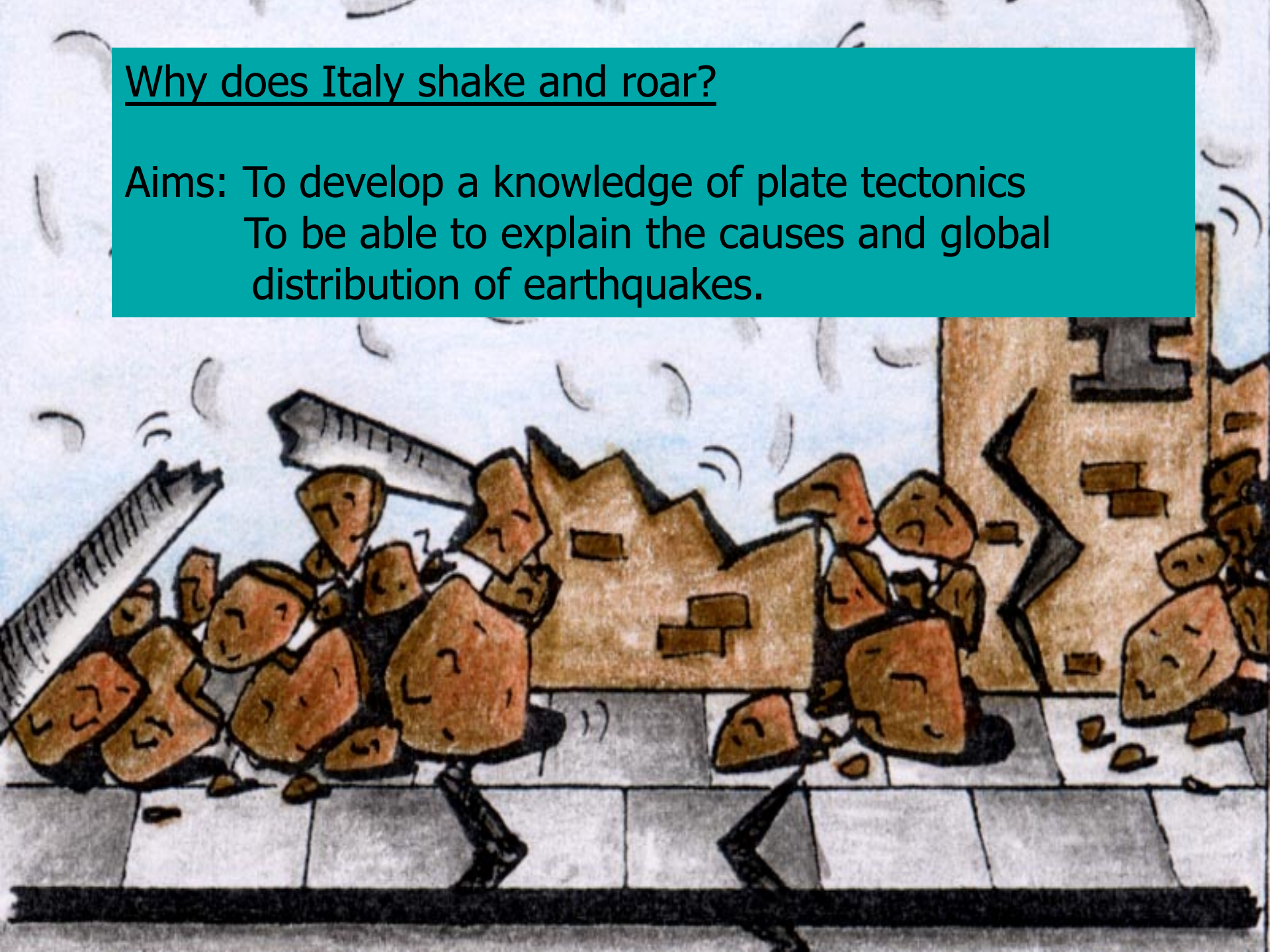


Why does Italy shake and roar?

