ASPIRE
INTERNATIONAL SCHOOL

Science Department

2023/2024

Year 7

Term 2, Revision Pack (Unit 6)

Name: …….

Class: ……

6.1 Sound waves

Things that vibrate make sounds. To vibrate means to move **backwards and forwards** very quickly.

Not all sounds are the same, sounds can vary in both **loudness** and **pitch**.

Loudness means how energetic the particles are.

- if vibrations are very large (energetic), the sound is loud, such as a vacuum cleaner
- if vibrations are very small (less energetic), the sound is quiet, such as clicking on a keyboard.

- We increase the **loudness** of sound by using more **force** (hit a drum stronger, pluck a string with more force)

The pitch explains the sharpness of the sound. (**How high or low the tone is**)

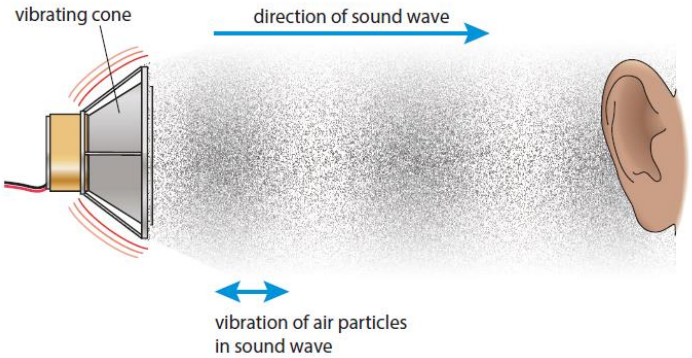
- Thunder makes a sound with a low pitch.
- A baby crying makes a sound with a high-pitch

- We increase **the pitch** of sound in a guitar by increasing the **tension** of a string, decreasing its **length** (shorter) or decreasing the **thickness** (thinner string).

Sound travels from a vibrating object to our ears, this is called a **sound wave**.

When the particles in front of the object vibrate, those particles make other particles in front of them vibrate. This makes a sound wave.

The **speed of sound** waves in air is about 343 metres per second.



Notes:

- The vibrations of the air particles in very loud sounds can cause damage to the ears.
- Vibrations from very quiet sounds can be too small for the ears to detect.
- Sound at a certain pitch can cause damaging vibrations, even when the sound is not very loud.

Remember that sound is a way of transferring energy (sound waves transfer sound energy).

- Sound waves travel faster in a solid, than a liquid than a gas, as the particles of the solid are tightly packed, with larger spaces in a liquid and far apart in a gas.

- There are no sounds (vibrations) in a vacuum as there are no particles to vibrate or a medium to transfer these vibrations.

To hear a sound, there must be:

- a vibration to make the sound
- a medium containing particles through which the sound wave can travel.

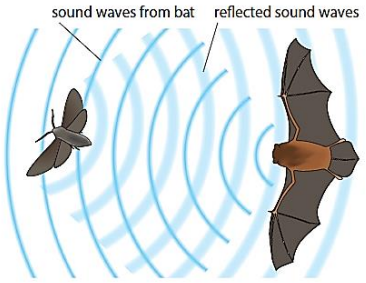
6.2 Reflections of sound

One **property** of all waves is that they can be **reflected** from surfaces. Therefore, sound waves can be reflected.

- A sound wave travelling towards a wall will hit the wall and come back.

- Sound waves reflect best from large, smooth, flat surfaces.

- The reflection of a sound wave is called an **echo**.



The sound wave from the bat (thin lines) echoes off the insect (wider lines).

Examples of useful echoes:

1- Bats use echoes to find insects for food.

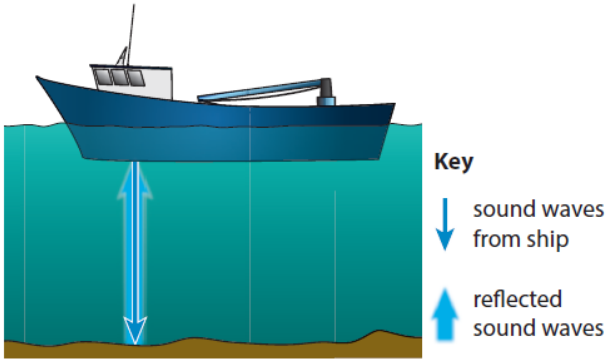
The bat makes a sound. The sound wave reflects off the insect – there is an echo. The bat can work out where the insect is from the time taken for the echo to reach the bat and the direction the echo comes from.

