

ملخص مراجعة جميع الدروس منهج انسابير



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف التاسع العام ← علوم ← الفصل الثالث ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 2025-05-30 22:35:23

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
علوم:

إعداد: Asheh-AL Yousef

التواصل الاجتماعي حسب الصف التاسع العام



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف التاسع العام والمادة علوم في الفصل الثالث

مراجعة عامة وفق الهيكل الوزاري مع الإجابات

1

حل تجميعية تدريبات صفحات الكتاب وفق الهيكل الوزاري منهج بريدج

2

مراجعة عامة وفق الهيكل الوزاري منهج انسابير

3

تجميعية صفحات الكتاب وفق الهيكل الوزاري منهج بريدج مع أسئلة امتحانات سابقة

4

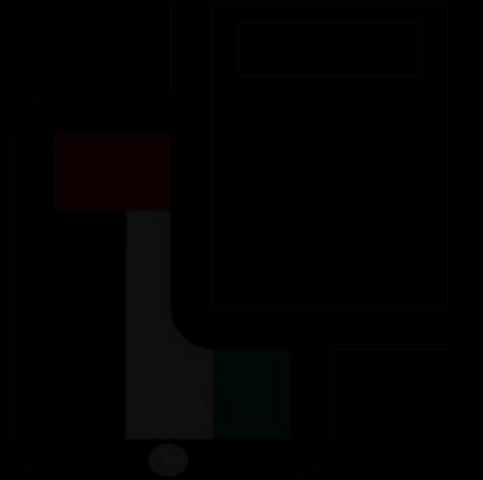
الهيكل الوزاري الجديد 2025 منهج بريدج

5



Yousef AL-Asheh

Lesson 1: Wave properties



Lesson 1: Wave properties

- A wave is a method of transferring energy without transferring matter.

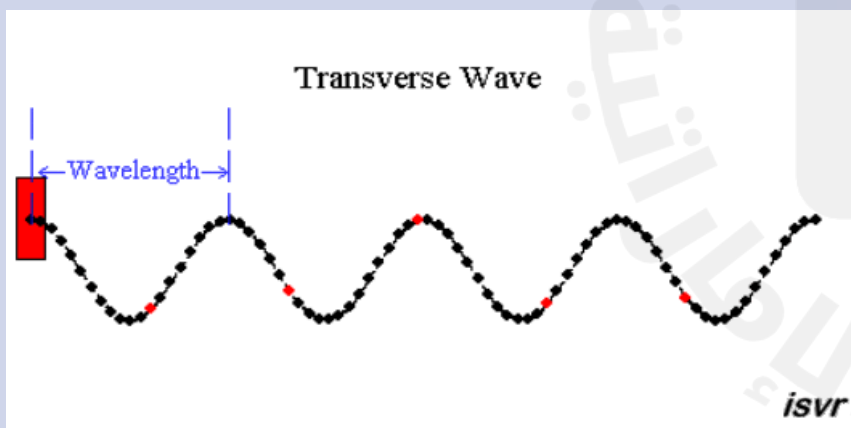
Mechanical Waves	Electromagnetic waves
Waves that can travel through solids, liquids, and gases. Can not travel through vacuum	Waves that can travel through solid, liquids, gases, and vacuum

Lesson 1: Wave properties

- There are two types of Mechanical waves:

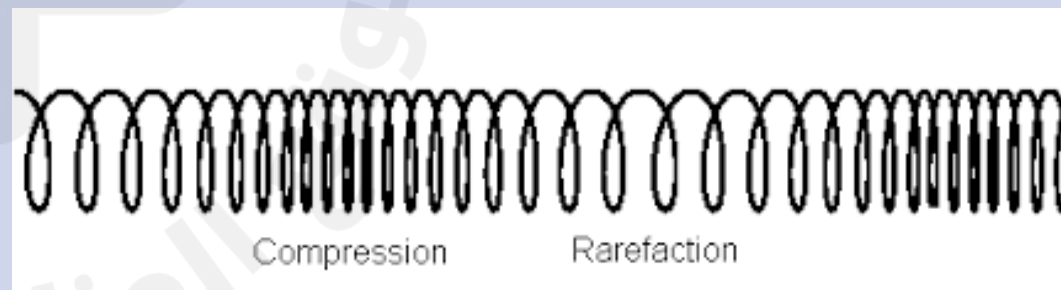
Transverse Waves

- A wave in which the particles of the medium move perpendicular to the direction the wave travels

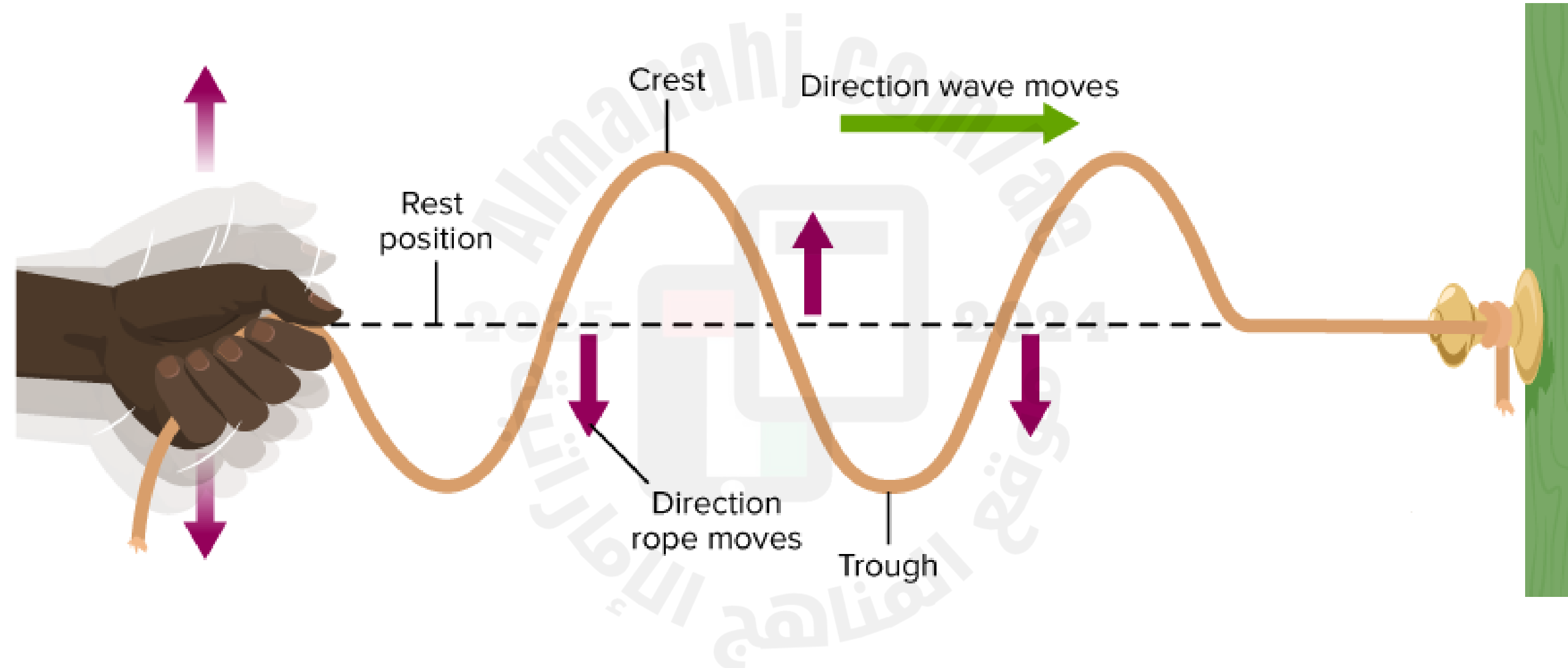


Longitudinal Waves

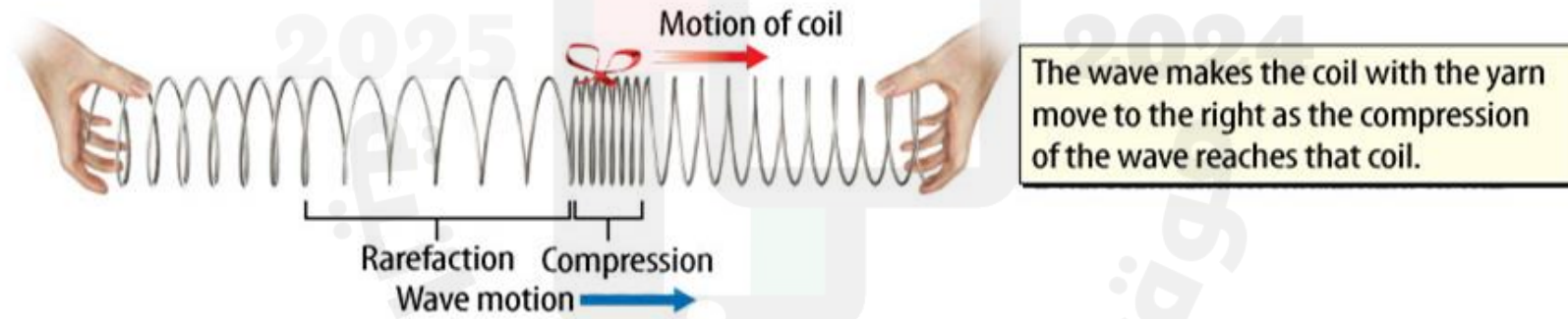
A wave that makes the particles of a medium move back and forth parallel to the direction the wave travels is



Parts of the wave

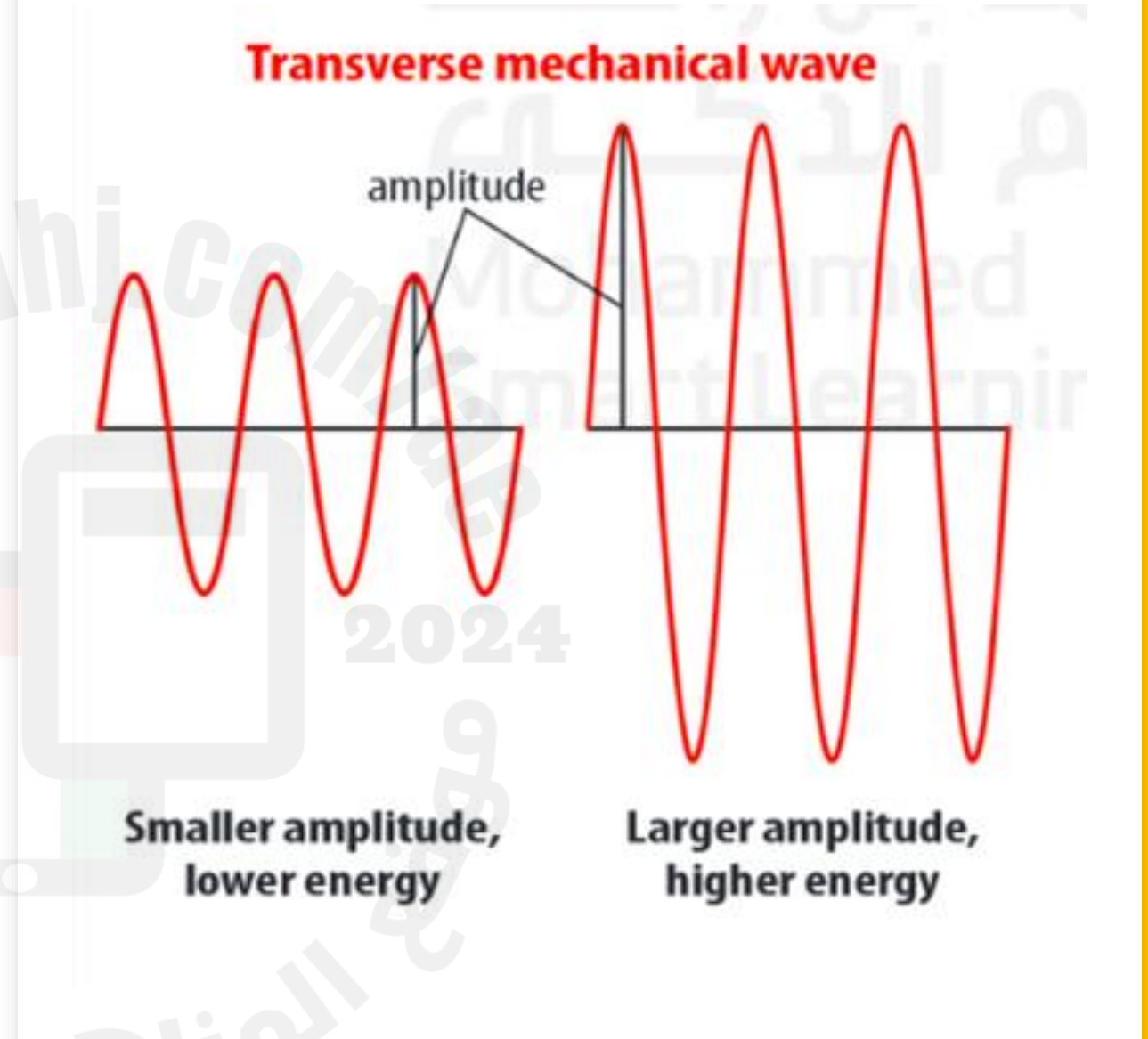


Longitudinal Waves



Amplitude

- A wave's Amplitude is the maximum distance a wave moves from its rest position
- The more the energy the wave has the higher the amplitude.
- the less energy the wave has the lower the amplitude.

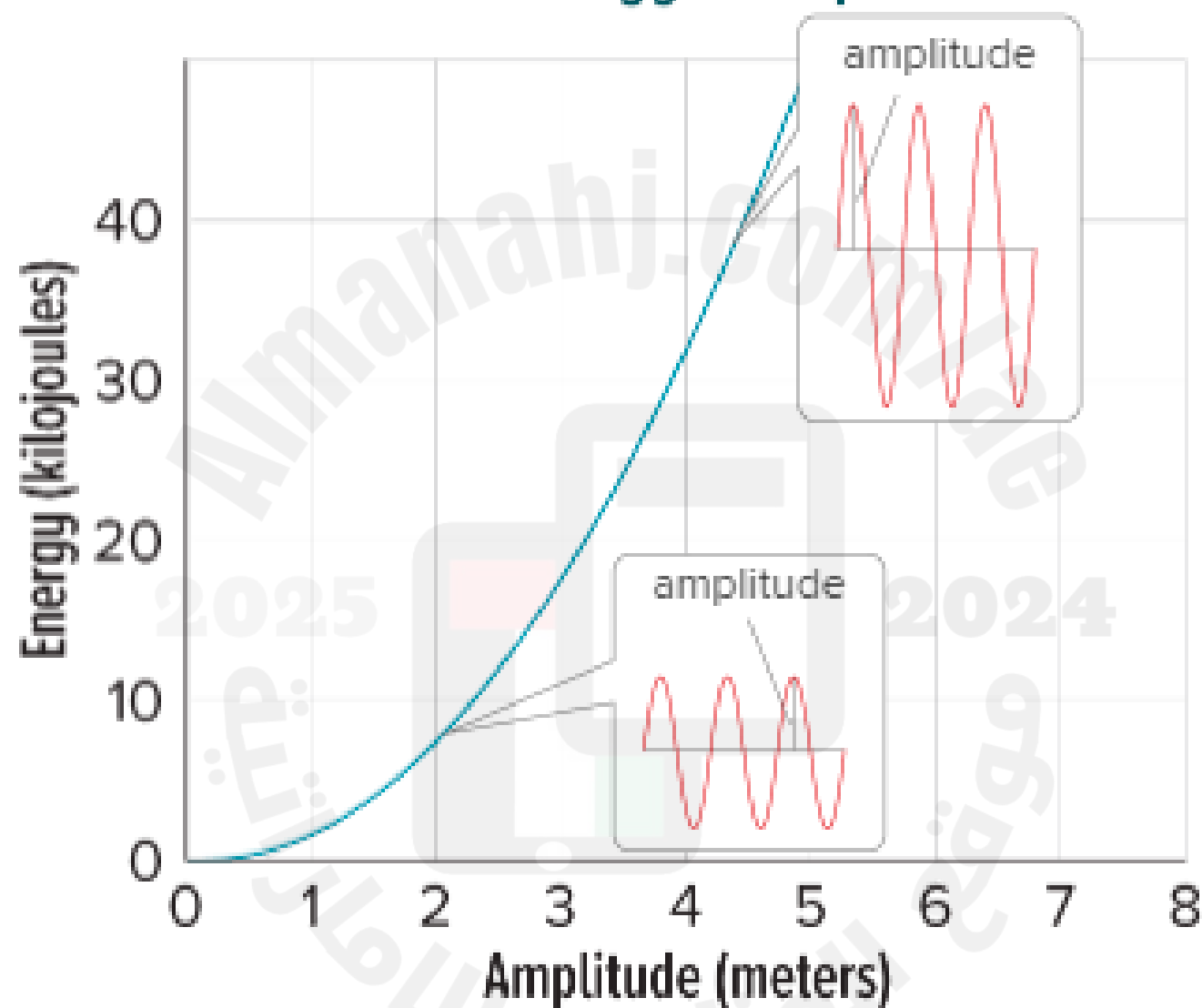


Math connection between Energy and Amplitude

The relationship between wave energy and amplitude can be expressed with a mathematical model.

$$\begin{array}{l} \text{energy} \propto \text{amplitude}^2 \\ E \propto A^2 \end{array}$$

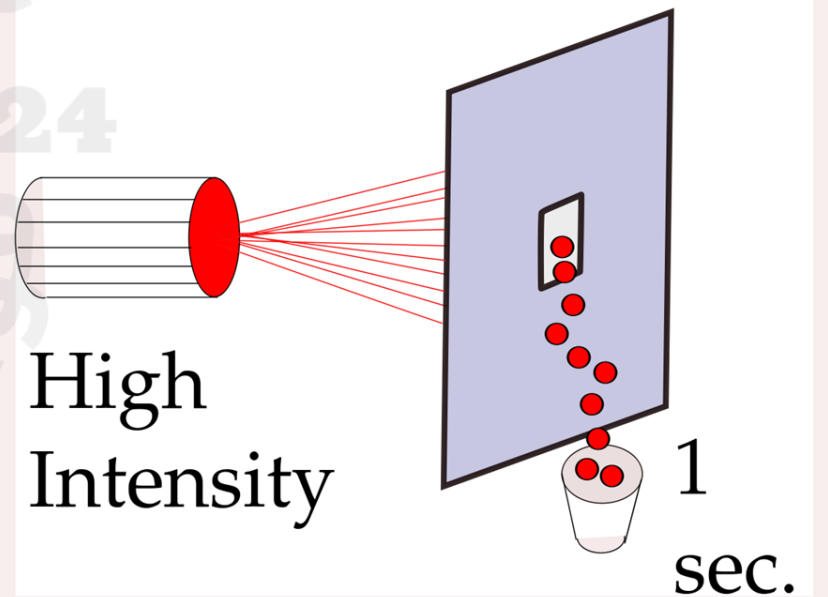
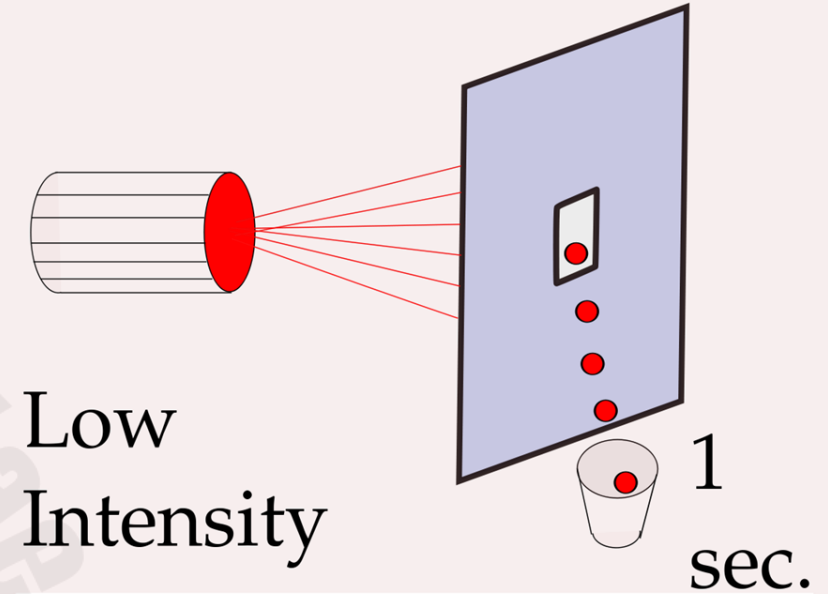
Wave Energy v. Amplitude



