sentences below. Identify the words that are used to express it.

1. Most volcano hazards are triggered directly by an eruption.
2. Electrical grids can be affected.
3. The ash spewed by a volcano can negatively affect the engines in an aircraft.
4. The explosiveness of the eruption could cause pyroclastic flows which would destroy anything within their path.
5. Volcanoes can be destructive but *volcanic* action can lead to the formation of fertile *soils.*
6. Ash and lava could have a negative impact on the soil, primarily through making the soil more acidic.
7. A volcanic eruption of Mount Krakatoa in 1883 resulted in tsunamis killing over 35,000 people.

Describe the cause and effect relationship between other phenomena, e.g. earthquakes and tsunami, earthquakes and volcanoes, human activity and global climate change, etc.

D) Task 4 Video – The Colossal Consequences of Supervolcanoes
(https://ed.ted.com/lessons/the-colossal-consequences-of-supervolcanoes-alex-gendler/)

E) Word formation: Prefixes hyper-, hypo-, post-, sub-
Guess the meaning of the following words:

hypersonic	***postglacial***
hyperabundant	***postmortem***
hypothermia	***submerge***
hypoacidic	***suboceanic***

Task 4 Video – The Colossal Consequences of Supervolcanoes

(https://ed.ted.com/lessons/the-colossal-consequences-of-supervolcanoes-alex-gendler/)

1. What do you think were the main aspects of the events of 1816 that made people suspect a supernatural apocalypse?
2. Which aspect of a supervolcanic eruption makes it deadly?
3. What caused the genetic human evolution bottleneck 70,000 years ago?
4. Describe the steps of how a caldera is formed and how it leads to a supervolcanic eruption.
5. Which famous USA landmark sits atop a supervolcano?
6. How can the devastating effects of a supervolcano be avoided?