2- Boats can use echoes to find the depth of water under the boat.

A sound is sent from the bottom of the boat. The sound travels through the water and reflects off the solid ground. The echo comes back to the boat.

The time taken for the echo to come back can be used to work out the depth.

Notice that the distance travelled by the sound is double the distance from the object making the sound to the reflecting surface.
The sound has to travel from the object to the reflecting surface and back again.



3- Echoes can also be used to make images from inside the body or in unborn babies.

Examples of unwanted echoes:

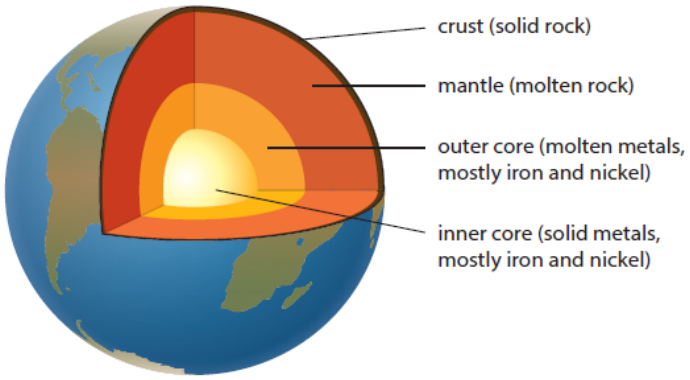
1- When recording music:
echoes change the sound. A musical note that is played once will repeat with an echo. This effect will spoil the recording.

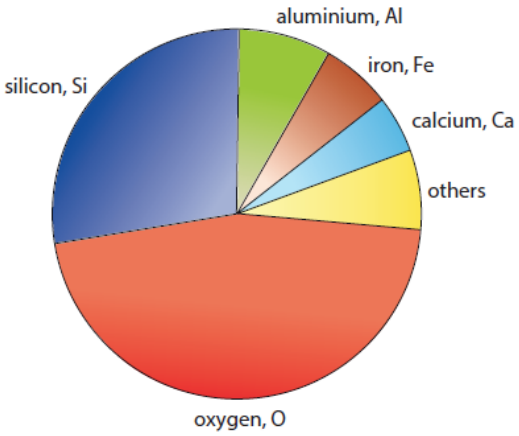
2- Theatres are designed to stop echoes. Theatres usually have no large flat surfaces that could cause echoes.

To prevent the effect of the echo they use different materials to stop the reflection of sounds such as: curtains, carpets, wooden floors, stuffed walls and chairs,….etc.

The shapes on the walls of this room are made to stop echoes.

6.3 Structure of the Earth





The Earth consists of 3 layers:

1- Crust: solid rocks
2- Mantle: molten rocks (hot liquid)
3- Core: is made of the metals nickel and iron.
The outer core is Liquid while the inner core is solid.

- The most common metal in the crust is Aluminium.

- The most common non-metal in the crust is Oxygen.

a German scientist called Alfred Wegener suggested that, millions of years ago, all the land was one large continent.
Over millions of years, the land broke up and drifted apart. This idea is called **continental drift**.