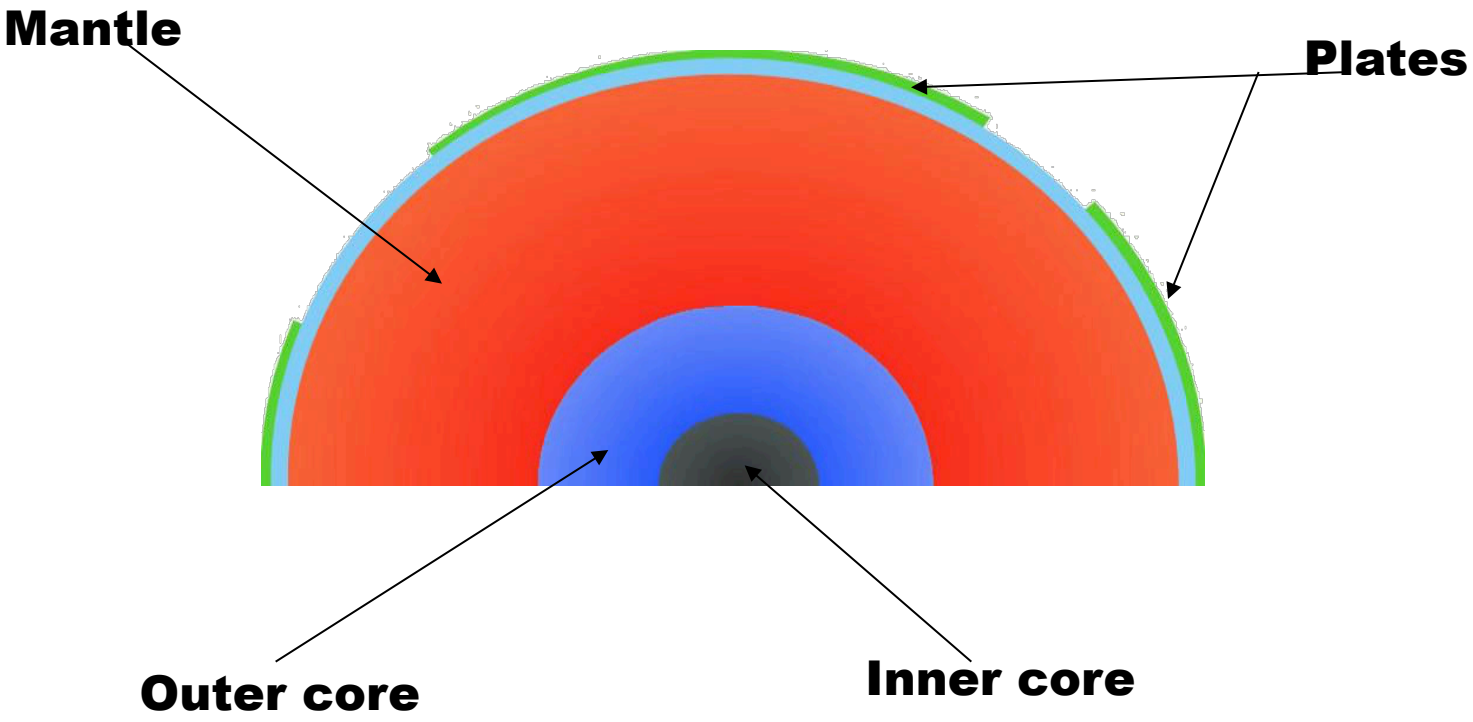
Aims: To develop a knowledge of plate tectonics
To be able to explain the causes and global distribution of earthquakes.

Keywords: Earthquakes, plate margins, conservative margins, destructive margins, seismograph, focus, epicentre.