Intensity

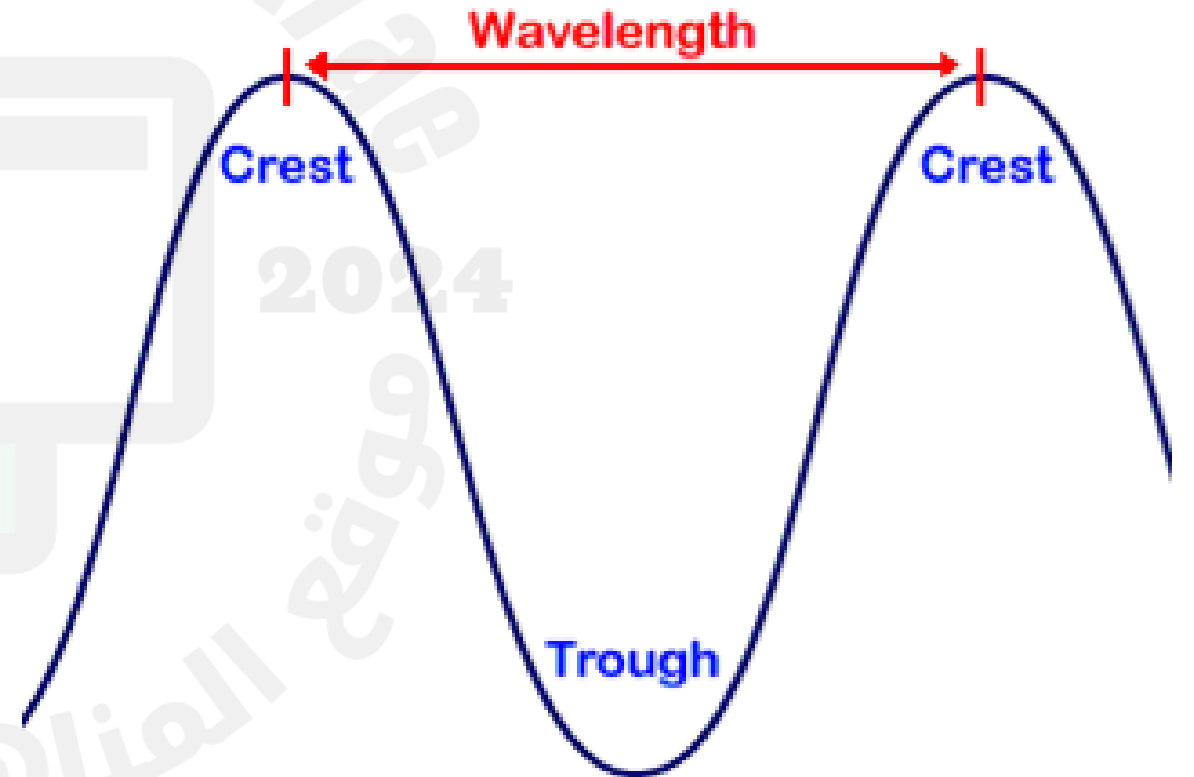
- Intensity is the amount of sound energy that passes through a square meter of space in one second.
- The unit **Decibel** (dB) describes the intensity, in turn, the loudness of sound

Average energy per unit time per unit area



Wavelength

- The distance between a point on one wave, and the same exact point on the next wave
- Wavelength is measured in units of distance, such as meters.

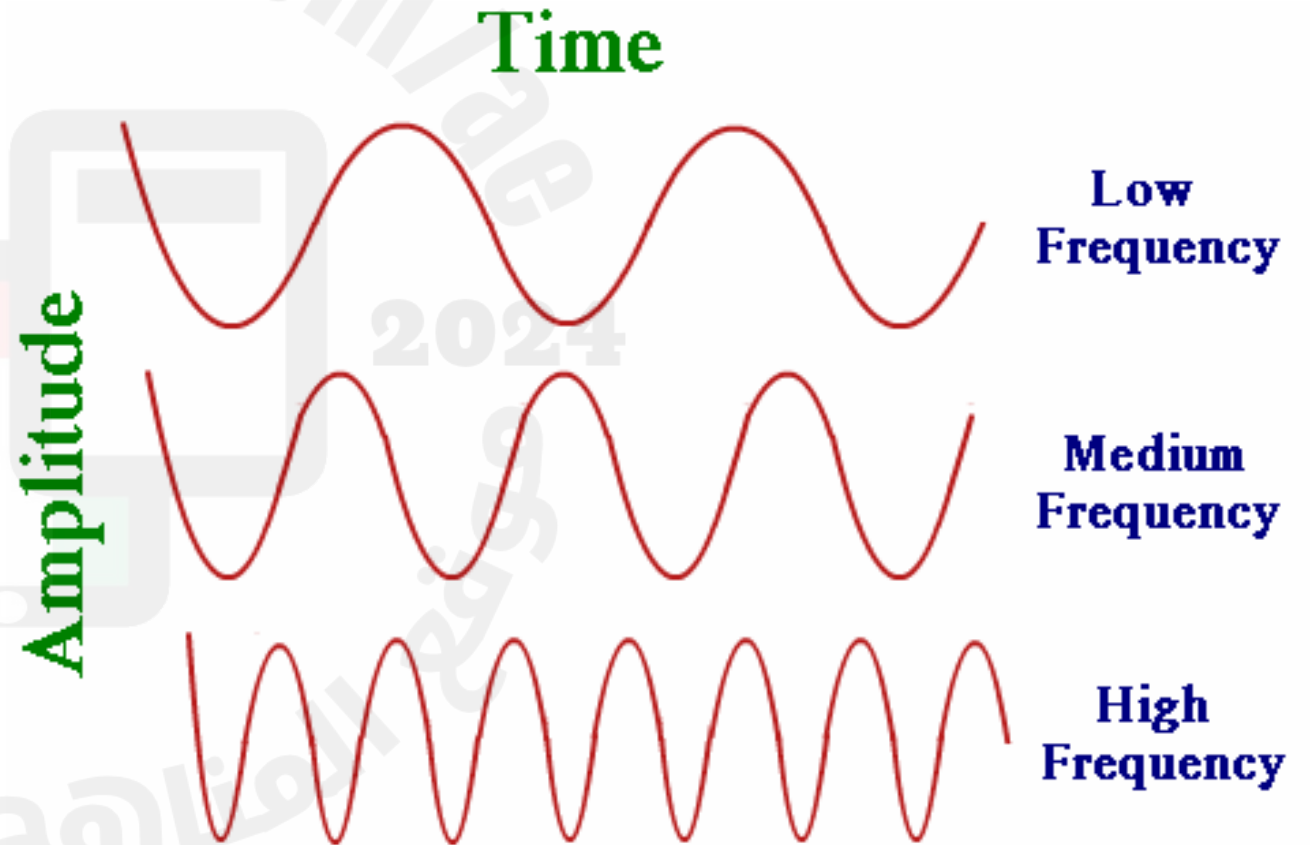


Frequency

- The number of wavelengths that pass a point each second is a wave's frequency.

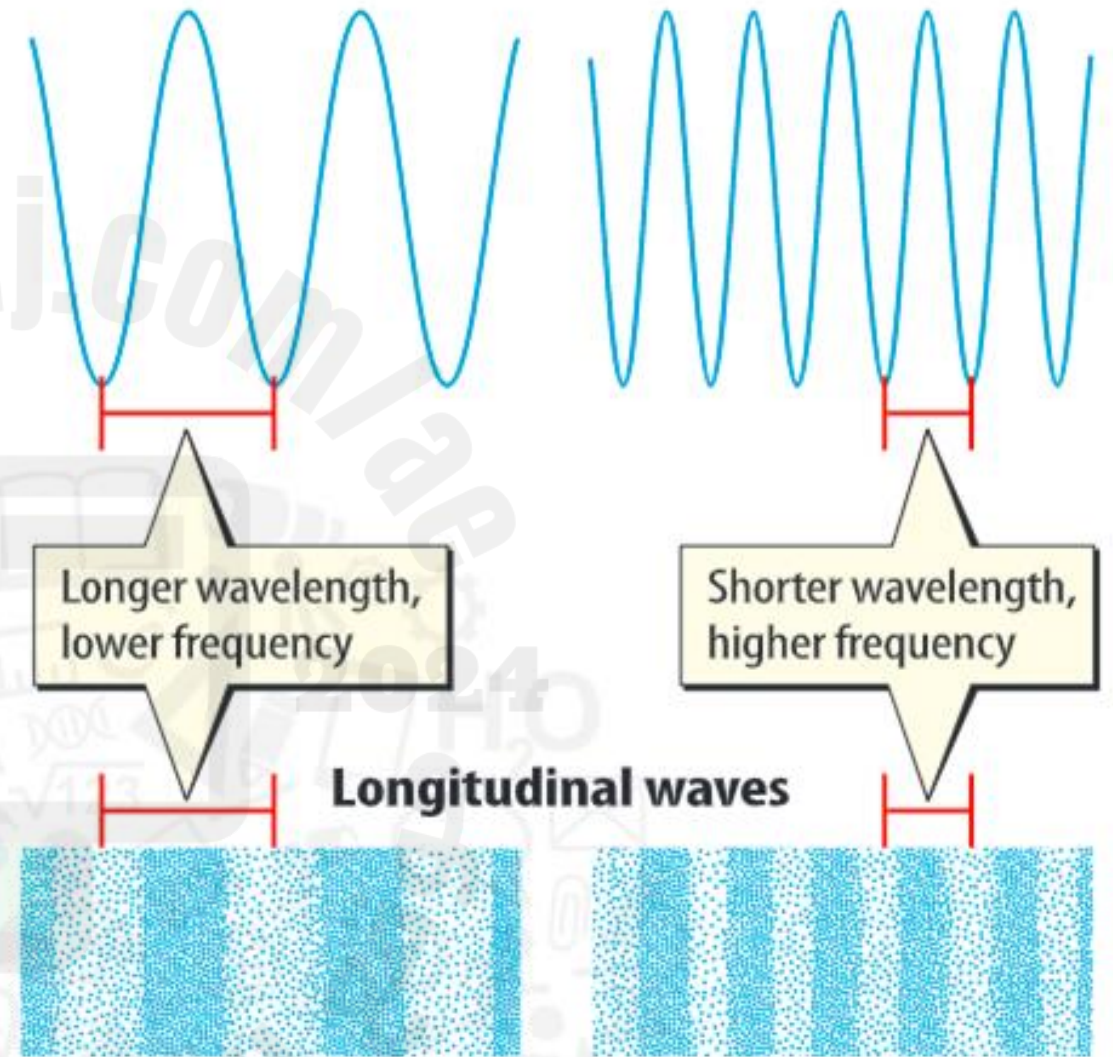
- Frequency is measured in Hertz (Hz)

- The energy of a wave is proportional to the frequency of it.



Frequency and wavelength

- the longer the wavelength, the lower the frequency.
- The shorter the wavelength, the higher the frequency.



Wavelength and Frequency

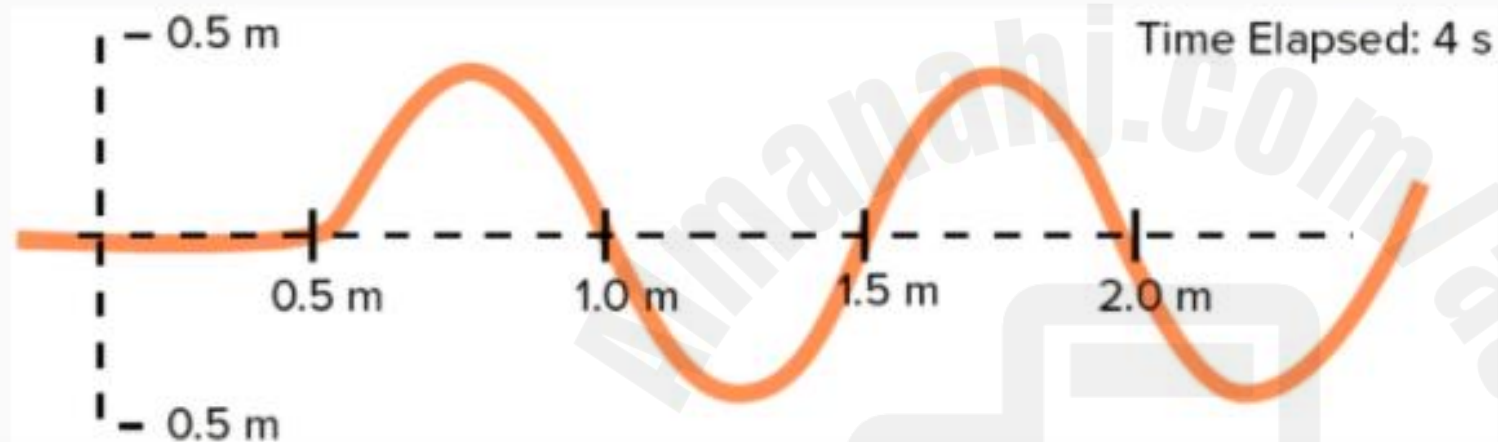
- To calculate the frequency of waves, divide the number of wavelengths by the time.

- $$\text{Frequency} = \frac{\text{number of Wavelength}}{\text{Time}}$$

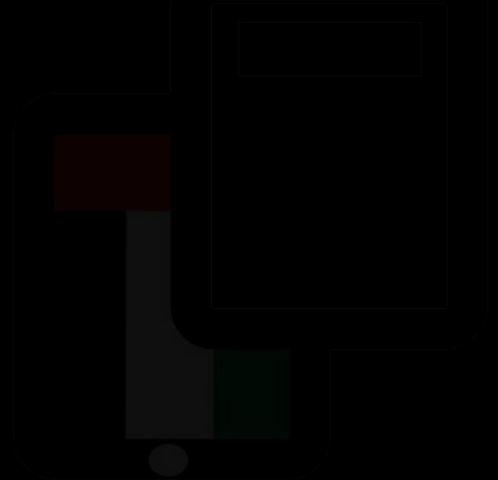
Question 1:

Difficulty level: Unset

1. Determine the wavelength, frequency, and amplitude for each wave.

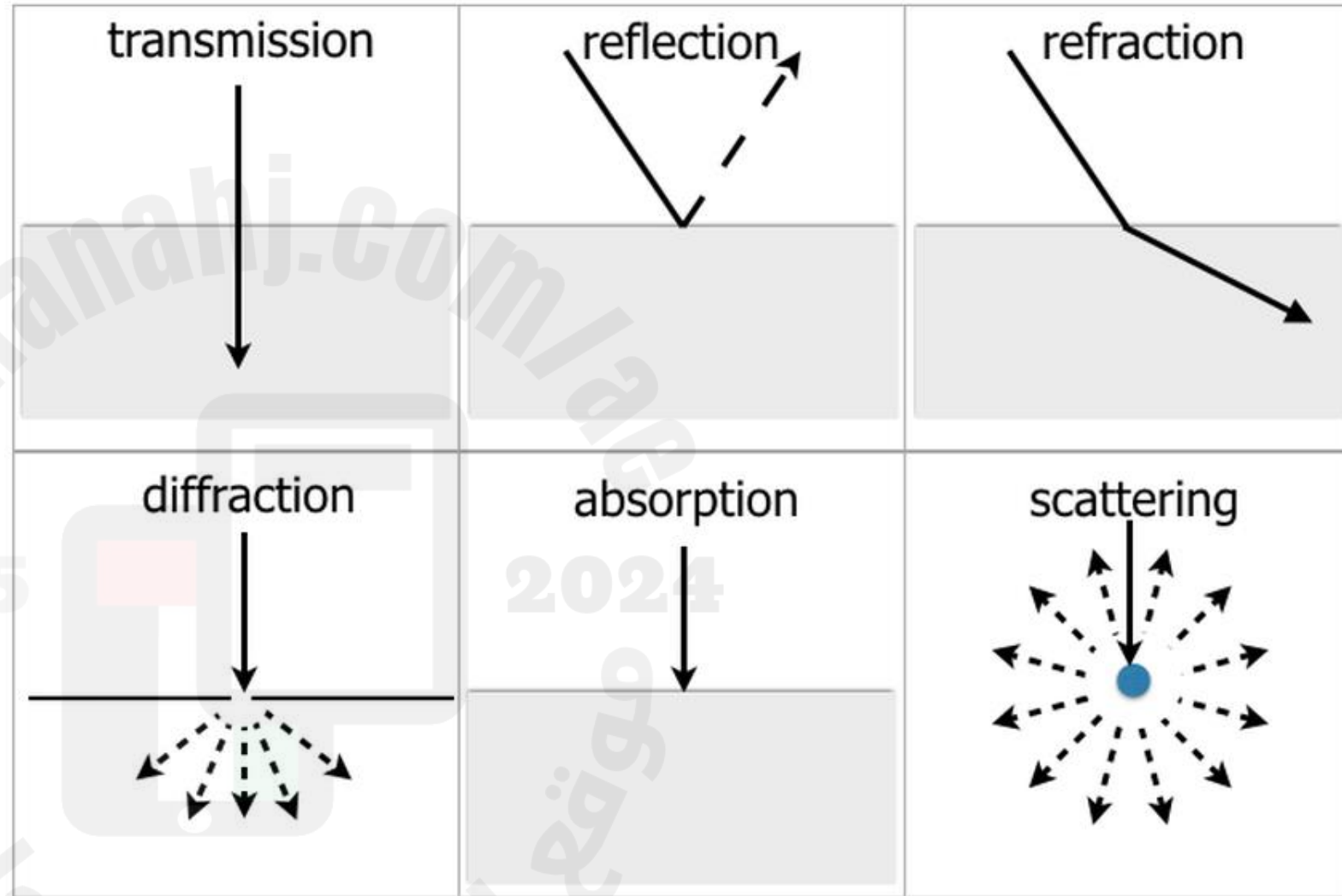


Lesson 2: Mechanical Wave Interaction



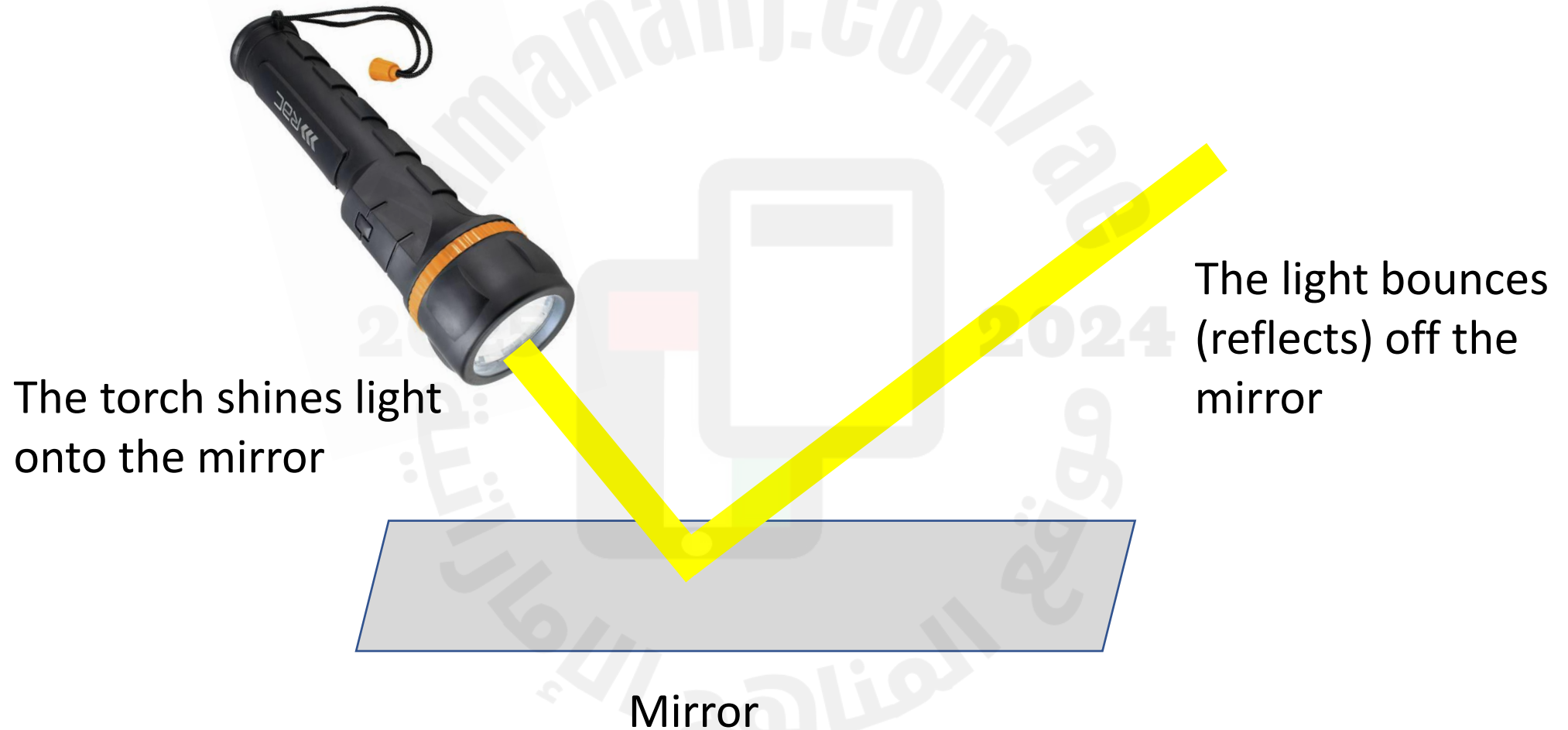
Wave Interaction with Matter

1. Transmission
2. Absorption
3. Reflection
4. Diffraction



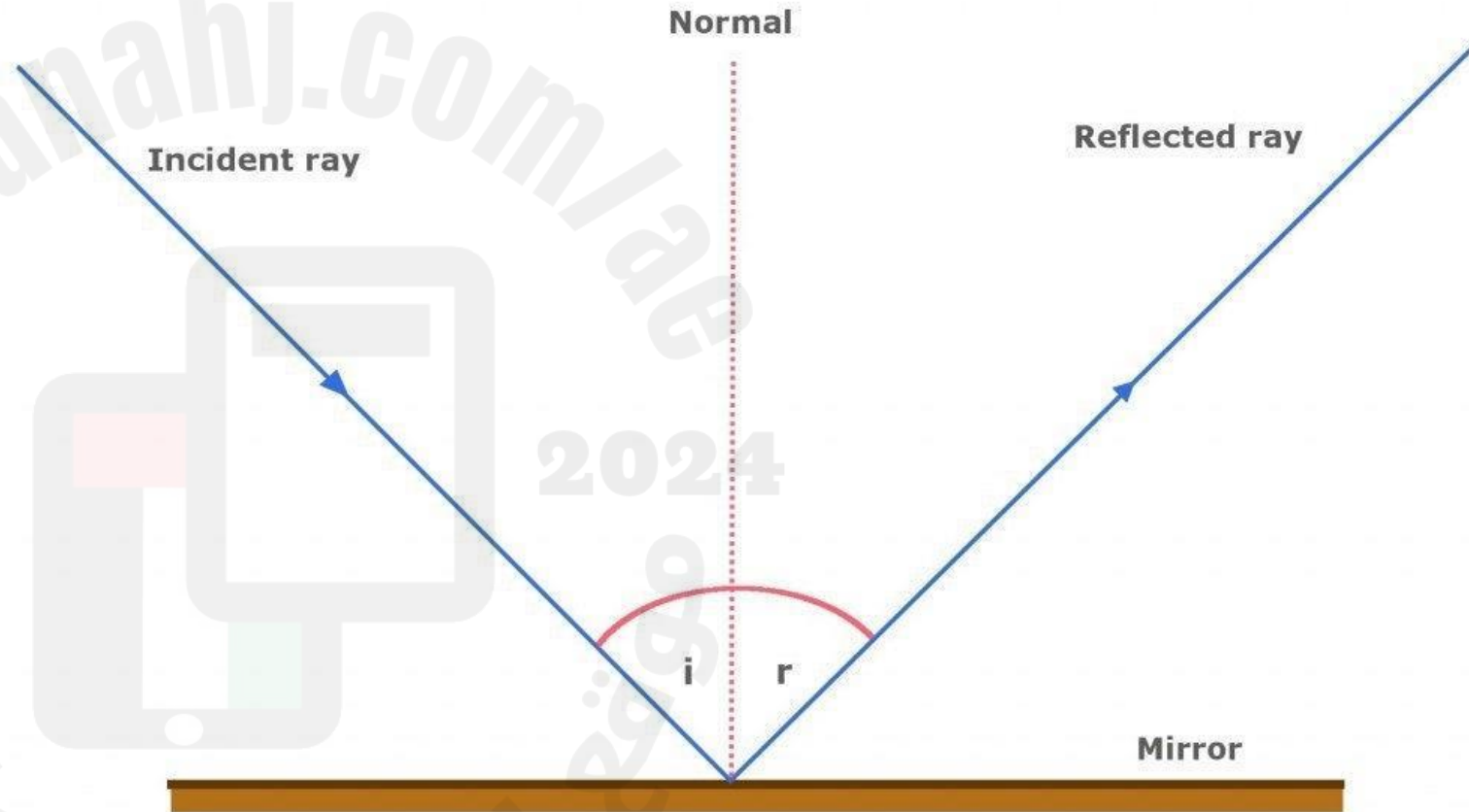
A Reflection

- A reflection is the bouncing of a wave off a surface

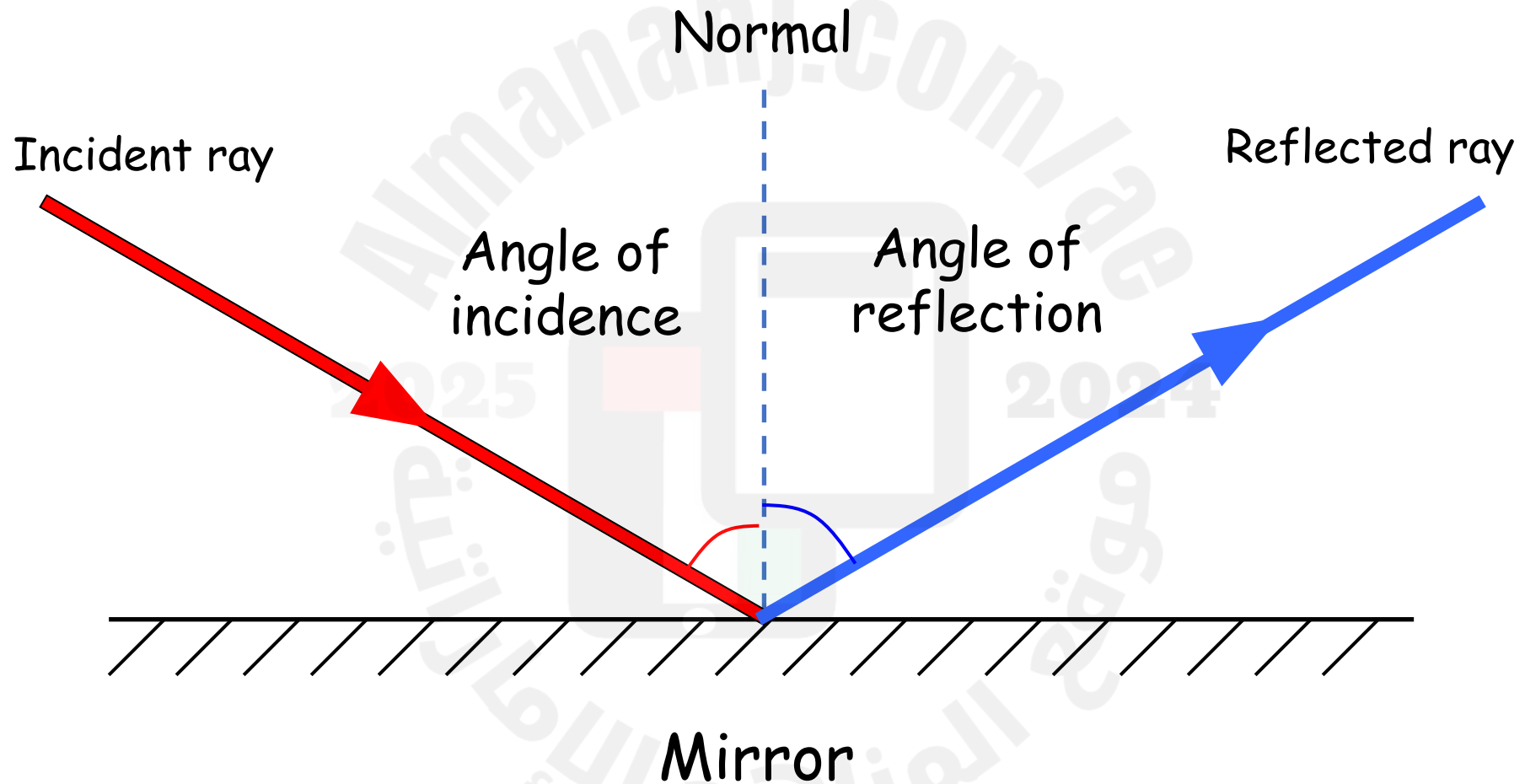


Law of Reflection

- The law of reflection states
The angle of reflection is **equal to** the angle of incidence



Angle of incidence = Angle of reflection

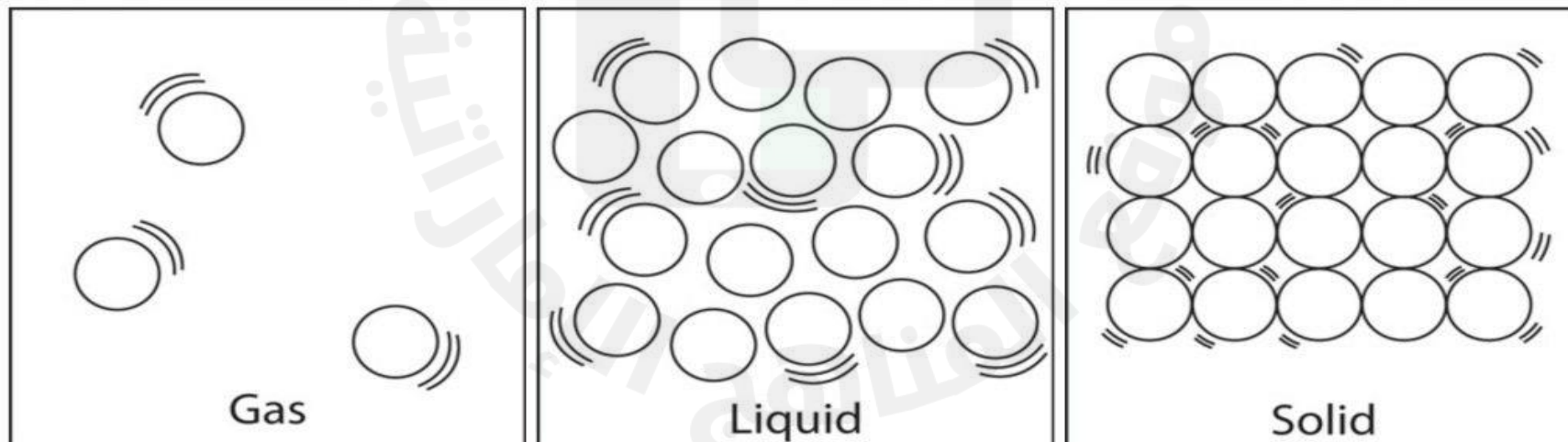


Speed of sound

- To calculate the speed of sound you divide the distance over time.
- $\text{Speed of sound} = \frac{\text{Distance}}{\text{Time}}$
- Unit of the speed of sound is meter/second or m/s

Speed of sound

- Two factors affect the speed of sound:
 1. The density of the medium
 2. The temperature.
- Sound travels the fastest in solids, than liquid, and the slowest in gases



Speed of sound

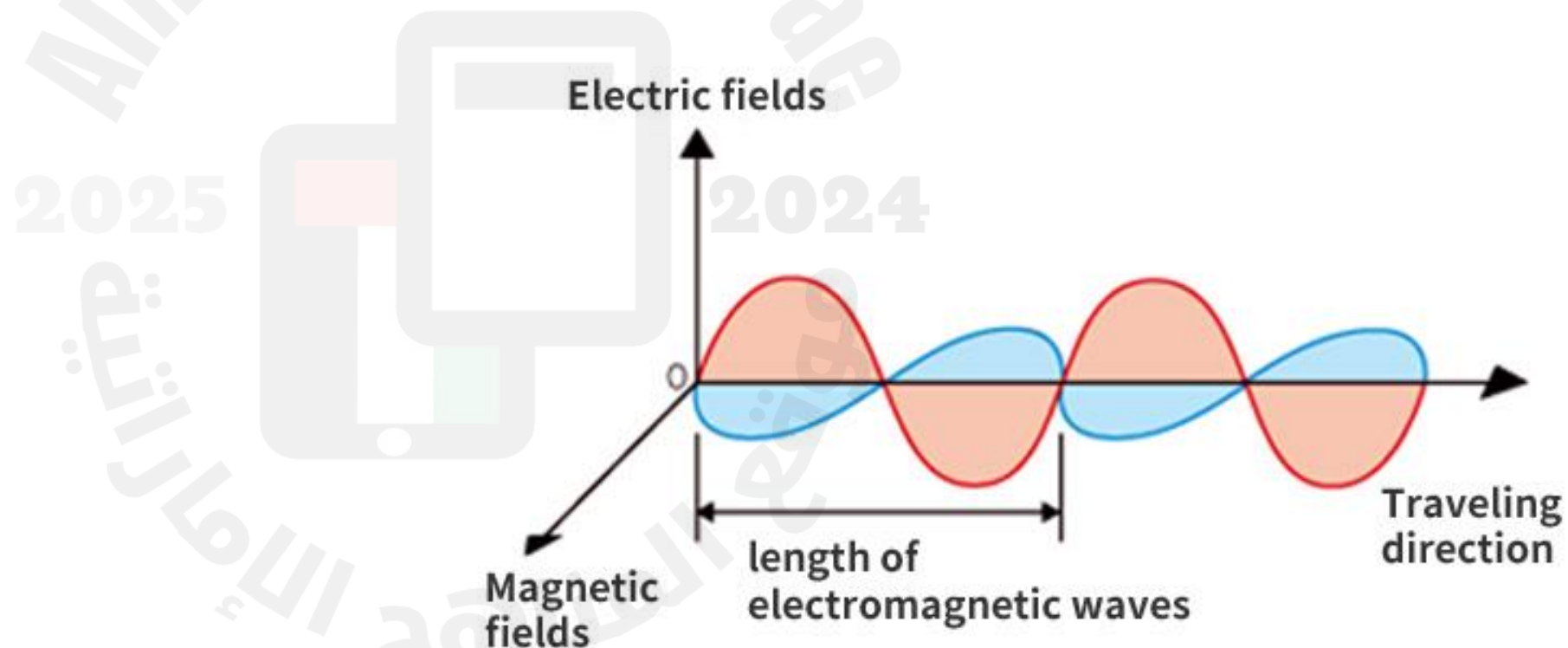
- The affect of Temperature on the speed of sound:
 1. **If the medium is air:** the speed of sound will be higher in high temperature. Example: the speed of sound is higher at 30 C than in 10 C.
 2. **If the medium is liquid or gas:** the speed of sound will be higher at lower temperature, meaning the speed of sound is higher in water whose temperature is 2 C than in water whose temperature is 40C

Lesson 3: How light Travels



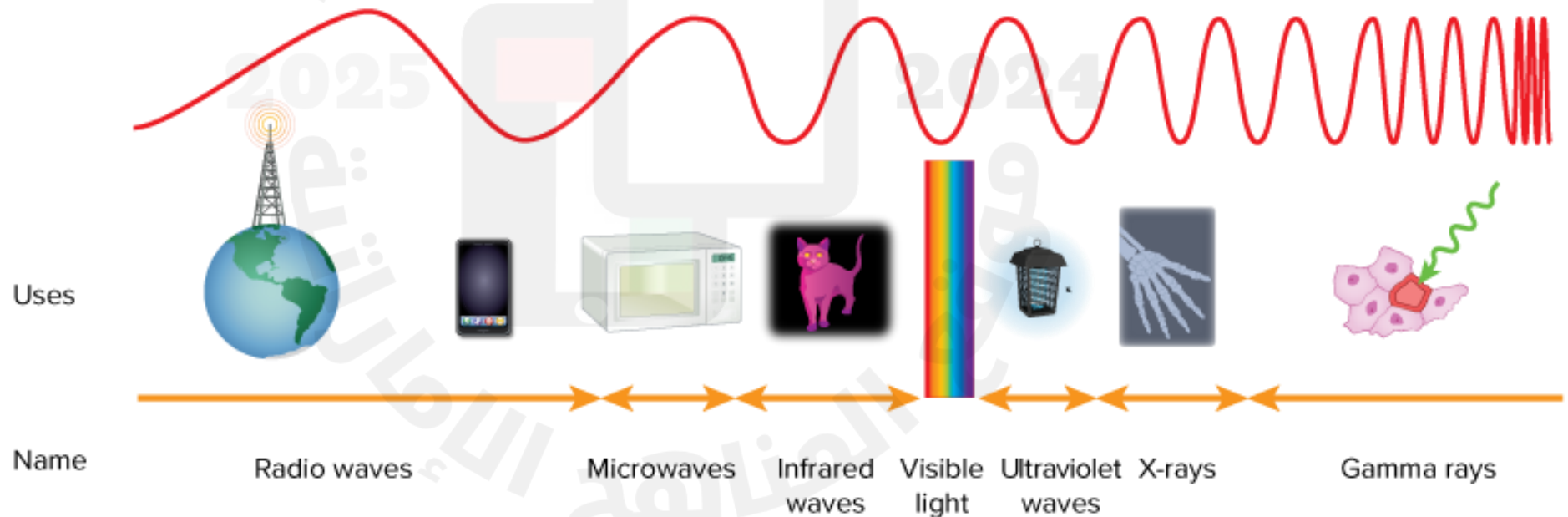
What is Light?