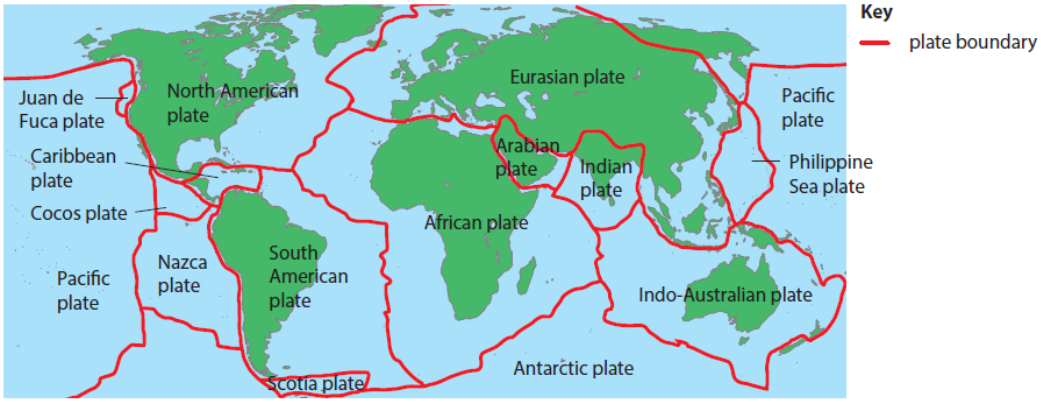
His evidence for this idea was that:
• the shapes of the continents fit together
• the types of rock on the different continents match up where they fit together
• the fossils on the different continents match up where they fit together.

Wegener could not explain how continental drift happened, so not everyone believed his ideas.

The Earth's crust is made up of large **tectonic plates**.
(tectonic plates are separate parts of the Earth's crust; that move on the mantle.)

- Some of the plates are under the oceans: they are called oceanic plates.
- Some of the plates form the continents: they are called continental plates.

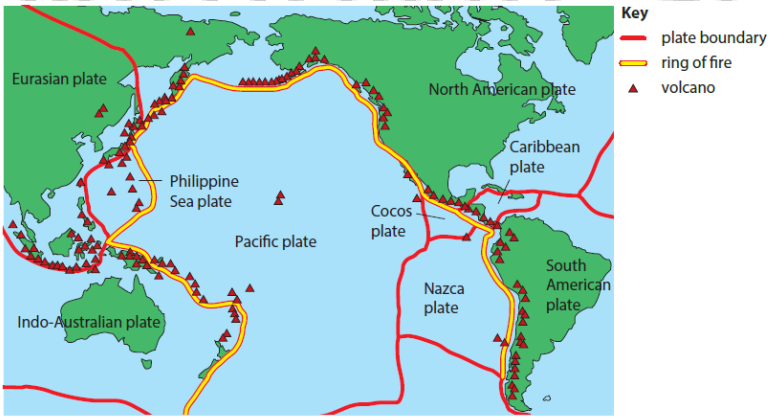
These tectonic plates move slowly on the liquid rock called **magma** beneath them. This is how continental drift occurs.



The red lines show the edges of the tectonic plates.

6.4 Changes in the Earth

- The places where tectonic plates meet are called **plate boundaries**.
- **Geological change** happens at plate boundaries. This is because the tectonic plates are always moving.
- Some of the geological change is very slow – it happens over millions of years. But others are very sudden and violent such as volcanic eruptions and earthquakes in the area of the Pacific Ring of Fire.



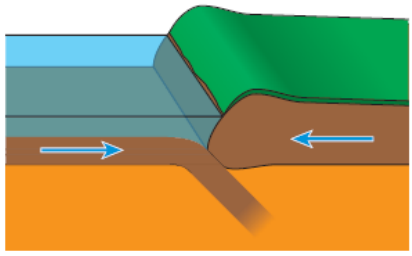
Pacific Ring of Fire

Movement of plates

The movement of tectonic plates creates three types of plate boundaries:

