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EARTHQUAKE



WHAT IS AN EARTHQUAKE?

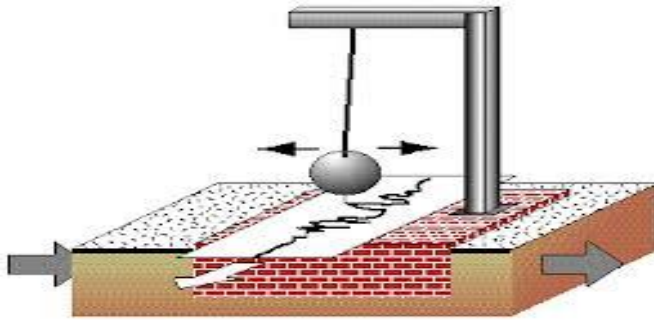
Earthquakes are tremors or vibrations in the Earth's crust which cause the ground to roll, shake and move.

WHAT HAPPENS?

The Earth's outer layer is broken into seven large pieces, or plates / *tectonic plates*. All of these plates move in different directions and at different speeds. They usually move between 2 cm to 10 cm per year. The plates are always slowly moving, but they get stuck at their edges due to friction. This leads to accumulation of stress. When the stress on the edge overcomes the friction, there is an earthquake that releases energy in *seismic waves* that travel through the earth's crust and cause the shaking that we feel. These seismic waves can cause damage to buildings and other structures.

Plates: The earth is made of the inner core, the outer core, the mantle and the crust. Plates are large pieces of rock in the earth's outer shell. The crust has large plates that fit together like loose pieces of a jig saw puzzle around the planet; **Seismic waves:** Vibrations that move through the earth in a way similar to waves moving in water. They can travel through solids and liquids.

When this stress on the plates gets too large, it exceeds the strength of the rocks in the crust and causes fractures. These fractures are known as faults and as these represent zones of weakness within the lithosphere, it is along faults where the majority of earthquakes occur when the plates slip suddenly.



Seismograph: Instrument that plots the intensity of earthquake waves on a roll of specially marked graph paper.

The magnitude of an earthquake is determined by the use of a scale called **Richter Scale** and the intensity of an earthquake is determined by a **Modified Mercalli Scale**.

A person who studies earthquakes is called a **Seismologist**.

SOME SAFETY MEASURES

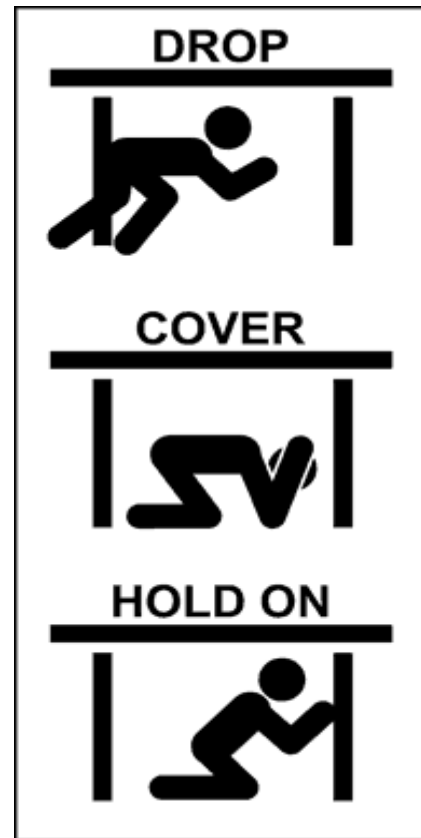
BEFORE

- ✓ Make an emergency kit.
- ✓ Make an emergency plan.
- ✓ Know the safe spots in every room – under a sturdy table or against an inside wall.
- ✓ Ask your family/school to hold earthquake drills – drop, cover and hold on!

DURING

If inside:

- ✓ DROP to the ground.
- ✓ Take COVER under a sturdy table or other heavy furniture. If there is nothing to get under, cover your face and head with your arms and crouch near an inside wall.
- ✓ HOLD ON until the shaking stops.
- ✓ STAY AWAY from windows, glass, lighting fixtures, or furniture that could fall, like bookcases.
- ✓ STAY INSIDE during the shake!
- ✓ Do not use elevators!