- Light is an **electromagnetic waves** that you can see.
- Electromagnetic waves are made of **electric** and **magnetic** fields. The energy carried by an electromagnetic wave is called **radiant energy**



Electromagnetic Waves

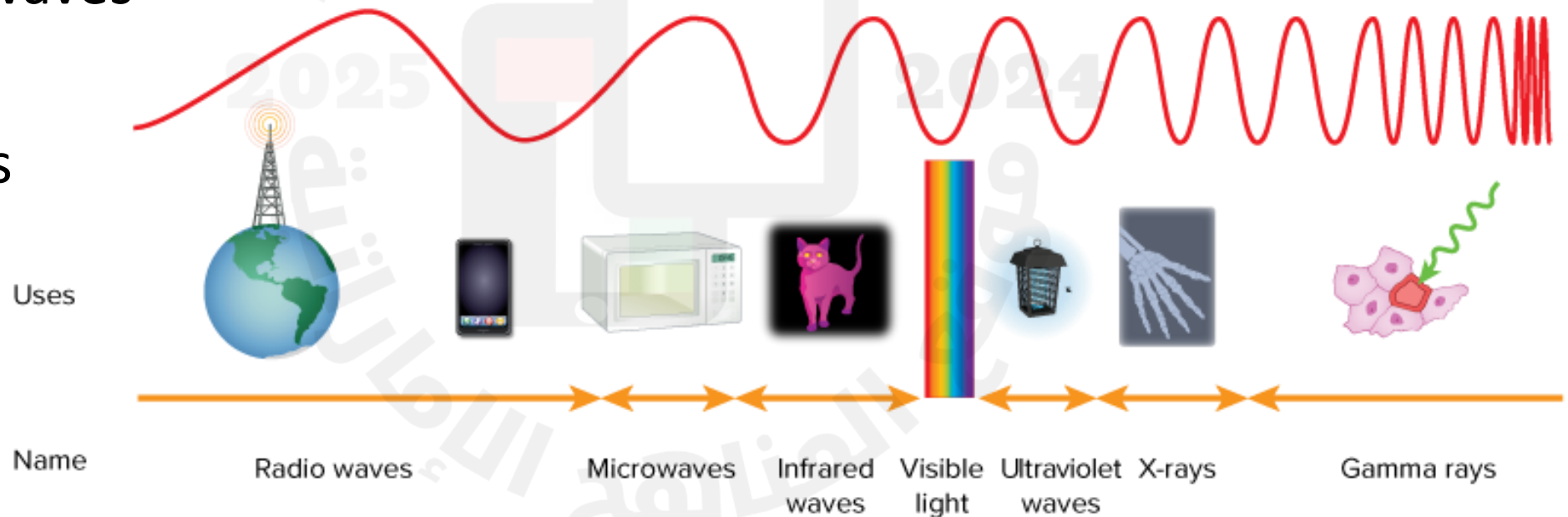
- There are many different types of electromagnetic waves.
- These waves are classified by their wavelengths and frequencies in the electromagnetic spectrum.
- **Light** is the only wave that you can see with your eyes



Electromagnetic Waves

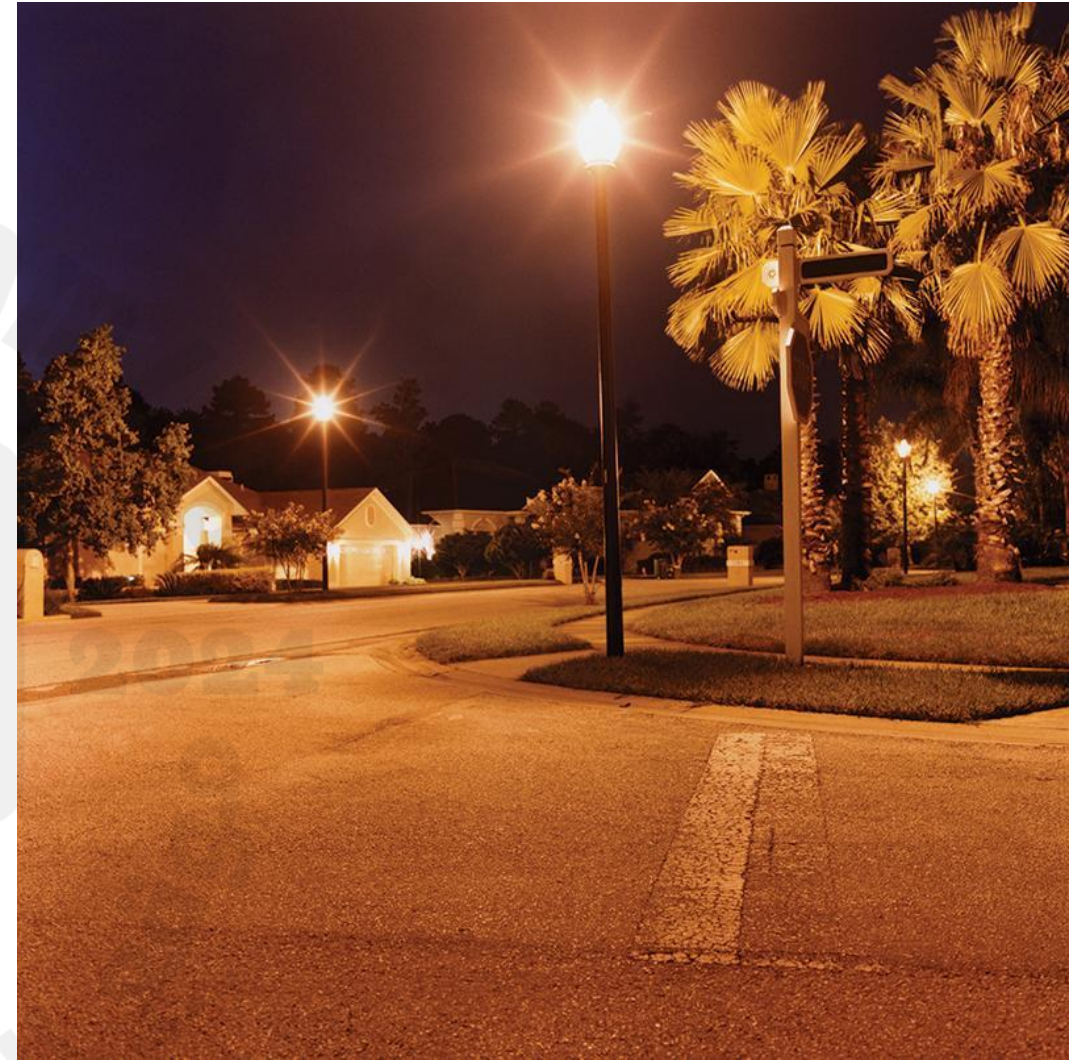
• Electromagnetic waves Include:

1. Radio waves
2. Microwaves
3. Infrared waves
4. Ultraviolet waves
5. X-rays
6. Gamma rays



Properties of Light

- Recall: Intensity is the amount of energy that passes through a square meter in one second.
- Intensity depends on:
 1. The amount of energy a source emits.
 2. The light's distance from the source.



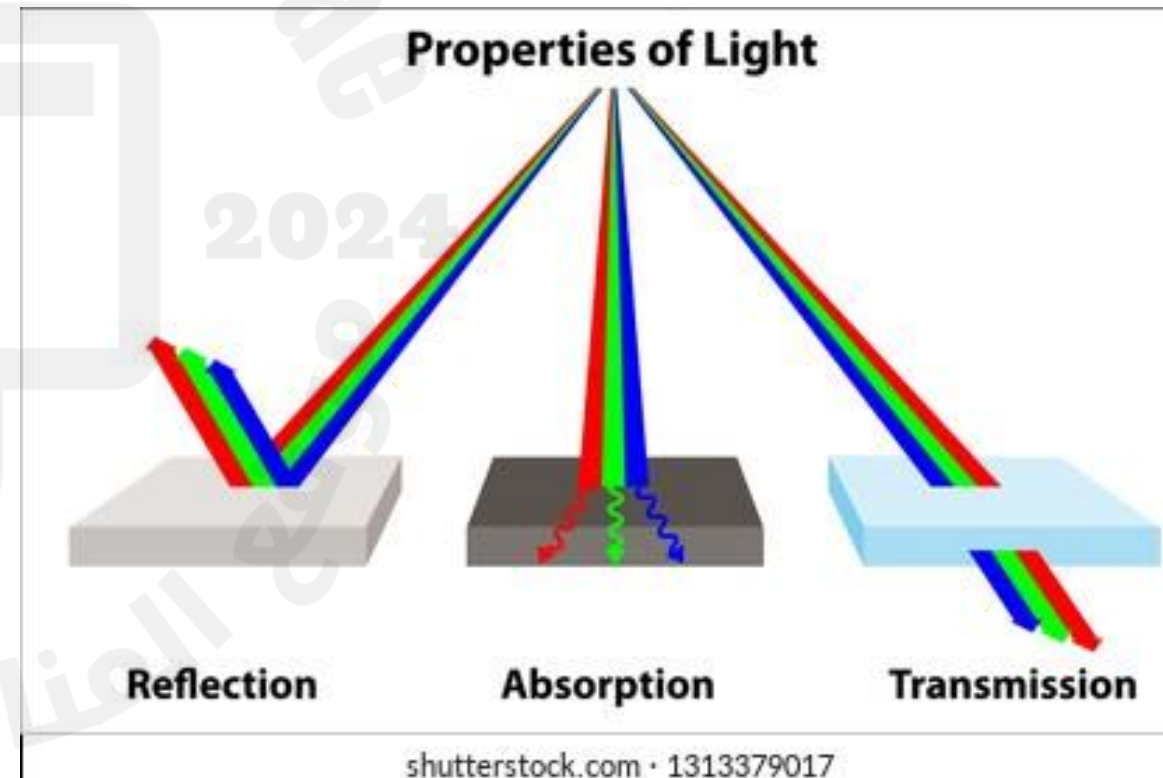
Speed of Light

- Light, along with the other electromagnetic waves travels through vacuum at a speed of about 300,000 km/s.
- However, light waves slow down when they travel through matter.
- Light waves travel much faster than sound waves.

Speed of Light Waves in Some Materials	
Material	Wave Speed (km/s)
Vacuum	300,000
Air	299,920
Water	225,100
Glass	193,000

How does Light interact with matter?

- Like mechanical waves, light waves can be transmitted, absorbed, or reflected when they interact with matter.



Transmission of light

- A material that allows almost all of the light to pass through it and through which objects can be seen clearly is transparent.
- Example: The squirrel behind the glass can be seen because the glass is transparent.
- **Note: If you can see through the material, the object behind it then it's transparent**



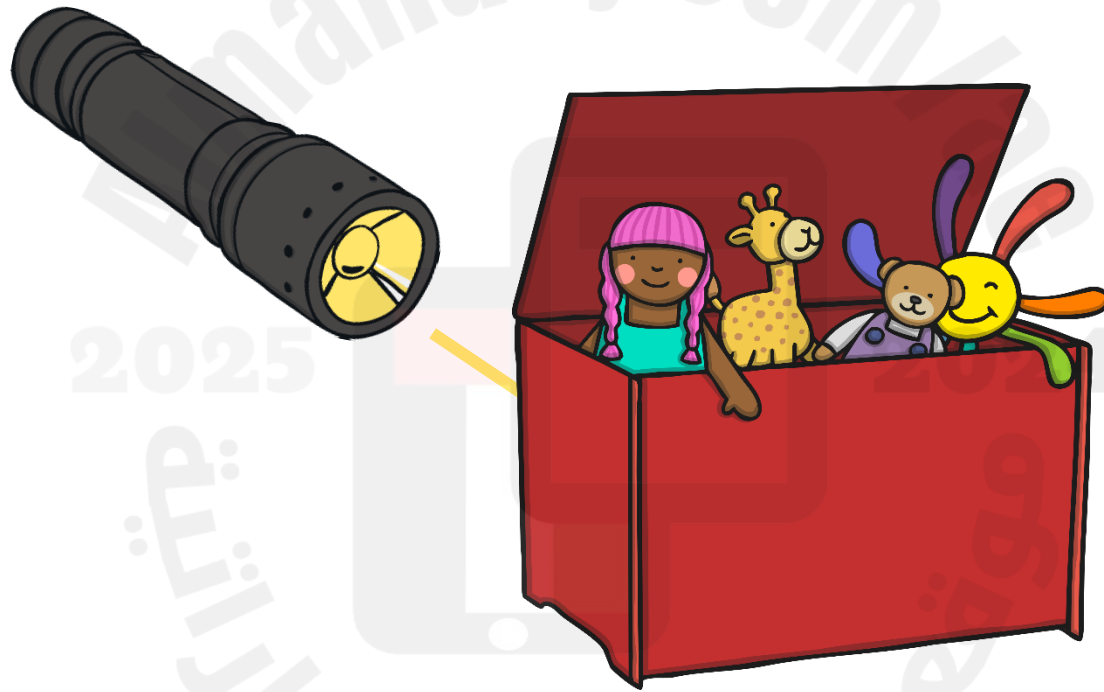
How does light interact with matter?

- A material that allows most of the light that strikes it to pass through, but through which objects appear blurry is translucent.
- Example: you can't see clearly the two people talking behind the frosted glass



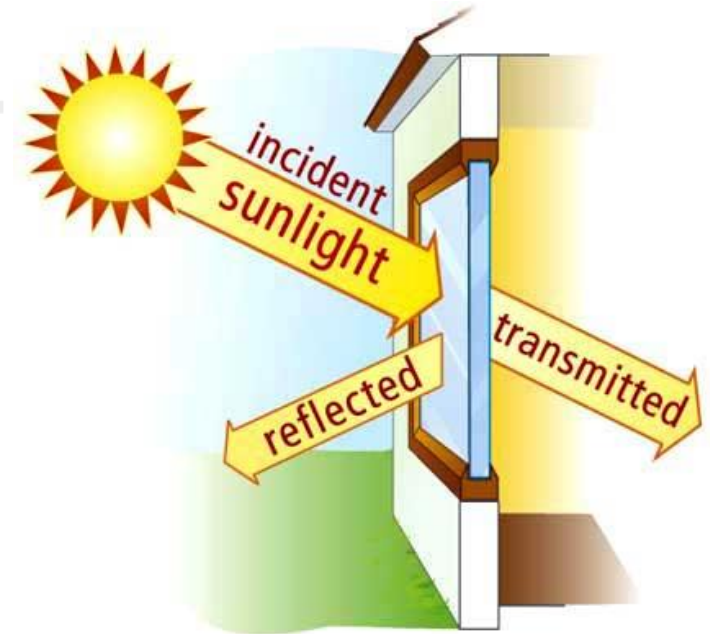
Opaque

A material through which light does not pass is called opaque

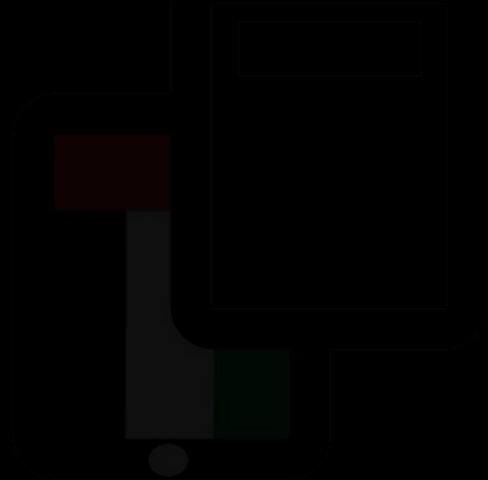


Important Note

- Most types of matter interact with light in a combination of ways.
 - For example, a window both transmits and reflects light.
 - Some of the light that hit an opaque object such as a book, is absorbed and reflected at the same time.
-
- **Note: if you can see through a material and the things behind it, then this material transmit light.**
 - **If you can see the material itself, then this material reflects light**

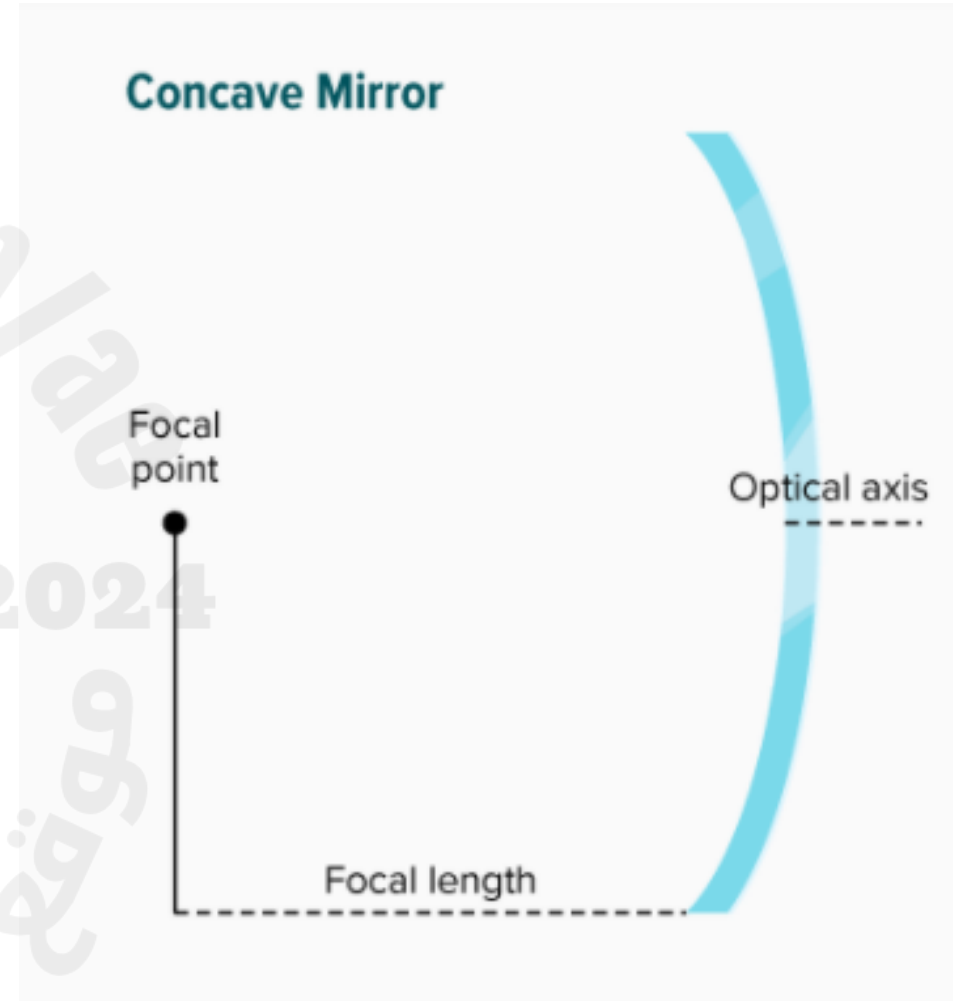


Lesson 4: reflection and mirrors



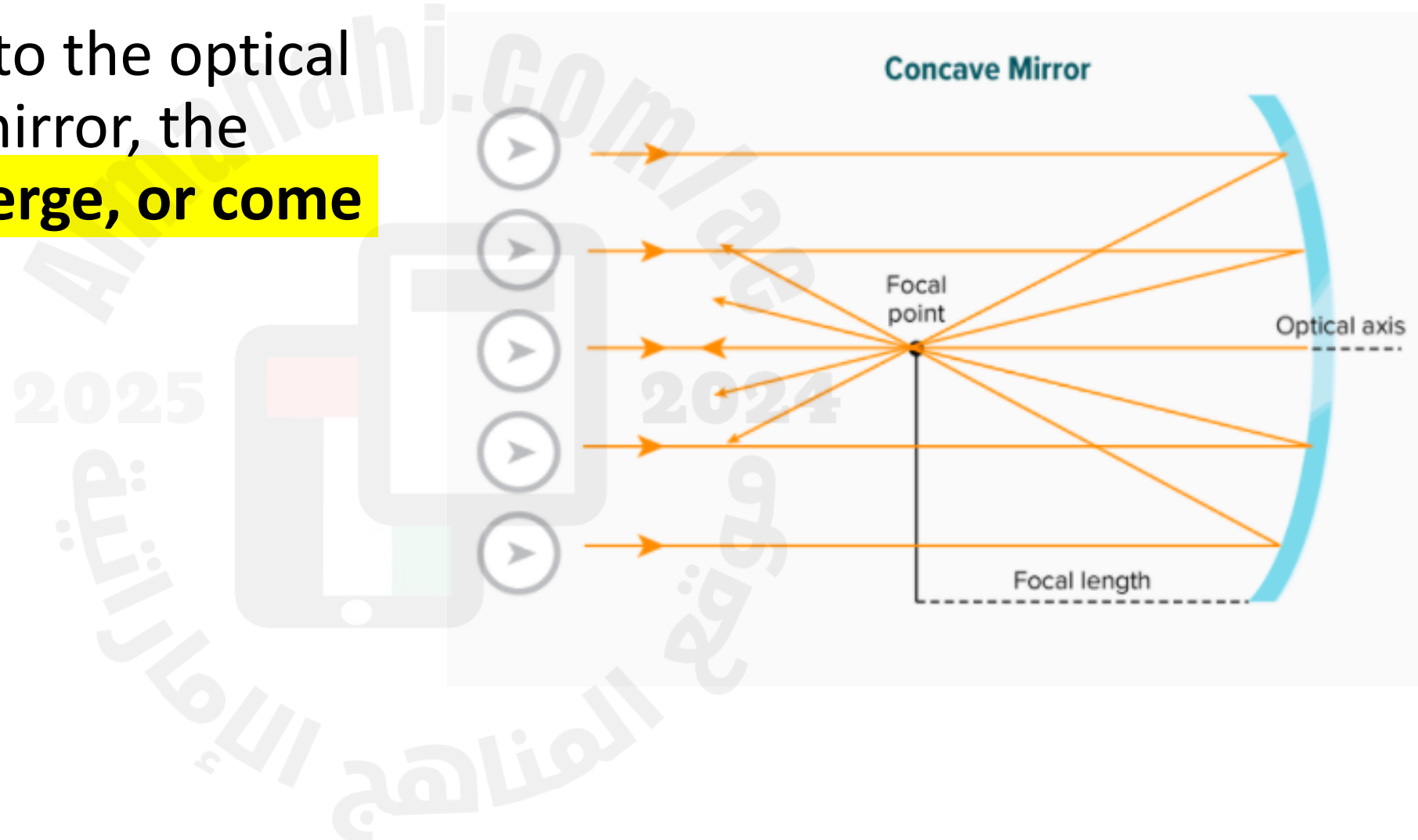
What happens when light reflects off a smooth, curved surface?