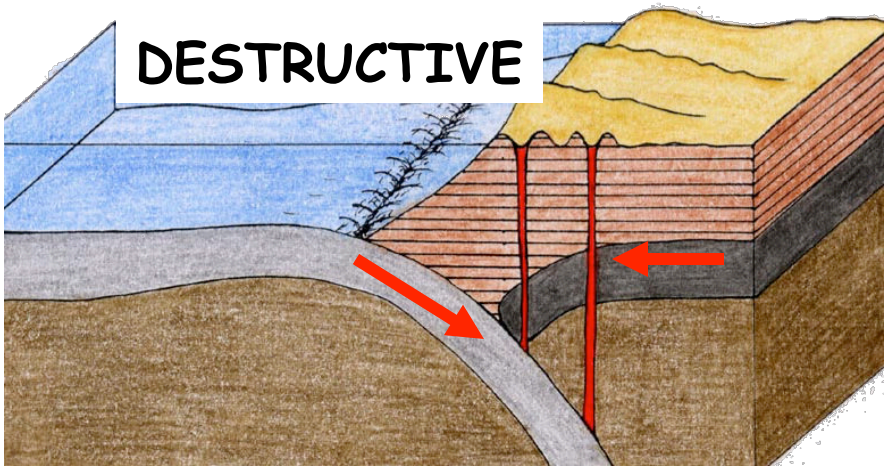
Starter: Answer the following

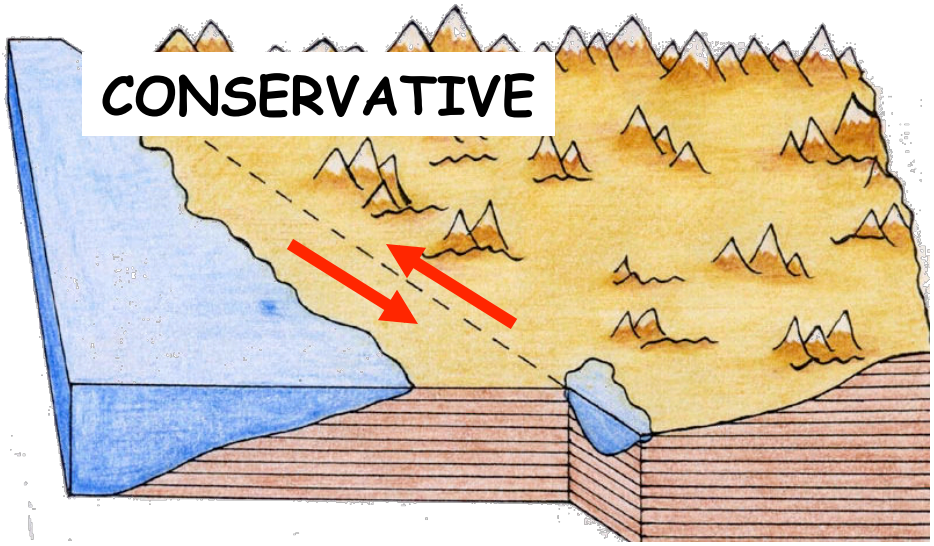
- **What is an earthquake?**
- **Where do they happen?**

Cross-section of the Earth



What are earthquakes? What are plate margins?