If outside:

- ✓ Stay there. Move away from buildings, streetlights and wires.
- ✓ Stay out in the open until the shaking stops. Buildings could collapse and hurt you.

If trapped under debris:

- ✓ Cover your mouth with your shirt.
- ✓ Do not scream – you could breathe in dust.
- ✓ Tap on a pipe or wall so rescuers can find you.

AFTER

- ✓ Expect aftershocks. They are usually not as strong but can cause damage.
- ✓ Open cabinets carefully. Objects might have moved and could fall on you.
- ✓ Wear long pants, long sleeves and shoes to protect your skin from getting scratched by broken objects.
- ✓ Don't put on electric switches or light a lamp or put on gas stoves without checking the damages and risks involved.



- ✓ Text, don't talk. Unless there's a life threatening situation, if you have a cell phone, send a text so that you don't tie up phone lines needed by emergency workers. Plus, texting may work even if cell service is down.
- ✓ Do not spread or listen to rumors.
- ✓ Listen to radio for latest information and instructions from local authorities.

Aftershocks: A smaller earthquake that follows the main shock or previous earthquake.

TEST YOUR KNOWLEDGE

I. Unscramble the following words

1. AHRQETAUEK
2. PIEECTNER
3. ESISOAGPMRH
4. FTSACRKOEH

II. Fill in the blanks from the following words

Warning, Tectonic plates, Panic, Drop-Cover-Hold on

1. Practise your earthquake drill of _____
2. Do not _____
3. Earthquakes usually give no _____
4. Earthquakes are caused by movement of _____

III. Match the column

Sl no.	Column A	Column B
1	Do not use	Cover mouth with shirt
2	During earthquake, if you are outside	Lift / elevator
3	If trapped under debris	Drop-Cover-Hold on
4	During earthquake, if you are inside	Stay outside

DID YOU KNOW?

- ✓ The largest recorded earthquake in the world was a magnitude 9.5 (Mw) in Chile on May 22, 1960.
- ✓ An earthquake on the moon is called a moonquake. Moonquakes are normally weaker than earthquakes.
- ✓ An average earthquake lasts around a minute.
- ✓ Japan is one of the most earthquake-prone nations in the world.
- ✓ Earthquakes can happen in any kind of weather.
- ✓ Sikkim has experienced 2 major earthquakes recently on 14th Feb 2006 and on 18th Sep 2011.

LANDSLIDE AND DEBRIS FLOW



WHAT IS A LANDSLIDE?

Landslides take place when dirt, pebbles, rocks and boulders slide down a *slope* together. Sometimes these landslides are small, and hardly noticeable. Other times however, they can be substantial, involving the entire side of a mountain.

Landslides can occur in any area, although some areas are more prone to landslides. Landslides could be triggered by a number of different causes such as earthquake, heavy rainfall, soil erosion, etc.

WHAT HAPPENS?

In a landslide, masses of rock, earth or *debris* move down a slope. Debris and mud flows are rivers of rock, earth, and other debris soaked with water. They develop when water builds up quickly in the ground, during heavy rainfall or rapid snowmelt and changes the earth into a flowing river of mud or “slurry.” It occurs quickly, striking fast with little or no warning and

can travel several miles from their source, growing in size as they pick up trees, boulders, cars, and other materials.

Slope: slanted surface of the earth; **Debris:** rubble, trash, random material like large pieces of wood, metal, plastic, etc.

SOME SAFETY MEASURES

BEFORE

- ✓ Make an emergency kit.
- ✓ Make an emergency plan.
- ✓ Become familiar with the land around you. Find out if you are in a landslide prone area.
- ✓ If you are near a stream or river, be alert for any sudden increase or decrease in water flow and for a change from clear to muddy water.

DURING

- ✓ Stay alert and awake. Many people die from landslides when they are sleeping.
- ✓ Listen for unusual sounds like trees cracking or boulders knocking together. If you hear something, tell an adult immediately!
- ✓ Move away from the path of a landslide or debris flow as fast as you can.
- ✓ If you cannot escape, curl into a tight ball and cover your head with your hands and arms.