- Not all mirrors are flat. A mirror that curves inward is called a **concave mirror**.
- A line perpendicular to the center of the mirror is **the optical axis**.



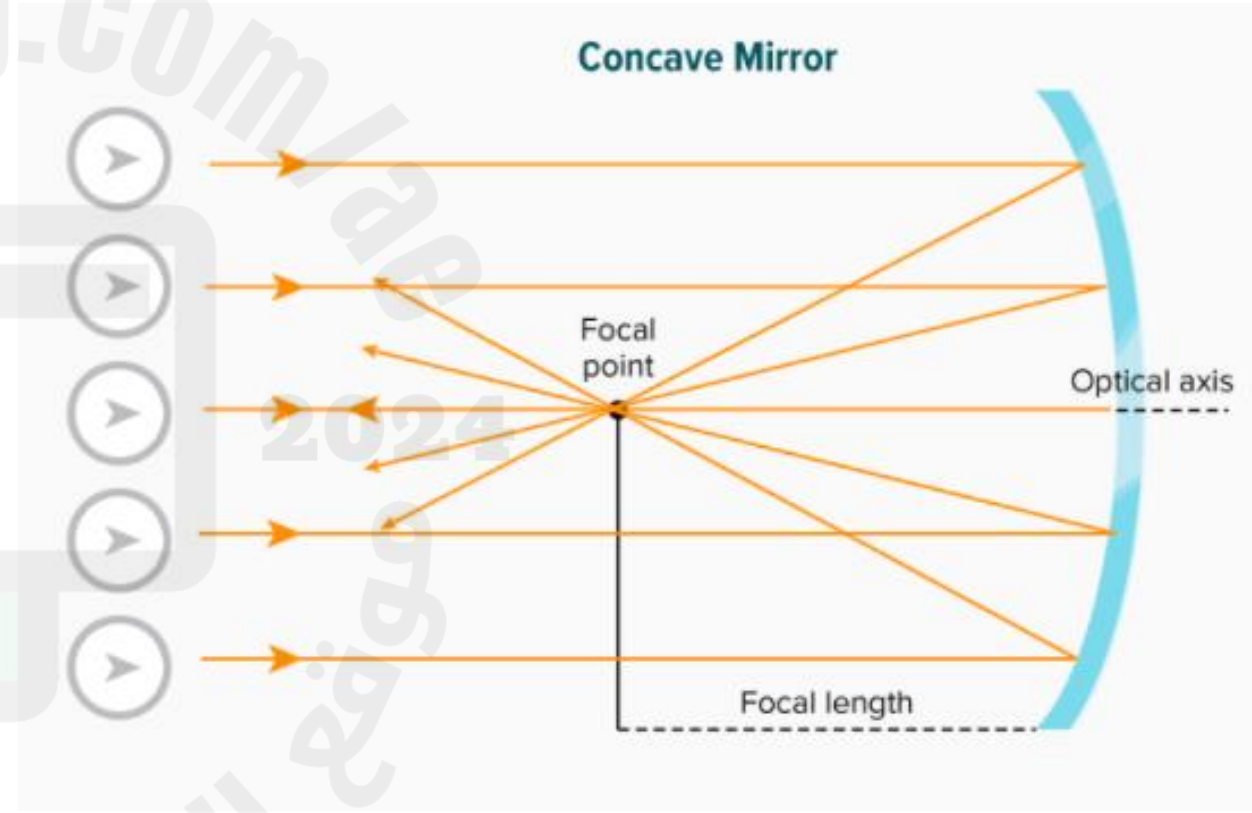
What happens when light reflects off a smooth, curved surface?

- When rays parallel to the optical axis hit a concave mirror, the reflected rays **converge, or come together.**



What happens when light reflects off a smooth, curved surface?

- The point where light rays parallel to the optical axis converge after being reflected by a concave mirror is **the focal point**.
- The distance from the mirror to the focal point is called the focal length



Images formed by a concave mirror

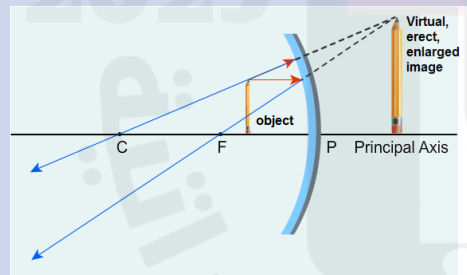
Object between
the focal point and
the concave mirror

Object placed
beyond the focal
point

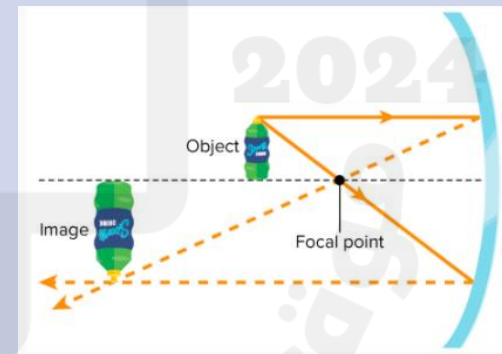
Object placed on
the focal point

**Type of Image
formed**

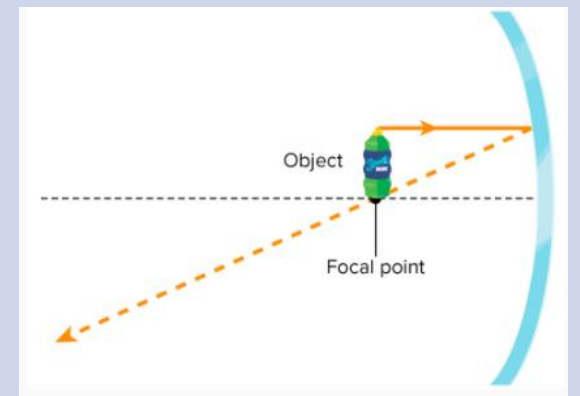
Virtual image



Real Image

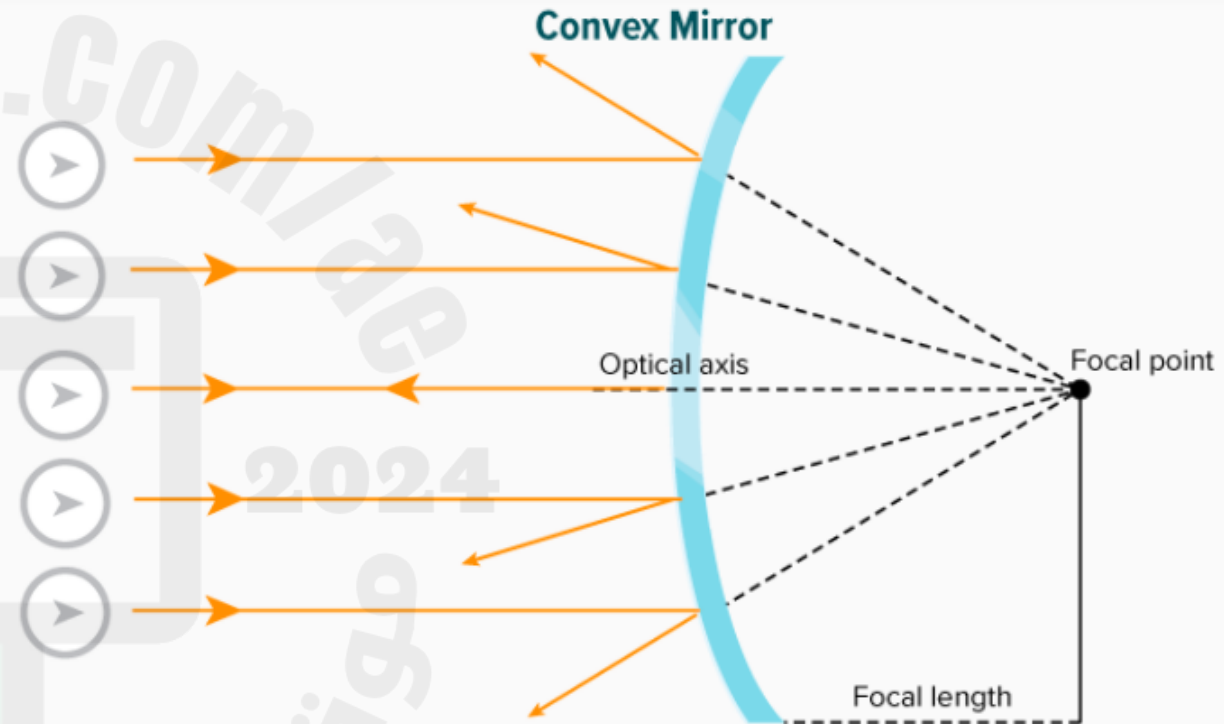


No image
formed



What happens when light reflects off a smooth, curved surface?

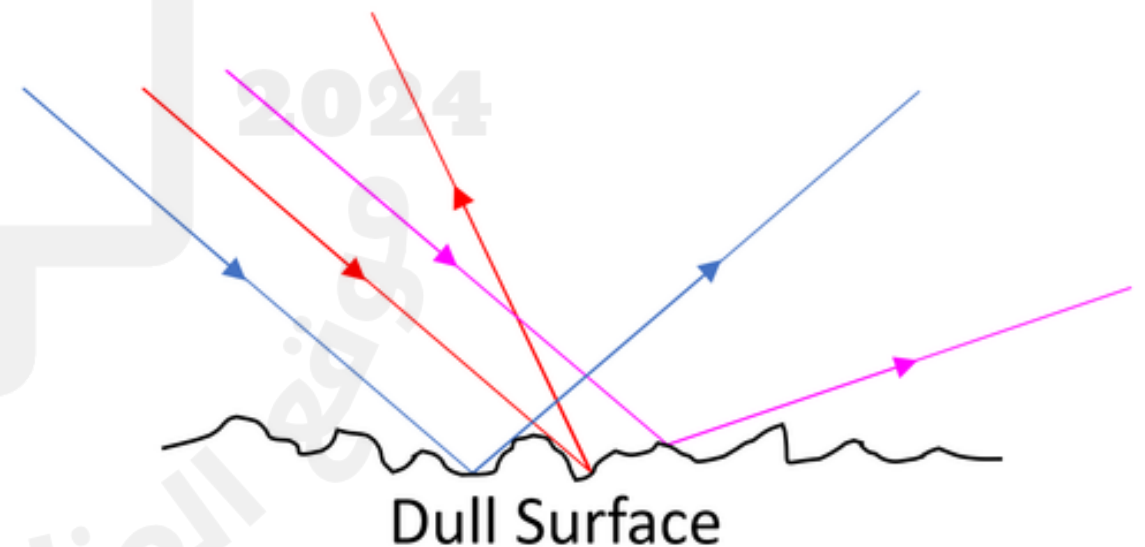
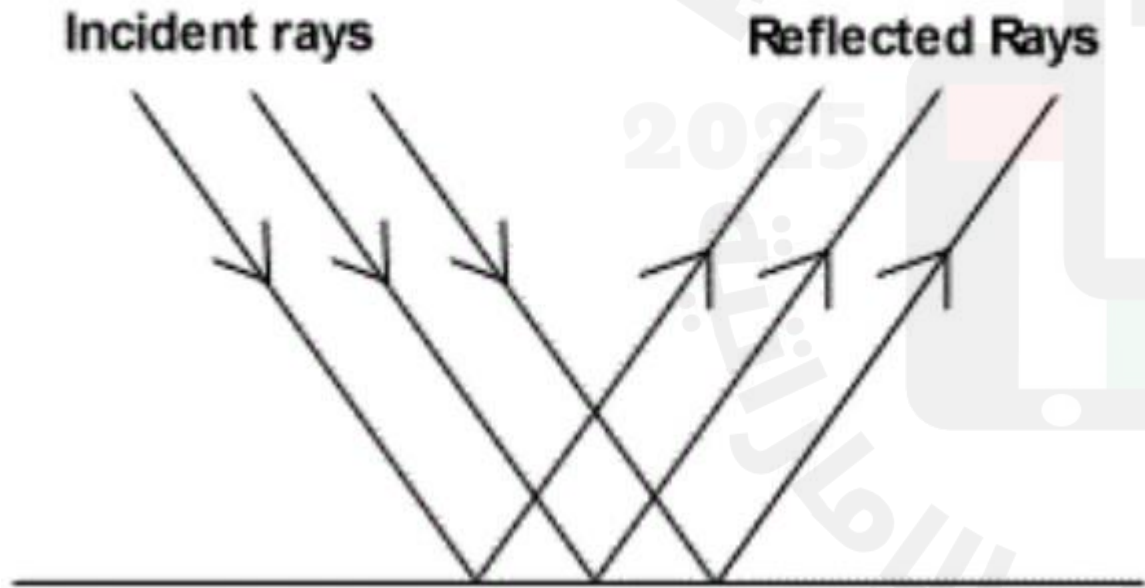
- A mirror that curves outward is called **convex mirror**
- Light rays **diverge**, or spread apart, after they hit the surface of a convex mirror



What happens when light reflects off a rough surface?

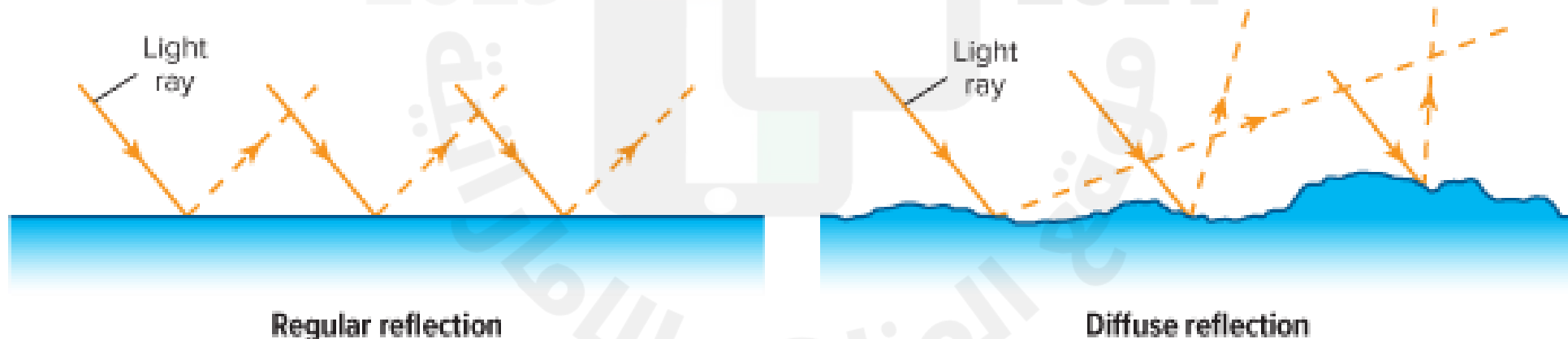
- Reflection of light from a smooth, shiny surface is called regular reflection
- Forms a normal image on the surface
- Reflection of light from a rough surface is called diffuse reflection
- An image doesn't form on the surface

Regular Reflection

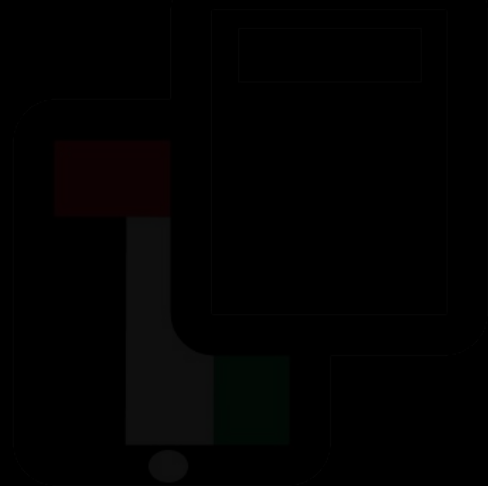


IMPORTANT NOTE

- The Law of reflection applies on both smooth and rough surface.
- When light hits an uneven surface, the angle of reflection is still equals to the angle of incidence at each point the light hit the surface. However, rays reflect in different directions.

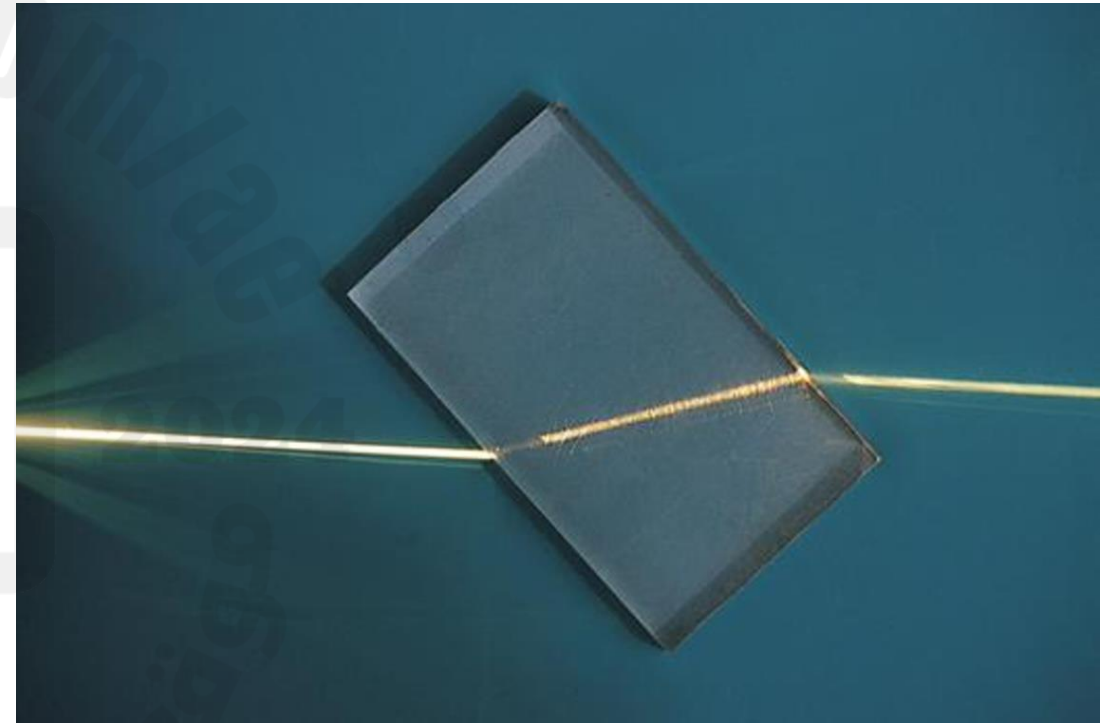


Lesson 5: Refraction and Lenses



What happens when light passes through a medium other than air?

- The change of direction of light wave as it moves from one medium to another is called **refraction**
- **This happens if the light changes its speed inside the medium**



What happens when light passes through a medium other than air?