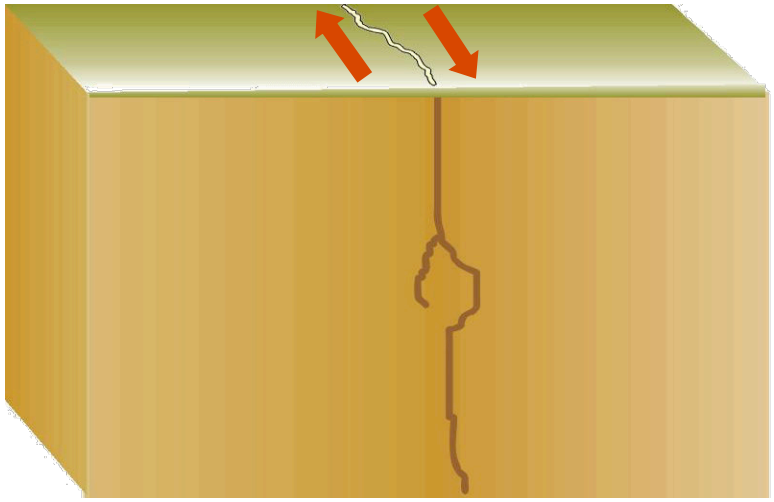


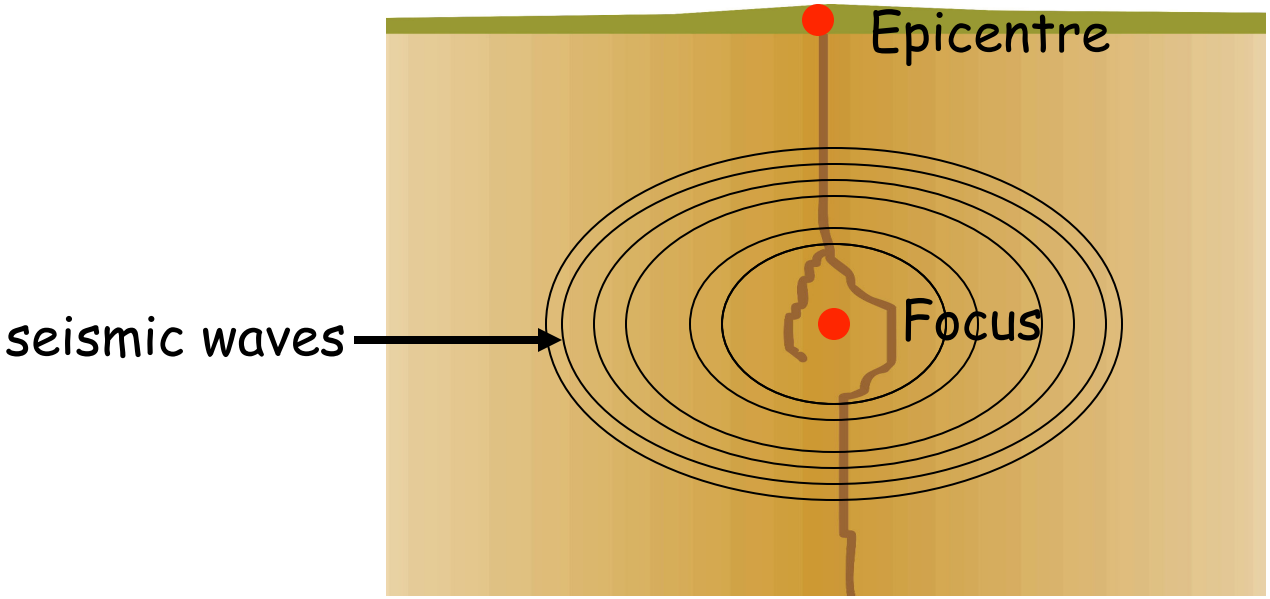
Earthquakes are vibrations caused by earth movements at plate margins and at major fault lines (cracks in the earth's surface).

They can occur at all major plate margins but the most severe earthquakes are normally found at **CONSERVATIVE** and **DESTRUCTIVE** margins.

Why do earthquakes happen?

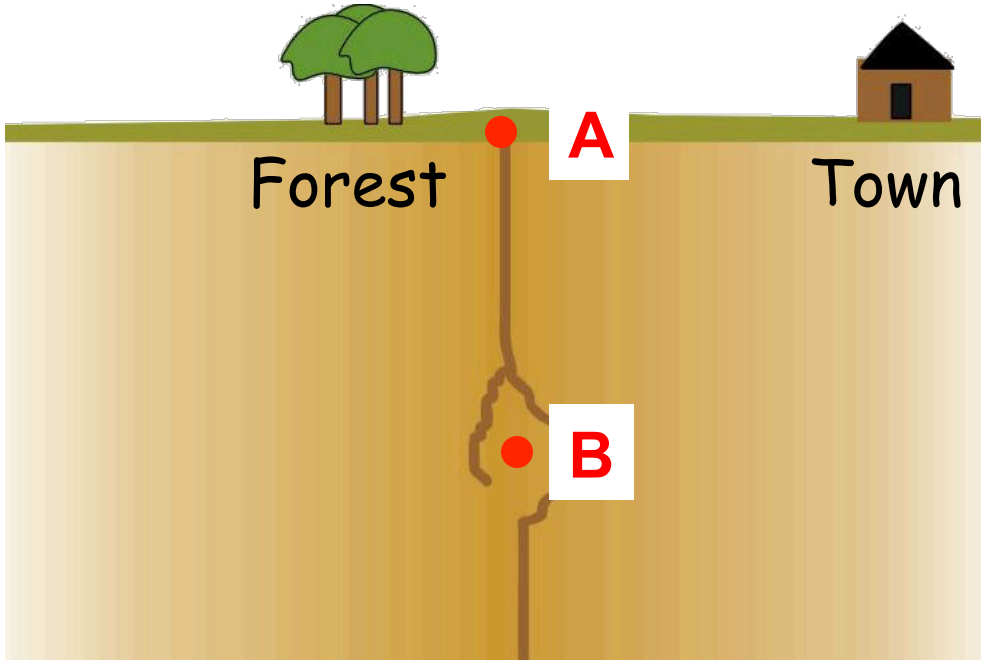
The two plates at a plate margin cannot move past each other easily. The two plates become locked. Friction causes pressure to build up. Suddenly, the pressure is released and the plates jolt into a new position. This causes **seismic waves**. The vibrations they cause are called an **earthquake**.