AFTER

- ✓ Stay away from the slide area. There may be additional slides.
- ✓ If you see dangling or loose wires, stay away and tell an adult.
- ✓ Listen to safety officials about where it is safe to go.

TEST YOUR KNOWLEDGE

I. Unscramble the following words

1. ANLSDILED
2. EBDIRS
3. LOSEP
4. LUSRYR

II. Fill in the blanks from the following words

landslide prone area, alert, mass of moving rocks and soil, earthquake

1. Landslides are _____
2. In case of heavy rainfall, stay _____
3. Landslides may be triggered by _____
4. It is advisable not to live in a _____

III. Match the column

Sl no.	Column A	Column B
1	If you see dangling wires	Stay alert and listen for unusual sounds
2	If you are near a river	Stay away and inform an adult
3	During heavy rainfall	For safety instructions
4	Listen to safety officials	Check if the water turns from clear to muddy

IV. Where will you see the following sign and what does it indicate?



DID YOU KNOW?

- ✓ Certain types of vegetation help to hold soil and control landslides.
- ✓ There are some warning signs of landslide such as
 - Leaning trees
 - Water coming through the ground in new places
 - Slowly developing, widening cracks in the ground and streets
 - Tilting electric and telephone poles
 - Decks or patios that start to lean away from a house
 - Unusual sounds like trees cracking or boulders knocking together
 - New cracks in tiles, bricks, or building foundations

HAILSTORM



WHAT IS A HAILSTORM?

During a hailstorm small balls of ice fall from the sky which are called hailstones.

HOW DOES IT OCCUR?

Hailstones begin their life in a *thunderstorm cloud* as a tiny droplet of water, where cold and warm air currents collide. It is these air currents, and the difference in air temperature, that causes hailstones to form.

When the water droplet lands in a warm air current it is lifted upward, much like soap bubbles in the breeze. The air current takes the water droplet high into the cloud where temperatures are below freezing. The droplet freezes into a tiny ball of ice.

When the hailstone freezes it may be caught by a cold *downdraft* of air that pulls it downward rapidly. As it falls to lower levels where the temperatures are warmer, it begins to melt.

Thunderstorm cloud: Large group of tiny water droplets that we can see in the air. The droplets are so small and light that they can float in the air; **Downdraft:** A strong downward moving air

Normally, the hailstone melts completely and falls to the ground as rain. But, sometimes, the hailstone is caught up in another warm current that carries it upward to freezing temperatures. When this happens the hailstone forms another layer of ice.

If the hailstone is repeatedly carried upward and then falls and begins to melt, the hailstone grows larger each time it freezes. Eventually, it gets too heavy and falls to the earth. Because the stone is so big, it does not have time to melt before it reaches the ground.

Hailstorm may injure people and animals. It can also damage crops.

SOME SAFETY MEASURES

BEFORE

- ✓ Make an emergency kit.
- ✓ Make an emergency plan.
- ✓ Inform farmers on putting cattle shed.
- ✓ Inform farmers on need for crop insurance.
- ✓ Listen to weather forecast and warnings on television or radio.

DURING

- ✓ Find shelter. If you are inside, stay inside. Whether in a house or a car, you are safest where you are not going to be hit by hailstones. If you are outside and can't find shelter, use something to protect your head. Do not take shelter under trees as they can be hit by lightning or be blown over during a hail storm.

- ✓ Stay a safe distance from windows as hail stones or blowing tree branches can shatter a window during a storm.
- ✓ Avoid using electrical appliances. These may conduct electricity from lightning and electrocute you.
- ✓ Turn off and disconnect all electrical appliances, especially computers and televisions. If there is a power cut during the storm, keep everything turned off and disconnected until power is safely back on.
- ✓ If you are in vehicle, ask the driver to stop on the side of the road, away from ditches that may flood and far enough over not to block traffic. Cover your head with jacket, etc to avoid injury from broken windows.