- Each transparent material has a property called the index of refraction.
- A medium that has a **high** index of refraction is called “**slow**” because light moves slowly through it

Material	Index of Refraction	Wave Speed (km/s)
Vacuum	1.0000	300,000
Air	1.0003	299,920
Water	1.333	225,100
Glass	1.55	193,000

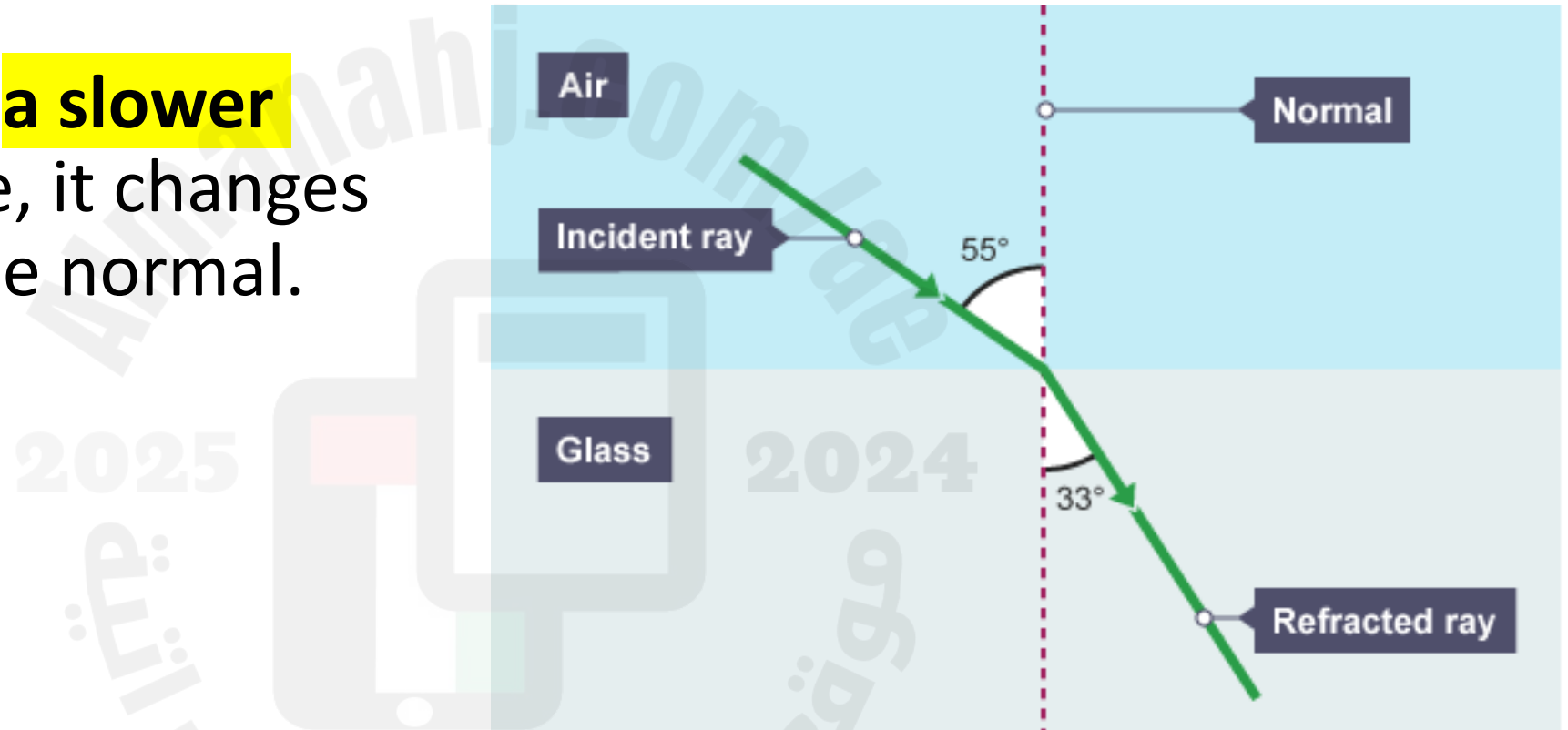
What happens when light passes through a medium other than air?

- A medium that has a relatively **low** index of refraction, such as air, is called **“fast”**

Material	Index of Refraction	Wave Speed (km/s)
Vacuum	1.0000	300,000
Air	1.0003	299,920
Water	1.333	225,100
Glass	1.55	193,000

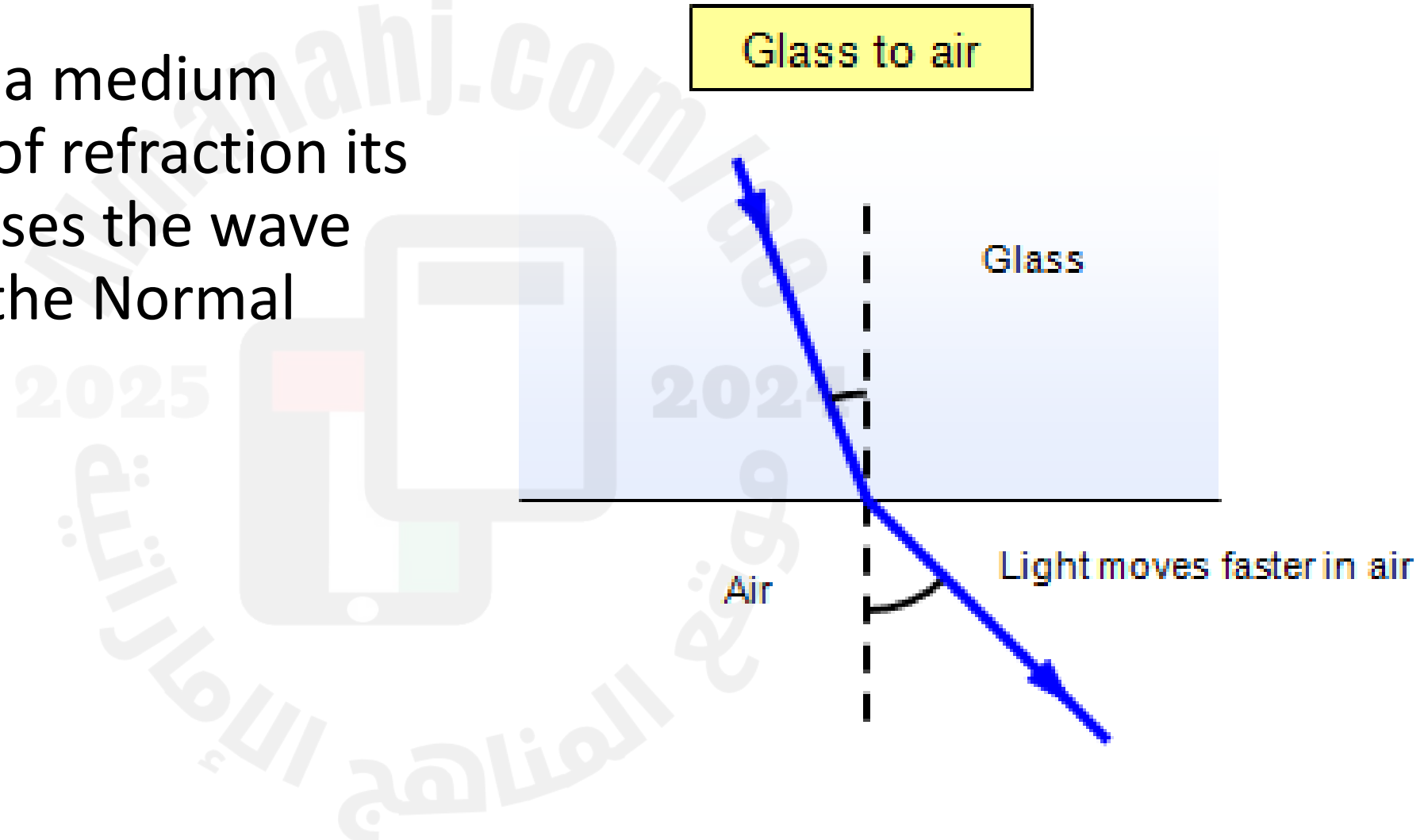
What happens when light passes through a medium other than air?

- As light moves into **a slower** medium at an angle, it changes direction **toward** the normal.



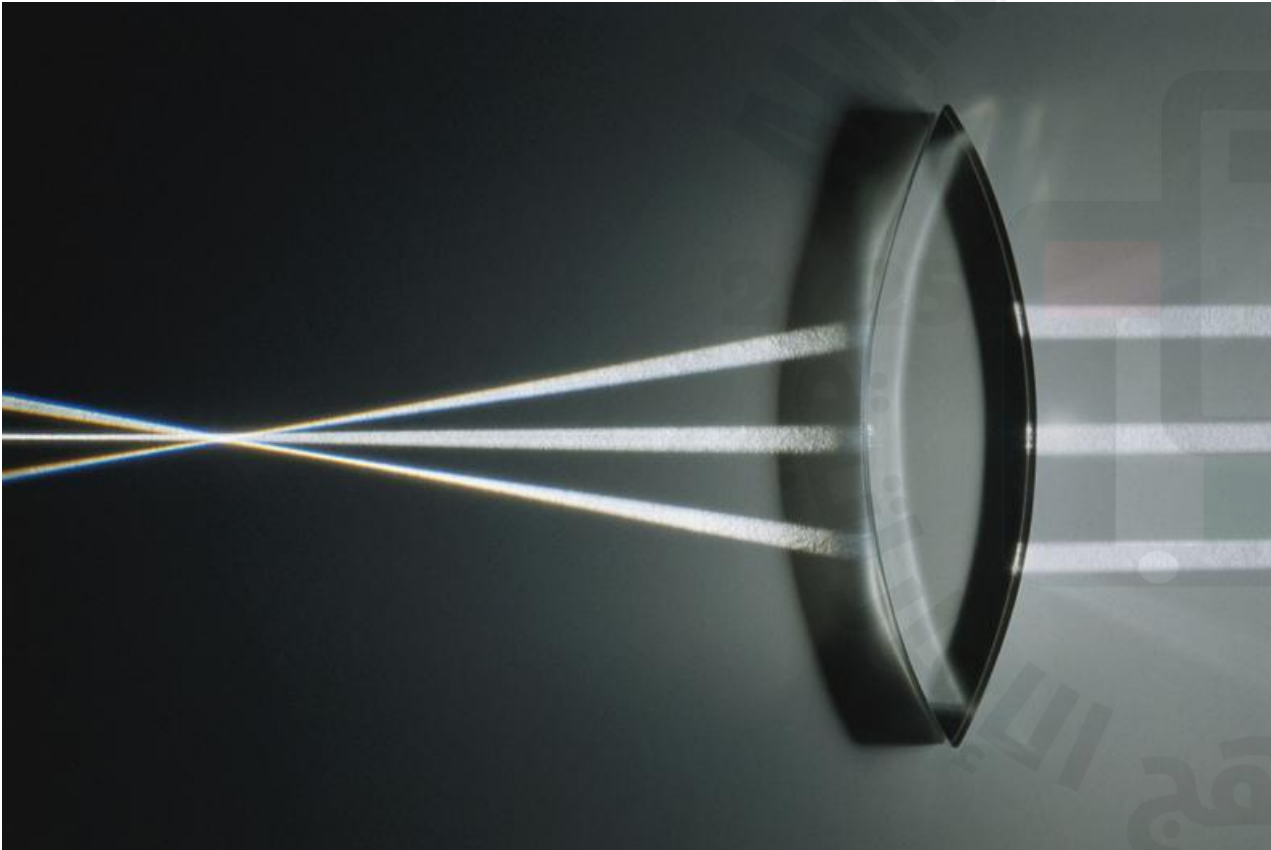
What happens when light passes through a medium other than air?

- As light moves into a medium with a lower index of refraction its speeds up. This causes the wave to turn **away** from the Normal



How do Lenses affect how an image is seen?

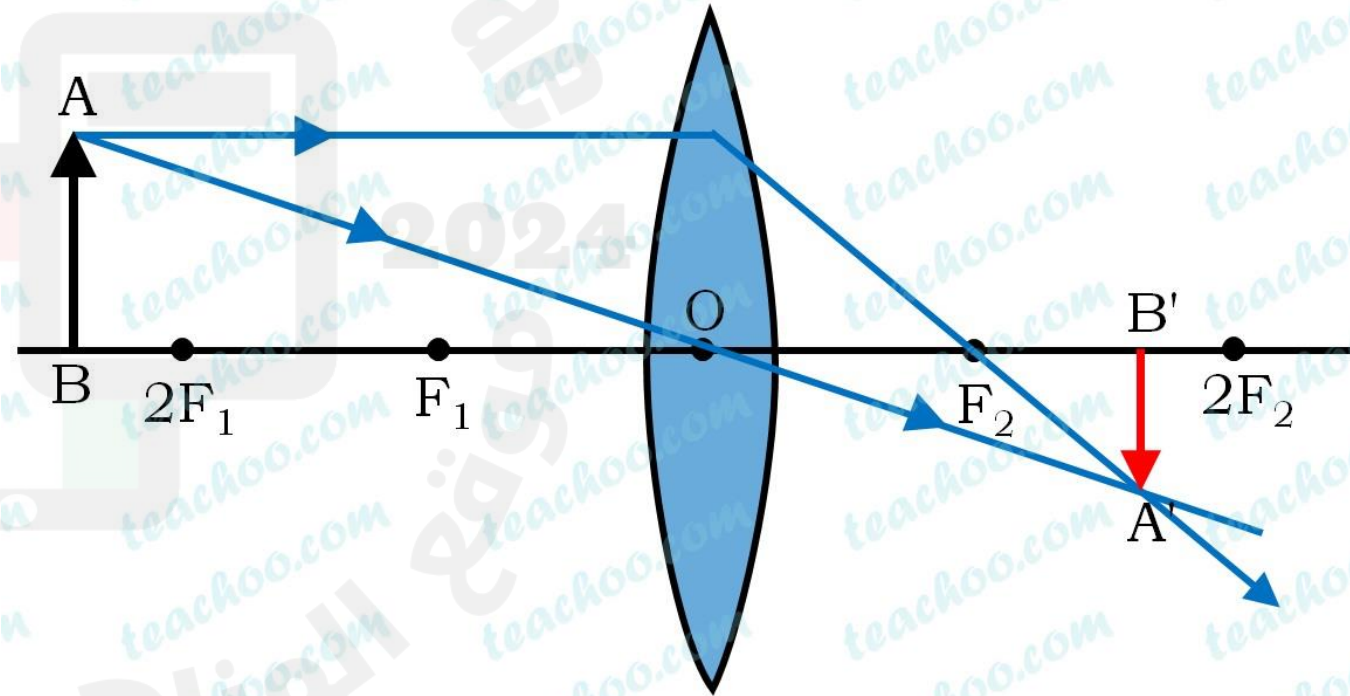
- In a **convex** lens, the light rays that move through a convex lens come together or **converge**.
- In a **concave** lens, the light spread apart, or **diverge**, as they move through a concave lens



Types of Images

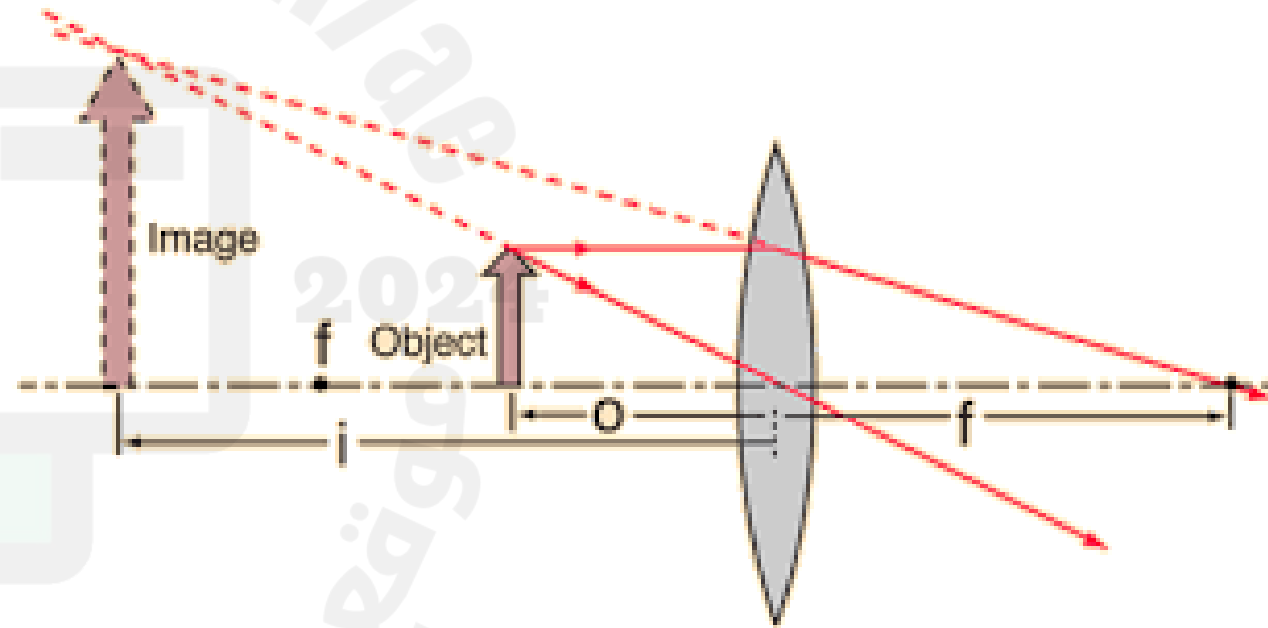
- If the object is placed more than one focal length, the image you see is inverted and smaller.

Convex Lens -
Object beyond $2F$



Types of Images

- If the object is placed less than one focal length from the lens, the image is upright and larger.
- The image is virtual because your brain interprets the rays as moving in a straight line.

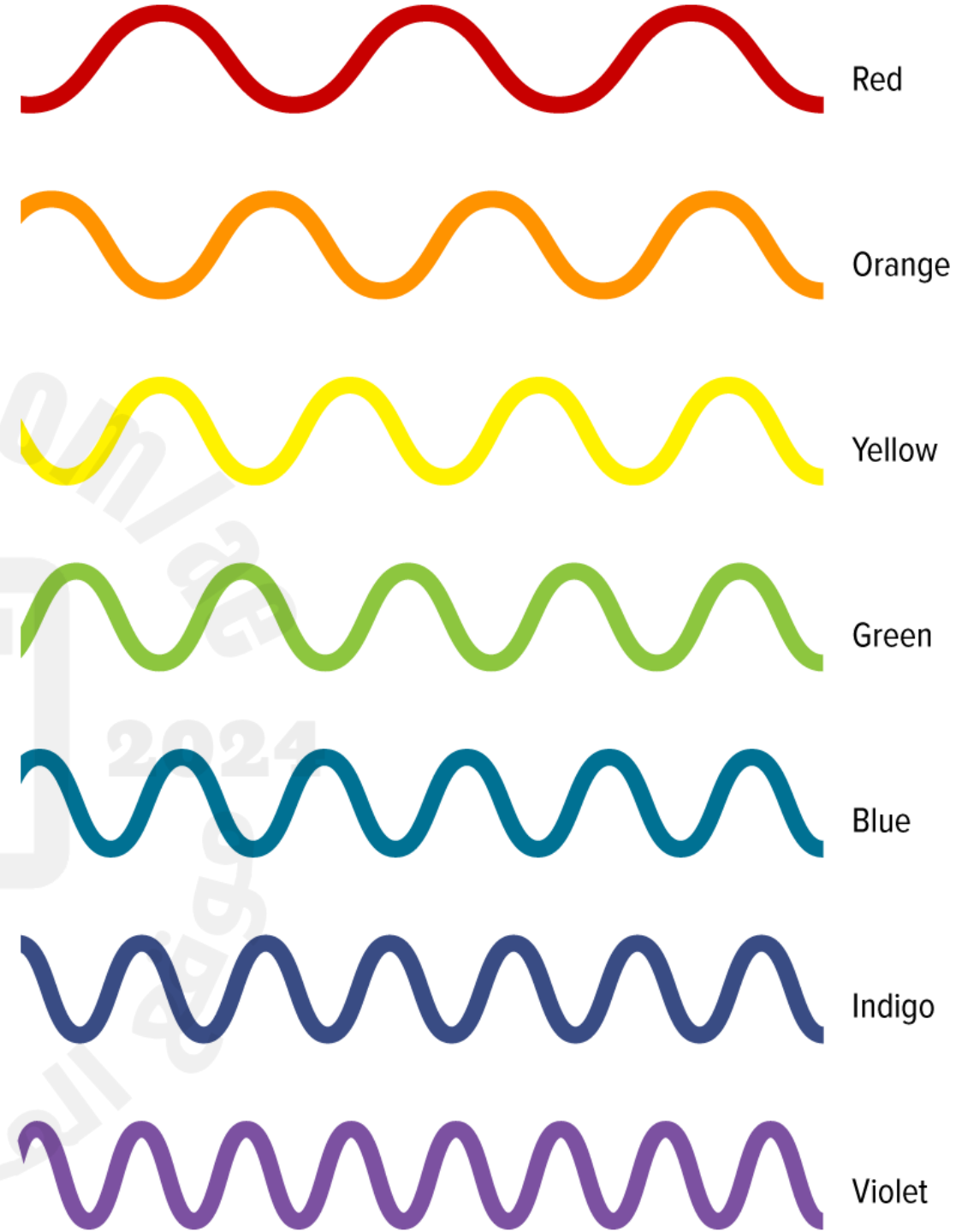


Lesson 6: Color of Light



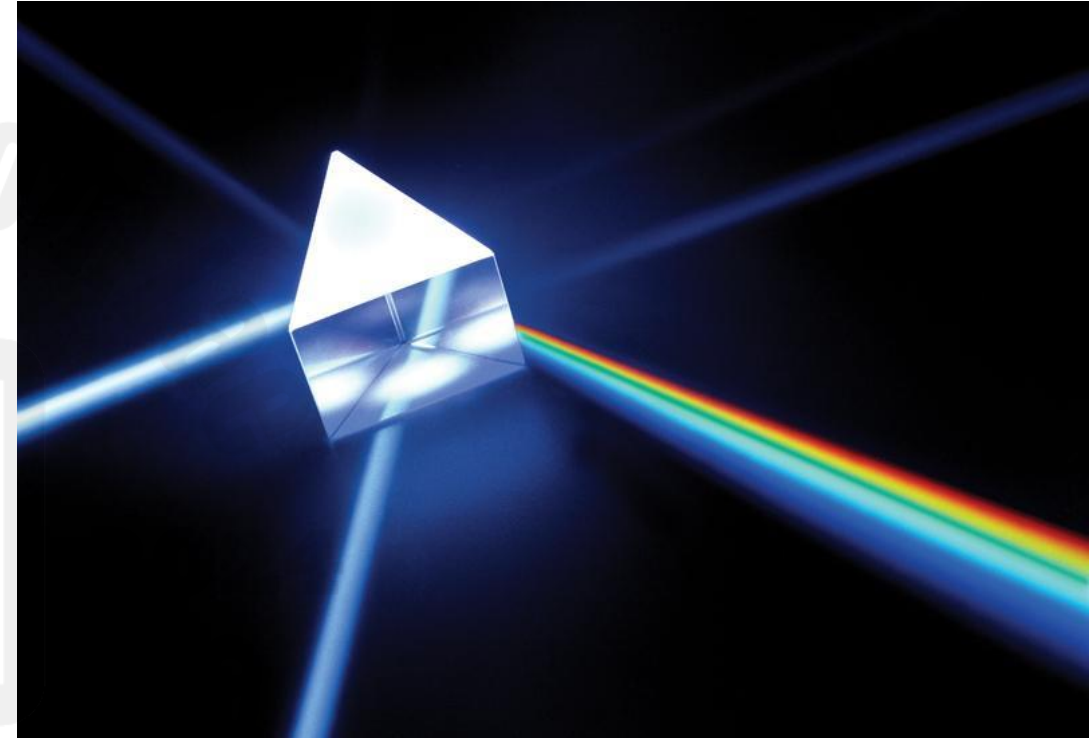
Why are there different colors of light?