Focus is the point at which the rock moves. The seismic waves start at the focus.

Epicentre is directly above the focus on the Earth's surface.



Epicentre

Focus

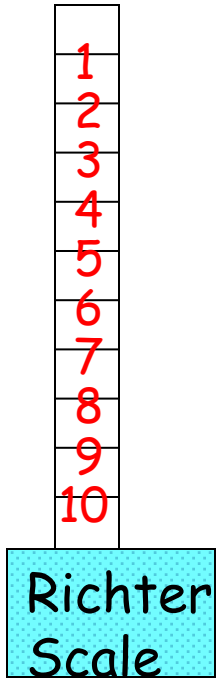
An earthquake has occurred along this fault line.
Match the letter with the correct label.

How are earthquakes measured?

The Richter Scale

This measures the magnitude of a tremor (how powerful it is) using an instrument called a **seismograph**.

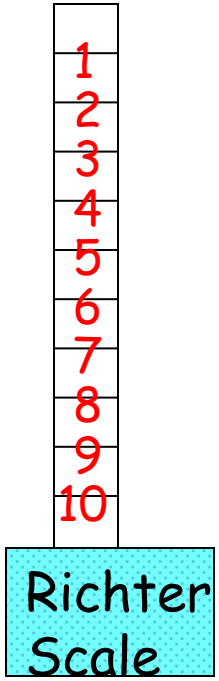
The Richter Scale is measured on a scale from 1 to 10. It is a logarithmic scale which means that a size '6' on the Richter Scale is 10 times more powerful than a size '5' and 100 times more powerful than a size '4'.



The largest earthquake ever recorded was in Chile. It measured 8.9 on the Richter Scale.

The Japanese earthquake in Kobe (September 1995) measured 7.2 on the Richter Scale.

The Greek earthquake (June 1995) measured 6.2 on the Richter Scale.



How many times greater was the Japanese earthquake?

Match up the correct keyword with its meaning.

- **Earthquakes are…where the earthquake begins in the crust.**
- **Conservative margins are…an instrument to measure earthquakes.**
- **Plate boundaries are…a movement or tremor in the earths crust.**
- **Destructive margins are…where two plates move alongside each other.**
- **A seismograph is …where two plates are destroyed as they push towards one another.**
- **The focus is….directly above the focus on the earths surface.**
- **Epicentre…a boundary between two plates.**

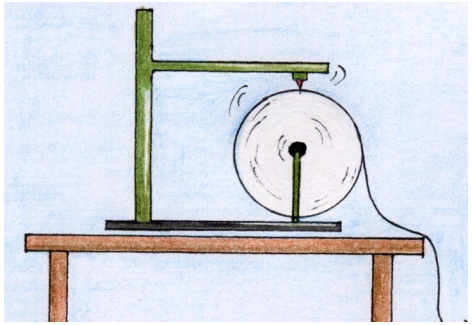
1)How can we predict an earthquake?