1- Subduction and folded mountains
2- Volcanoes
3- Earthquakes

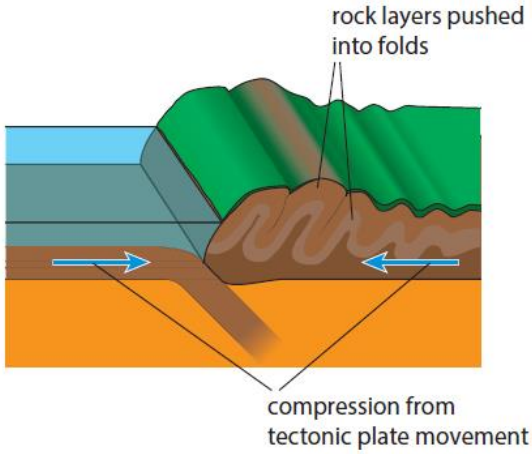
1- Subduction and folded mountains



Plates moving together

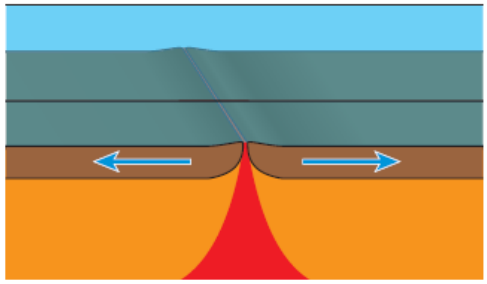
One plate may slide underneath the other one. This is called **subduction**. The rocks in the Earth's crust melt as they move into the mantle. They become part of the mantle.

When tectonic plates move together, the rocks crumple and fold upwards. The mountains that are produced are called **fold mountains**.
This can happen under the ocean or on land.



2- Volcanoes:

Volcanoes are usually formed at the plate boundaries when magma of the mantle rises up through cracks in the Earth's crust.



Plates moving apart

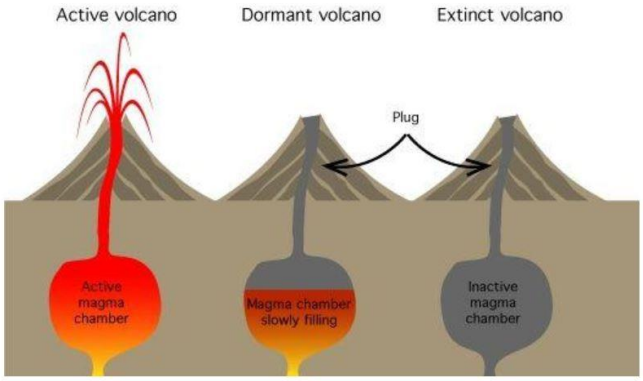
As tectonic plates drift away from each other, they break and crack when they become too thin. **Lava** (liquid rock) erupts from the mantle and hardens to form new crust with new rocks. This causes a **volcano**.

At the Earth's surface, magma erupts to form lava flows and ash deposits.

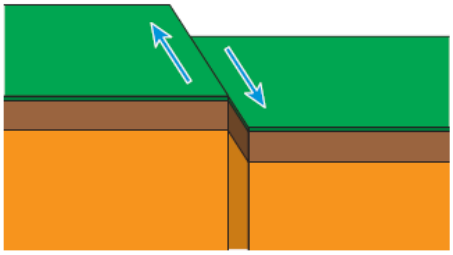
- Magma is the name for liquid rock when it is underground.
- Lava is the name for liquid rock when it is on the surface.
- The lava and ash harden as they cool to form new rocks. So, each time the volcano erupts, it gets bigger (Violent eruptions can even cause avalanches and earthquakes. Or tsunamis if the volcano is close to the sea).

Types of volcanoes are:

1- **Active**: may erupt at any time.
2- **Inactive** or **dormant**:
they have not erupted for a very long time.
3- **Extinct**: they will not erupt again.



3-Earthquakes:



Plates sliding past

Because the plates are very large and heavy, there is a lot of friction between the plates. Over the years, this makes the plates stick together. There is always force on the tectonic plates, so the pressure builds up and eventually the pressure causes violent movement. This is an **earthquake**.

- Some earthquakes are extremely violent and cause a lot of damage.
- The size or **magnitude** of the earthquake depends on the size of the faults at the plate boundaries, and how far the rocks move when the earthquake happens.