- Each color is a light wave that has a different **wavelength**.
- **Red** has the longest wavelength and the lowest frequency
- Violet has the shortest wavelength and the highest frequency



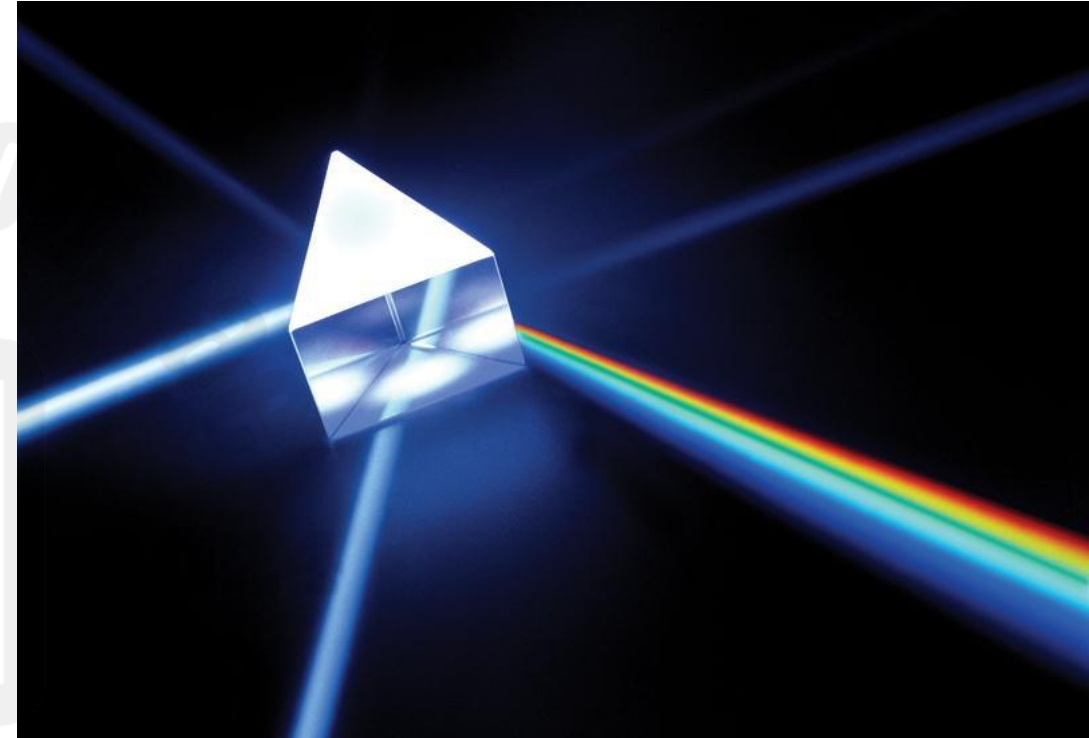
Why are there different colors of light?

- When entering a medium, Colors with **longer** wavelengths and **lower** frequencies travel **faster** and refract **less** than colors with higher frequencies.




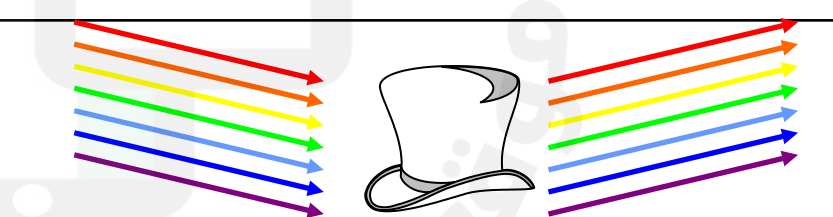
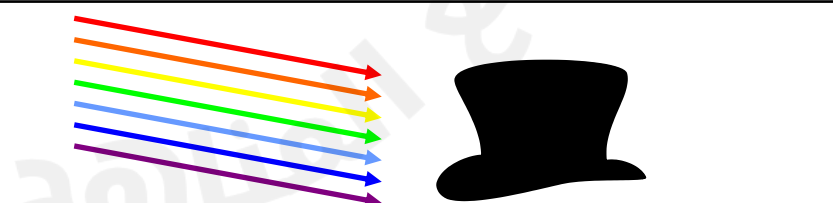
Why are there different colors of light?

- **Violet** wavelengths refract the most because their frequencies are the highest.
- **Red** wavelengths have the lowest frequencies and refract the least.
- This causes the colors of light to spread out when they are refracted through a prism



Seeing the color of opaque objects.

REMEMBER light CANNOT pass through OPAQUE objects.

When white light falls on an opaque object some colors are scattered (reflected in random directions)	
When white light falls on an opaque object some colors are absorbed (taken in by the object).	
If an object reflects all colors it appear white.	
If an object absorbs all colors it appears black.	

How do different colors of light affect what we see?

- why the glass appears blue?
- It's a blue translucent object so it absorbs all colors and passes (transmits) blue color.



How do different colors of light affect what we see?

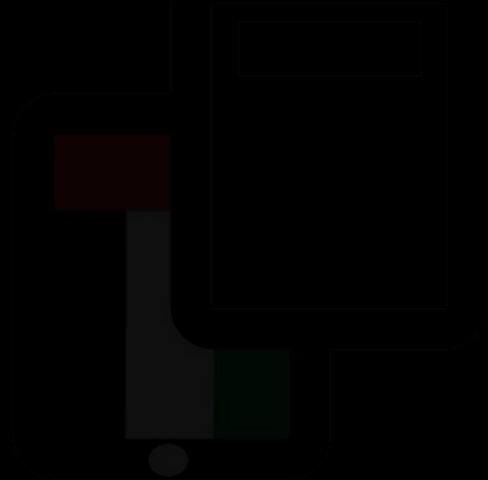


In red light, the apple appears red because it reflects the red light. But the leaves look black.

In green light, the apple appears black because no red light strikes it. But the leaves look green.

In blue light, both the apple and the leaves appear black.

Lesson 7: Communication with Signals

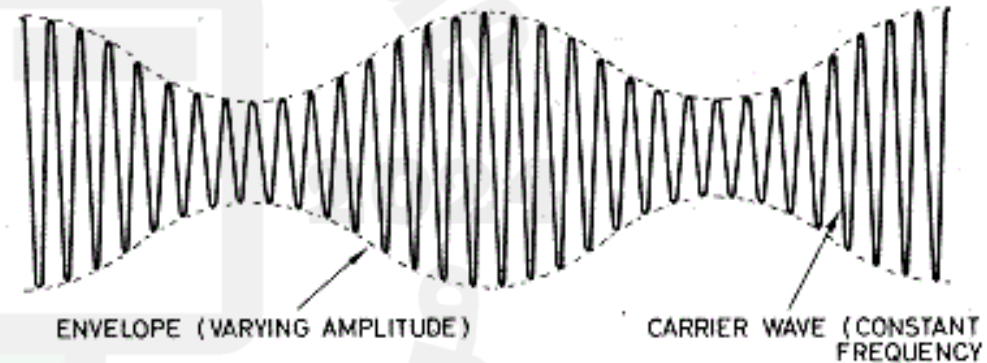


How are signals transmitted?

- There are two ways to modulate an electromagnetic wave:
 1. Change the wave's amplitude (AM)
 2. Change the wave's Frequency (FM)

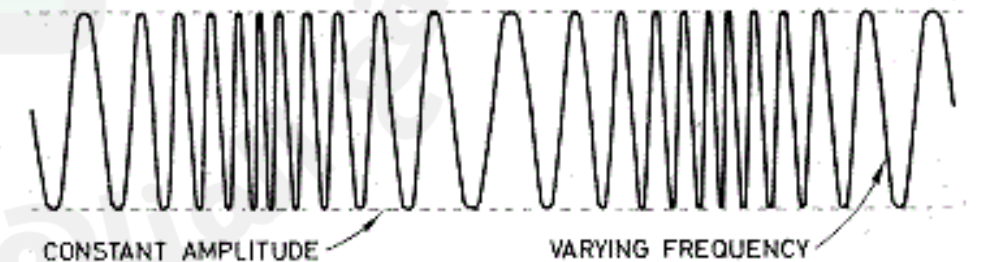
AM

(frequency constant,
amplitude modulated)



FM

(amplitude constant,
frequency modulated)



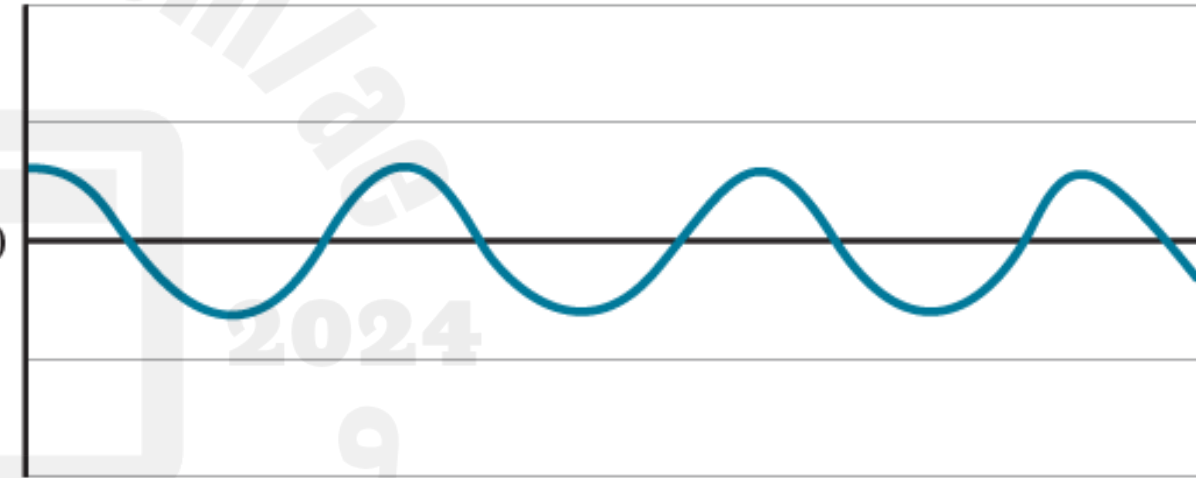
Lesson 8: Modern Communication with digital signal



What is an analog signal?

- Analog signals changes continuously over time.
- An Analog signal carries infinite number of values over time.
- Example: Human voices, thermometers,

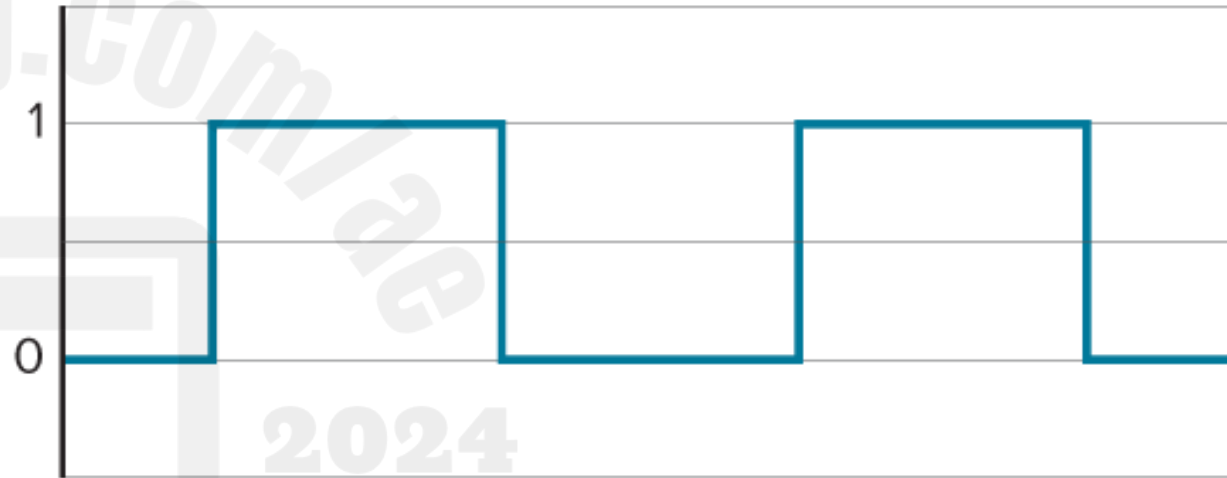
Analog Signal



What is a digital signal?

- A **digital signal** is an electric signal whose value changes between two values, ON and OFF
- A digital signal is not continuously changing values like analog signals.

Digital Signal



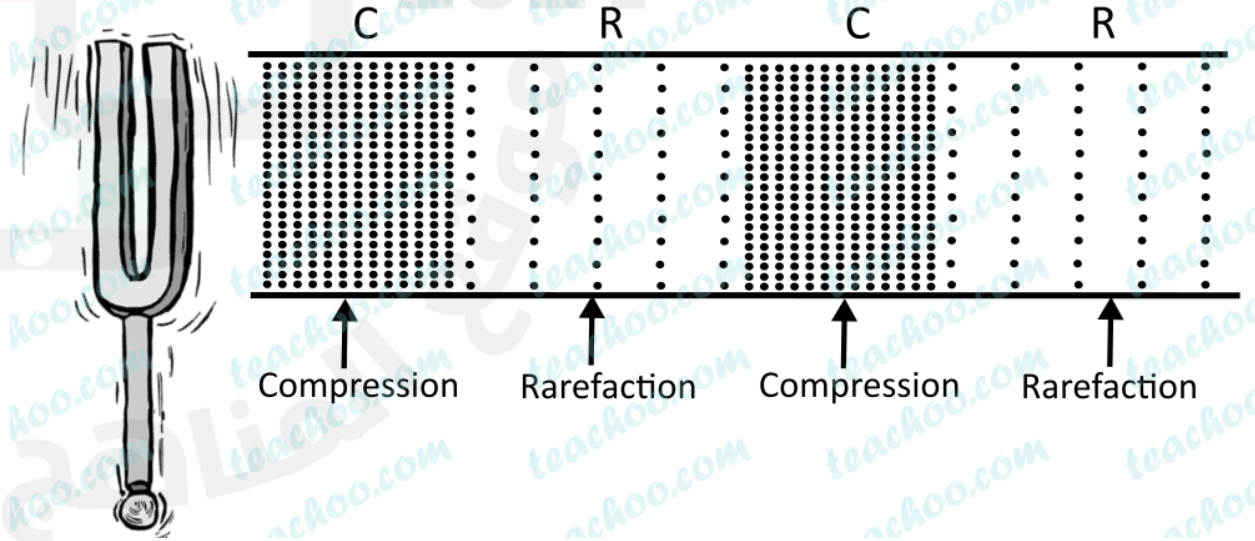
Lesson 9: The Nature of Sound



Sound waves

- Sound waves are longitudinal waves.
- There are two areas in longitudinal waves:
 1. Compression: where the particles are close together.
 2. Rarefaction: where the particles of the medium are spread out

Compression and rarefactions of a longitudinal wave



Sound Waves

- Sound waves travel through any type of matter—solid, liquid, or gas.
- The matter through which sound travels is called a medium.
- Sound waves cannot travel through a vacuum.
- The speed in which a sound wave travels depends upon the medium.

Lesson 10: Properties of Sound



Intensity and Loudness

- **Loudness** is the way humans understand sound intensity.
- A **decibel** is a unit of sound intensity.
- The abbreviation for decibels is **dB**.
- Every increase in 10 dB on the decibel scale represents a ten times increase in intensity (energy).

3. The table to the left shows the decibels produced by a number of objects. According to the table, which sound has 1,000 times more energy than the sound of a dishwasher?