AFTER

- ✓ Be careful on roads that may be slippery after a storm.
- ✓ Be careful from windows which could be broken by the storm.
- ✓ Stay away from electrical wires that could be damaged by the hailstorm.

TEST YOUR KNOWLEDGE

I. Unscramble the following words

1. AIHOSLRTM
2. AHLNITSEO
3. OLUCD
4. ADORFWNTD

II. Fill in the blanks from the following words

Mountainous regions, Thunderstorm cloud, Hailstone, Updraft and Downdraft

1. Balls or irregular lumps of ice that fall from the sky are called _____
2. Hailstones are formed in _____
3. Hailstorms usually occur in _____
4. Hailstones move up and down between _____

III. Match the column

Sl no.	Column A	Column B
1	Hailstorms	Seek shelter
2	During a hailstorm, if inside	May injure people and damage crops
3	Listen to	Stay away from windows
4	During a hailstorm, if outside	Weather forecast and warnings

DID YOU KNOW?

- ✓ Hailstorms usually occur mostly in mountainous regions than the regions with a lower temperature.
- ✓ Hailstones sometimes contain foreign matter such as pebbles, leaves, twigs, nuts, and insects.
- ✓ Normally, the heavier and bigger the hailstone is, the higher in the sky the hailstone falls from.
- ✓ The most deadly international hailstorm on record occurred in India on April 30, 1888 when close to 250 people were killed by falling hail, some died immediately, others died later from their injuries.

FIRE



WHAT HAPPENS?

- Forest areas catch fire
- Fire in the house or buildings occur due to an accident

A **wildfire** is a fire that is difficult to control and takes place in the wilderness, like a forest or countryside. Wildfires often begin unnoticed. These fires are usually started by lightning or accidents, such as campers or hikers who did not put out their campfire properly. They spread quickly, burning bush, dry leaves, trees, and homes.

SOME SAFETY MEASURES

BEFORE

- ✓ Make an emergency kit.
- ✓ Make an emergency plan.
- ✓ Help your parents to clean off dry leaves and twigs. These can catch fire if a wildfire is near your home.



- ✓ Never play with matches. You could accidentally start a fire.

DURING

- ✓ Listen to emergency officials if they ask you to evacuate.
- ✓ If you see a wildfire, call 101. You may be the first person to have spotted it!
- ✓ Help your parents fill outdoor tubs or cans with water.
- ✓ Help your parents place important papers inside the car. Put your pets in the car, too, so if you need to leave immediately, everything is packed.
- ✓ Put important things that won't be damaged by water in a pool or pond.
- ✓ Turn on outside lights and all the lights inside the house. This will help it to be seen in heavy smoke.

AFTER

- ✓ Stay away from downed or dangling power lines. They could *electrocute* you.
- ✓ Look out for ash pits or hidden *embers*. Stay away. They could burn you.

Electrocute: To kill by passing electricity; **Ember:** Pieces of burnt object that is still hot though it is no longer burning with flames

Home fires are often caused by carelessness and can be prevented.

WHY FIRE IS DANGEROUS!

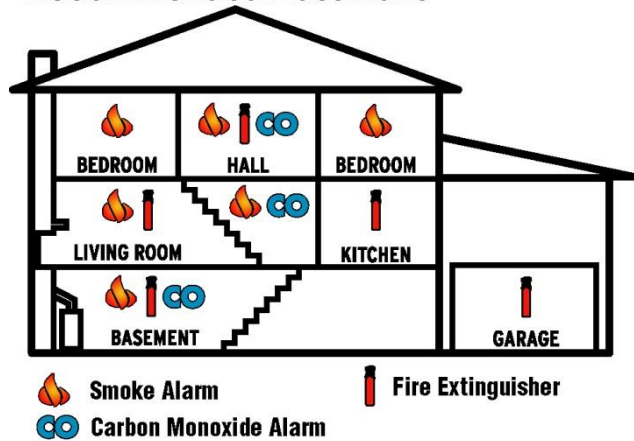
It is fast - There is no time to gather anything or make a phone call. In just two minutes, a fire could kill you. In five minutes, a house could be swallowed in flames.