predict → plan → protect

a tiltmeter can check any movement within the rocks

water levels can rise in wells and lakes because of cracks in the rock

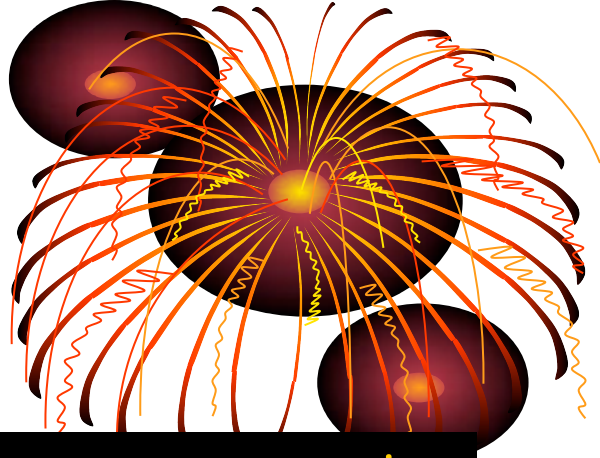
1. predict

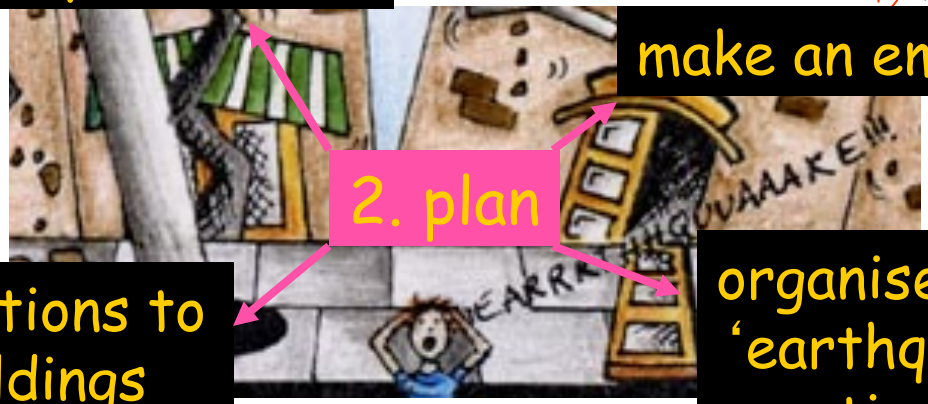


animals can act strangely before the earthquake

foreshocks before the main quake can be detected by a seismometer

advise people to plan for an earthquake (eg tell them to turn off the gas, find a 'safe' place in their homes, pack an emergency kit)





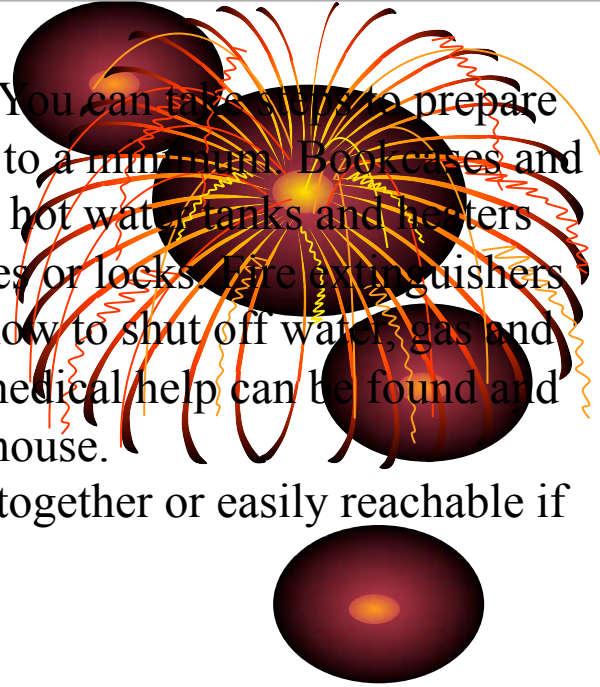
make an emergency plan

enforce regulations to make some buildings earthquake proof

organise regular 'earthquake practices' for offices and schools

2) How can we plan for an earthquake?

Prepare in advance



Earthquakes are unpredictable. There will be little, if any, warning. You can take steps to prepare yourself and your house in advance to make sure that risks are kept to a minimum. Bookcases and tall furniture that might fall over can be screwed to the nearby wall, hot water tanks and heaters can be strapped to a wall, cupboards can be fitted with strong catches or locks. Fire extinguishers should be available and you should know how to use them. Know how to shut off water, gas and electricity supplies. Everyone should know where fire, police and medical help can be found and how to summon assistance. Identify a meeting point outside of the house.

Every house should have an emergency kit in case of disaster, kept together or easily reachable if needed

- **first aid kit - know what to do and what to use**
- **food in cans (don't forget to include a can opener)**
- **sleeping bags, protective outer clothing, sturdy shoes**
- **water supplies (one gallon per person per day - allow for three days)**
- **torch, batteries, battery powered radio**
- **any special items required for young children or the elderly**
- **keep a torch, batteries and shoes by your bed in case of a night time earthquake**

When an earthquake occurs, don't panic!