6.5 Solar and lunar eclipses

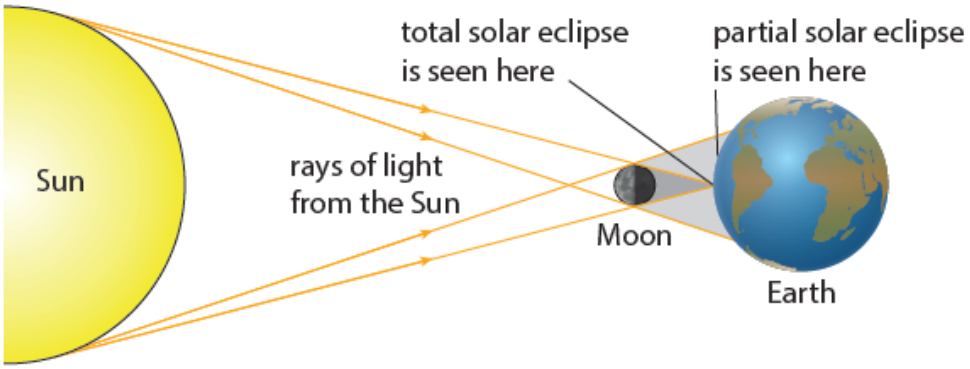
- An **opaque** object is an object that will not allow light to pass through.
- Light travels in straight lines called **rays**.

When an opaque object passes in front of a source of light, it **blocks** the light, so a **shadow** will form.

1- Solar eclipse

A solar eclipse happens when the Moon comes between the Sun and the Earth.

The Moon is an opaque object. The Moon blocks the rays of light coming from the Sun. The shadow of the Moon forms on the Earth.



Types of eclipse:

1- A total solar eclipse

2- Partial solar eclipse

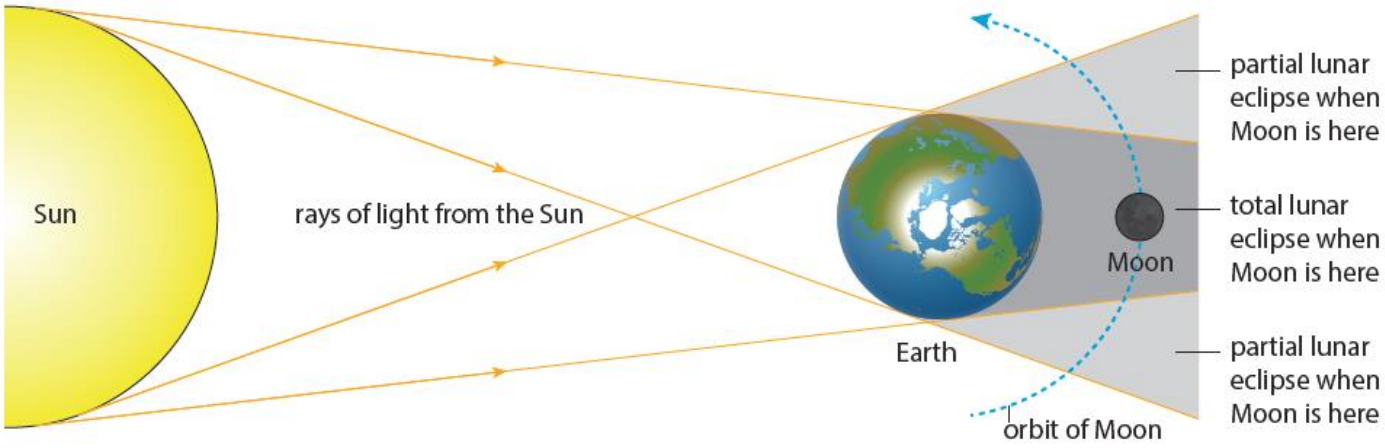
(The dark part of the Earth is in the shadow of the Moon. At the centre of the shadow, there is a total solar eclipse. Away from the centre, there is a partial solar eclipse).

Safety tip: You must **never** look directly at the Sun, even when there is an eclipse. The light from the Sun is very bright and can cause permanent damage to your eyes.

2-Lunar eclipse

A lunar eclipse happens when the Earth comes between the Sun and the Moon.

The Earth is also an opaque object, so the Earth blocks the light from the Sun and the shadow of the Earth is formed on the Moon.



You might think that solar and lunar eclipses should happen every month. The Moon takes 28 days to orbit the Earth, but the orbit of the Moon is tilted slightly. The orbit of the Moon is not exactly in the same plane as the orbit of the Earth around the Sun.

It is only when the Sun, Earth and Moon are in the same straight line that eclipses can happen.