It is hot - Heat and smoke could be even more dangerous than the flames. Breathing in really hot air could burn your lungs, and fire produces poisonous gases that can make you sleepy and unable to escape.

It is dark - It can be hard to find your way out of your house in a fire.

It is deadly - Fire uses up oxygen you need to breathe and produces smoke and poisonous gases that kill.

Recommended Locations



SOME SAFETY MEASURES

BEFORE

- ✓ Make an emergency kit.
- ✓ Make an emergency plan.
- ✓ Create a fire escape plan and practise it twice a year.
- ✓ Have *smoke alarms* and *fire extinguishers* in your house.
- ✓ Find two ways to get out of each room. A window might be a second way if the door is blocked by fire or smoke.
- ✓ Practice feeling your way out of the house in the dark or with your eyes closed.
- ✓ Sleep with your door closed. It helps prevent fires from spreading quickly.

Smoke alarms: Sensors attached to the ceilings that sound an alarm when they sense smoke; **Fire extinguishers:** A fire protection device to put out small fires

DURING

- ✓ Get low and go! Crawl under smoke to an exit. Heavy smoke and deadly gases collect along the ceiling.
- ✓ If you hear a smoke alarm, get out fast! You may only have a few seconds to escape.
- ✓ If smoke is blocking the door, use your second way out of the room or house.
- ✓ Feel the doorknob and door before opening it. If it is hot, leave the door closed and use the second way out.
- ✓ If you see smoke coming around the door, use the second way out.
- ✓ If you open a door, open it slowly and be ready to shut it quick if there is smoke.
- ✓ Don't hide from firefighters! They may look scary with all of their equipment but they are there to help you.
- ✓ Tell firefighters if there are any pets trapped in the house. Don't try to get them yourself!
- ✓ If your clothes catch on fire, **STOP – DROP – ROLL!** **STOP** running, **DROP** to the ground and cover your face with your hands. Then **ROLL** over and over or back and forth until the fire is out.



AFTER

- ✓ Don't go back into any building unless a firefighter or your parents say it is safe.

- ✓ If you are at home, keep a “fire watch”. That means, look for smoke or sparks throughout the house. If you see anything, tell a grown-up immediately!
- ✓ If you have evacuated, do not go home until safety officials say it’s okay.
- ✓ Stay away from downed or dangling power lines. They could electrocute you.
- ✓ Look out for ash pits or hidden embers. Stay away. They could burn you.
- ✓ Do not use water from the faucet unless emergency officials say it’s okay.

Evacuate: Leaving an area that has been declared unsafe

TEST YOUR KNOWLEDGE

I. Unscramble the following with the help of the meanings given

1. XTEIINSUEGRH (A fire protection device to put out small fires)
2. VACEIAUOTN (Leaving an area that has been declared unsafe)
3. XYEONG (The air that we breathe. Fires need it in order to burn)

II. Fill in the blanks from the following words

Matches, Stop-Drop-Roll, 101, Smoke Alarms and Fire Extinguishers

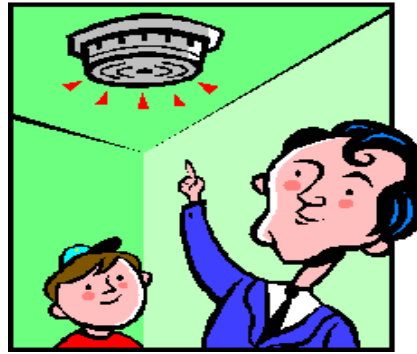
1. Practise your fire drill of _____
2. Never play with _____
3. In your house and school, keep _____
4. If you see fire, call _____

III. Match the column

Sl no.	Column A	Column B
1	If you are on fire	Collect along the ceiling
2	Before opening a door	Get out fast
3	If you hear smoke alarm	Stop-Drop-Roll
4	Heavy smoke and deadly gases	Feel the door knob

IV. What do you call the following and what is it used for?





ACTIVITY

Find out the following information about your state / town / village

1. How many Fire Brigade Stations does Sikkim have?
2. Do you have one in your town / village?
3. How far is the closest Fire Brigade Station from your house?
4. What is the Fire Emergency Number of your area?