3) Imagine you live in an earthquake zone. Design a leaflet to help peop

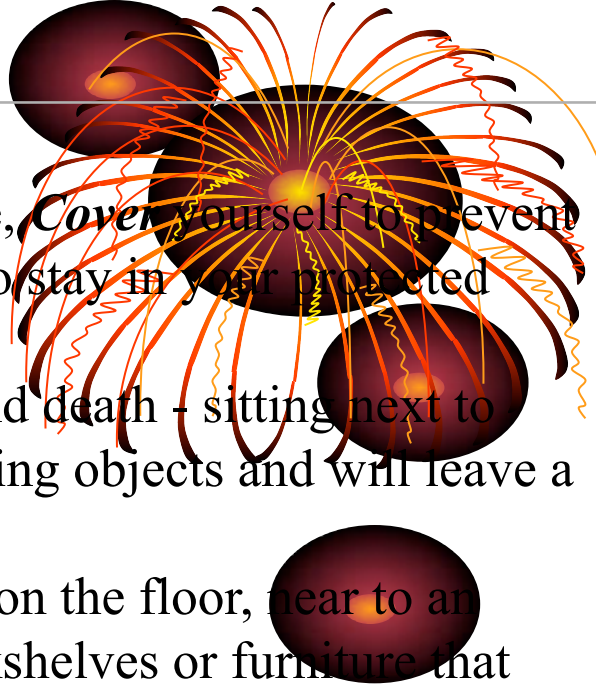
Drop, Cover and Hold On!

Drop alongside something strong and sturdy - a desk or table, ***Cover*** yourself to prevent falling objects from hitting your head or body and ***Hold on*** to stay in your protected area.

Crawling under desks and tables can lead to crush injuries and death - sitting next to desks and tables means that they are likely to absorb any falling objects and will leave a space at the side - large enough for a person to survive.

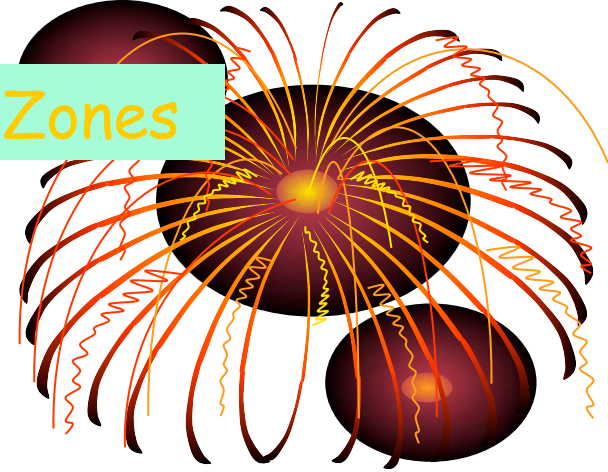
If you cannot get close to a table or desk then you should sit on the floor, near to an inside wall and away from windows (glass can shatter), bookshelves or furniture that could fall over. Sit beneath stairs or in door frames.

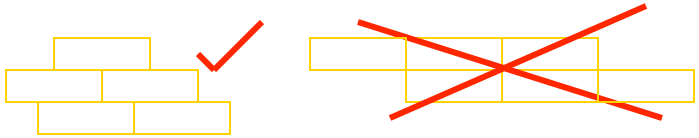
Earthquake drill should be practiced at least twice a year so that everyone knows what to do the moment the ground starts to shake.



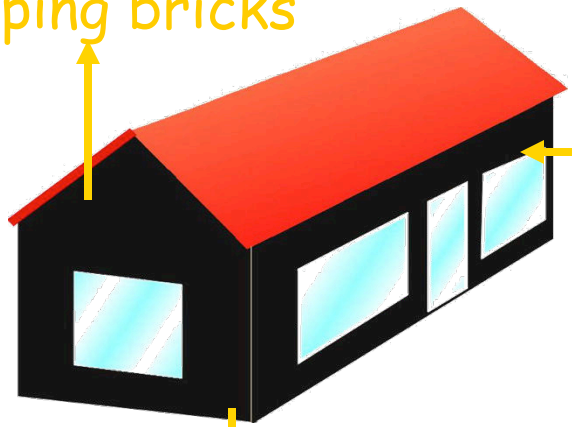
4) Design a poster to tell pupils what to do if an earthquake happens in

Building Regulations in Earthquake Zones





overlapping bricks

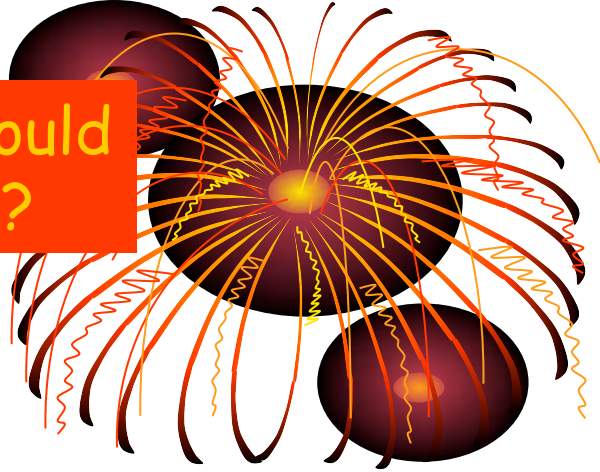


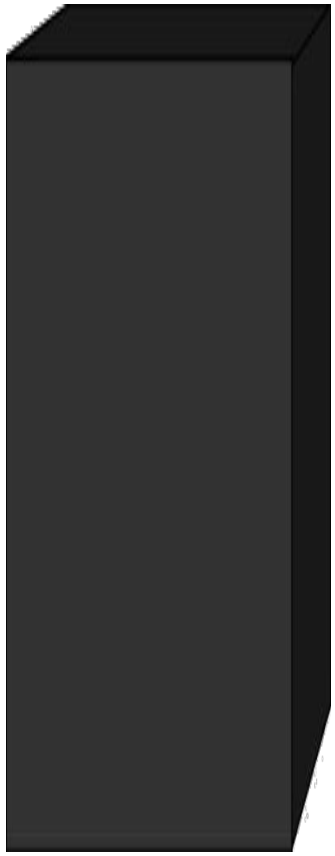
strong lintels

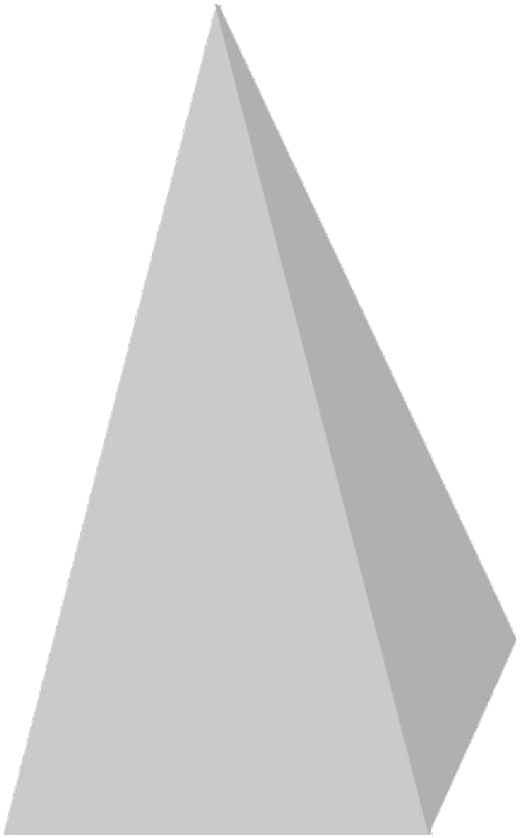
deep foundations

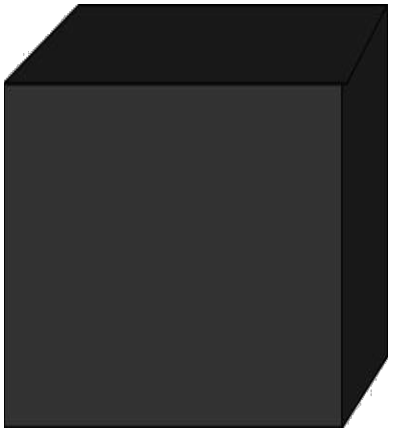
5) How can building be built to withstand earthquakes?

6) Which shape of building would be most 'earthquakes proof'?









Built to withstand earthquakes.

The Transamerica Pyramid in San Francisco , built to withstand earthquakes, swayed more than 1 foot but was not damaged in the 1989 California earthquake.

7) Why did it not get damaged?