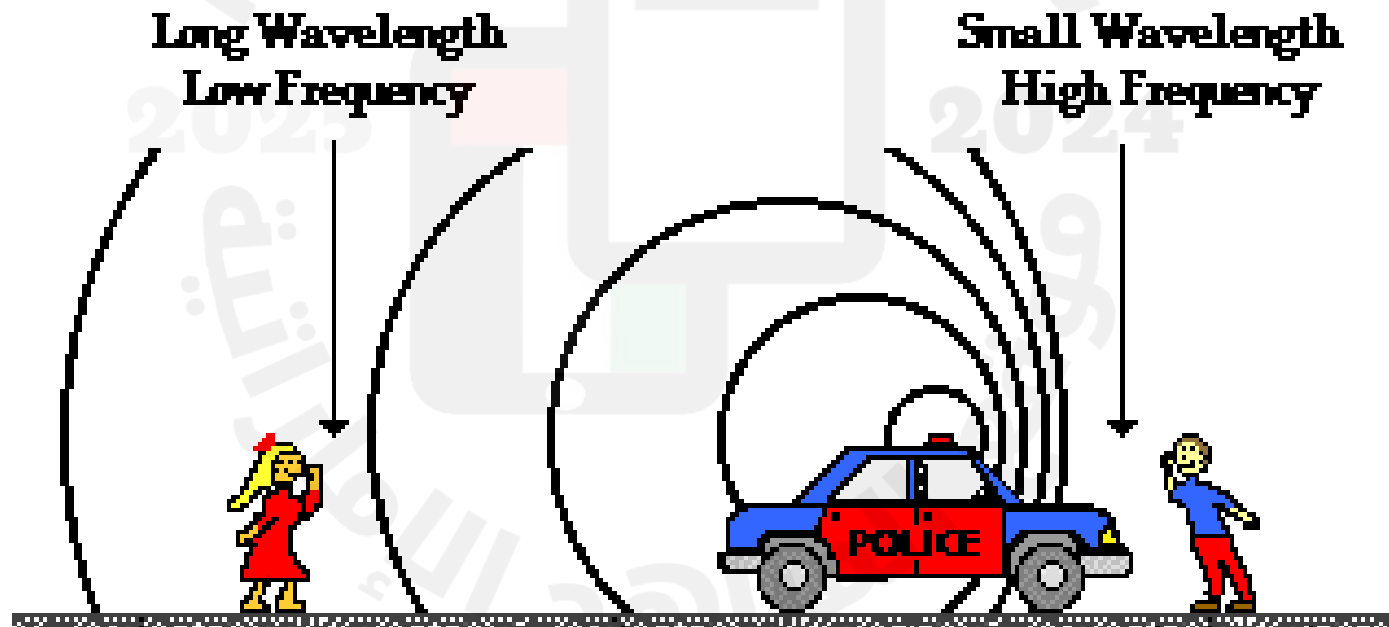
Sound	Decibel Level
Tornado siren	140 dB
Jackhammer	130 dB
Chain saw	100 dB
Lawn mower	90 dB
Vacuum cleaner	75 dB
Dishwasher	60 dB

- ☐ A chain saw
- ☐ B jackhammer
- ☐ C lawn mower
- ☐ D tornado siren

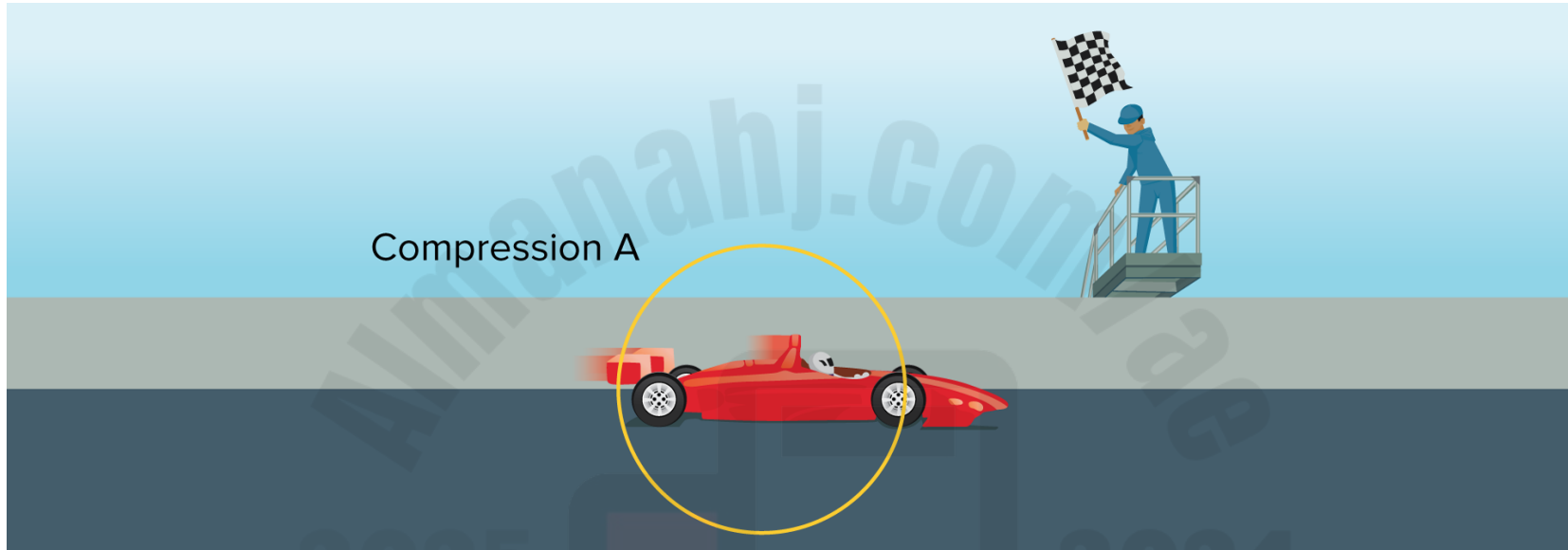
The Doppler Effect

The **Doppler effect** is the change in wave frequency due to a wave source moving relative to an observer or an observer moving relative to a wave source.

The Doppler Effect for a Moving Sound Source

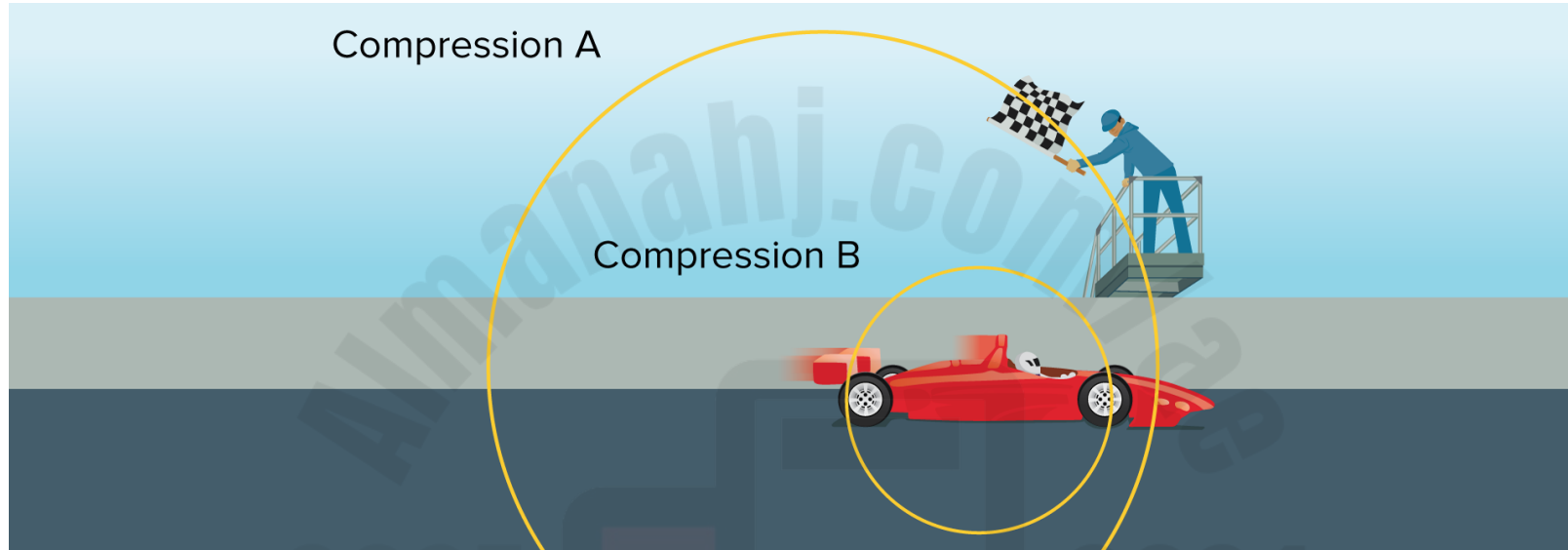


Doppler Effect



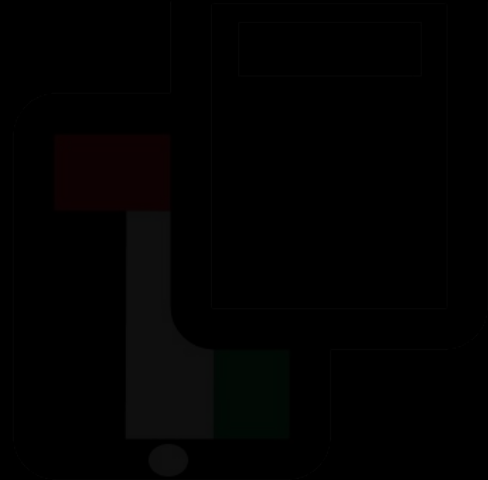
The race car sends out a sound wave as it moves, producing compression A. Compression A continues to move outward, and the car continues to move forward.

Doppler Effect



The car is closer to the flagger when it creates compression B. Compressions A and B are closer together in front of the car, so the flagger hears a higher-pitched sound.

Lesson 11: Music



Resonance

- **Resonance** is the ability of an object to vibrate by absorbing energy at its own natural frequency.
- Example: an opera singer can cause a glass to break if it sings at the same natural frequency as the glass
- Resonant frequencies amplify the sound
Of many musical instruments



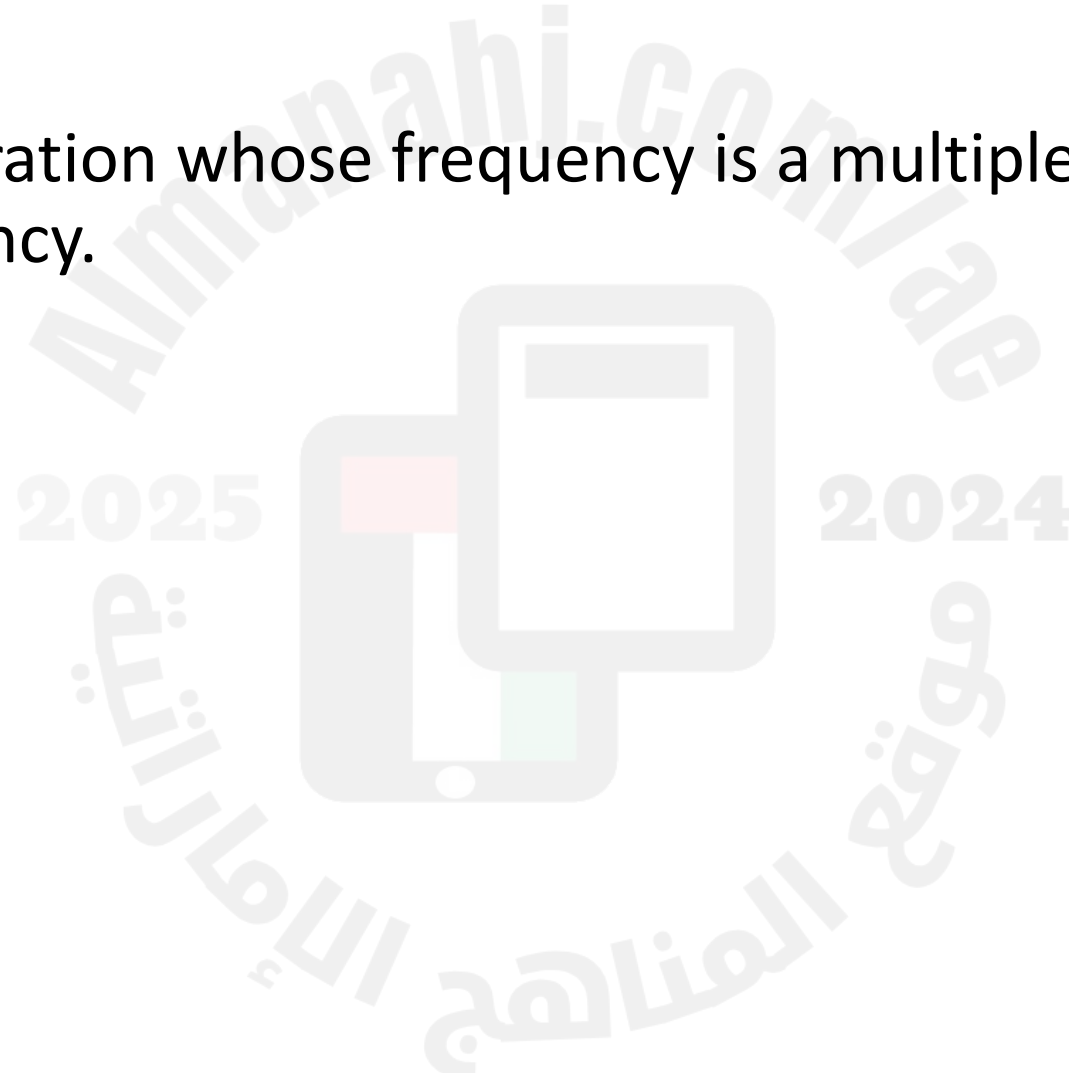
Sound Quality

- Suppose someone played a note on a flute and then played the same note on a piano. You could tell the difference between the two instruments, even if you had your eyes closed.
- **Sound quality** describes the differences between sounds of the same pitch and loudness.



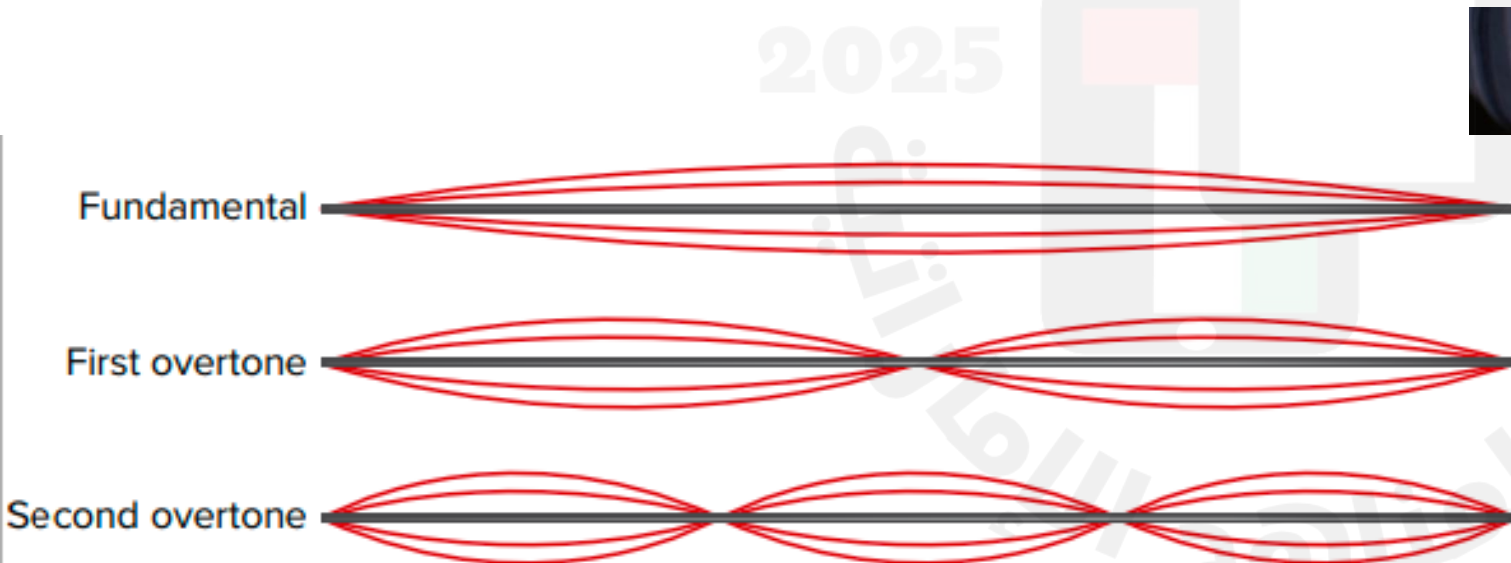
Sound quality and overtones

- Sound quality results from **overtones**.
- An **overtone** is a vibration whose frequency is a multiple of the fundamental frequency.

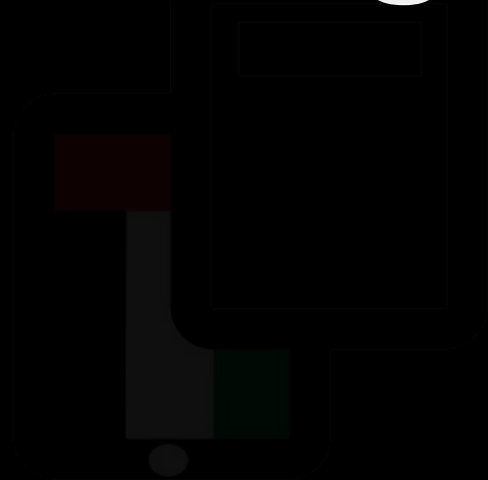


Sound quality and overtones

- Suppose a guitar string vibrates at a fundamental frequency of 250 Hz. Multiples of 250 are 500, 750, 1000, and so on. The guitar string will vibrate at its fundamental frequency of 250 Hz. It can also vibrate at overtones of 500 Hz, 750 Hz, 1000 Hz



Lesson 12: Using sound

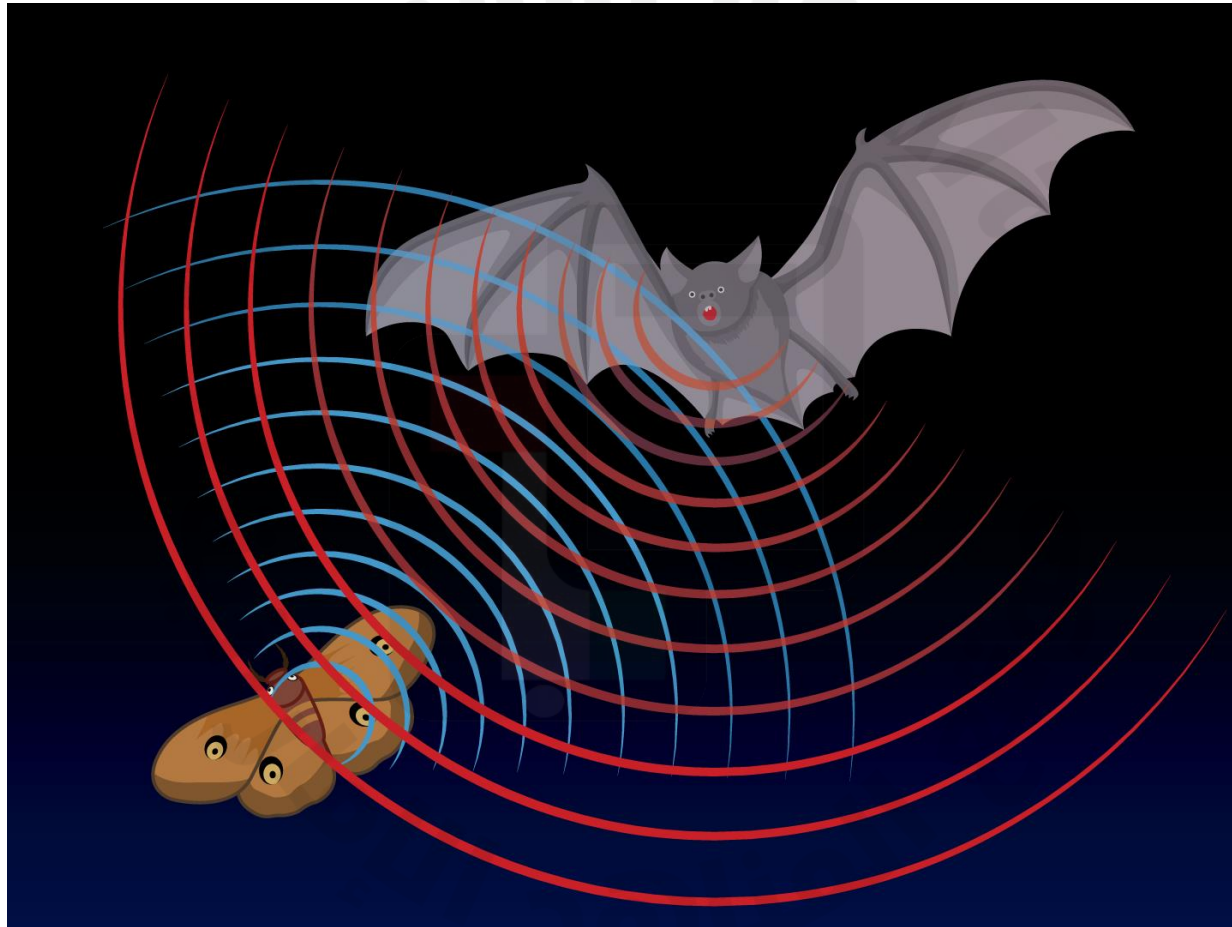


Echolocation

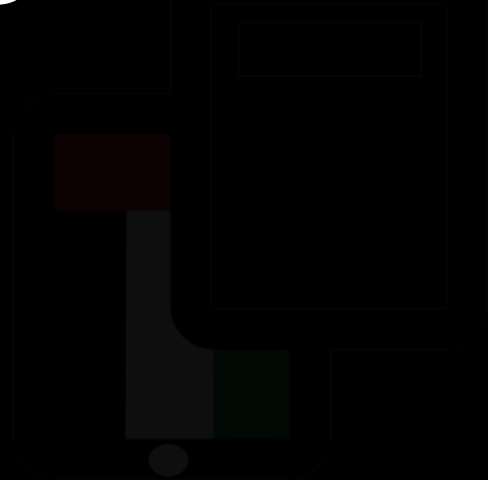
- Most species of bats depend upon echolocation for finding their prey in the dark.
- **Echolocation** is the process of locating objects by emitting sounds and then interpreting the sound waves that are reflected from those objects.

Echolocation

Some of the sound waves reflect off a moth.

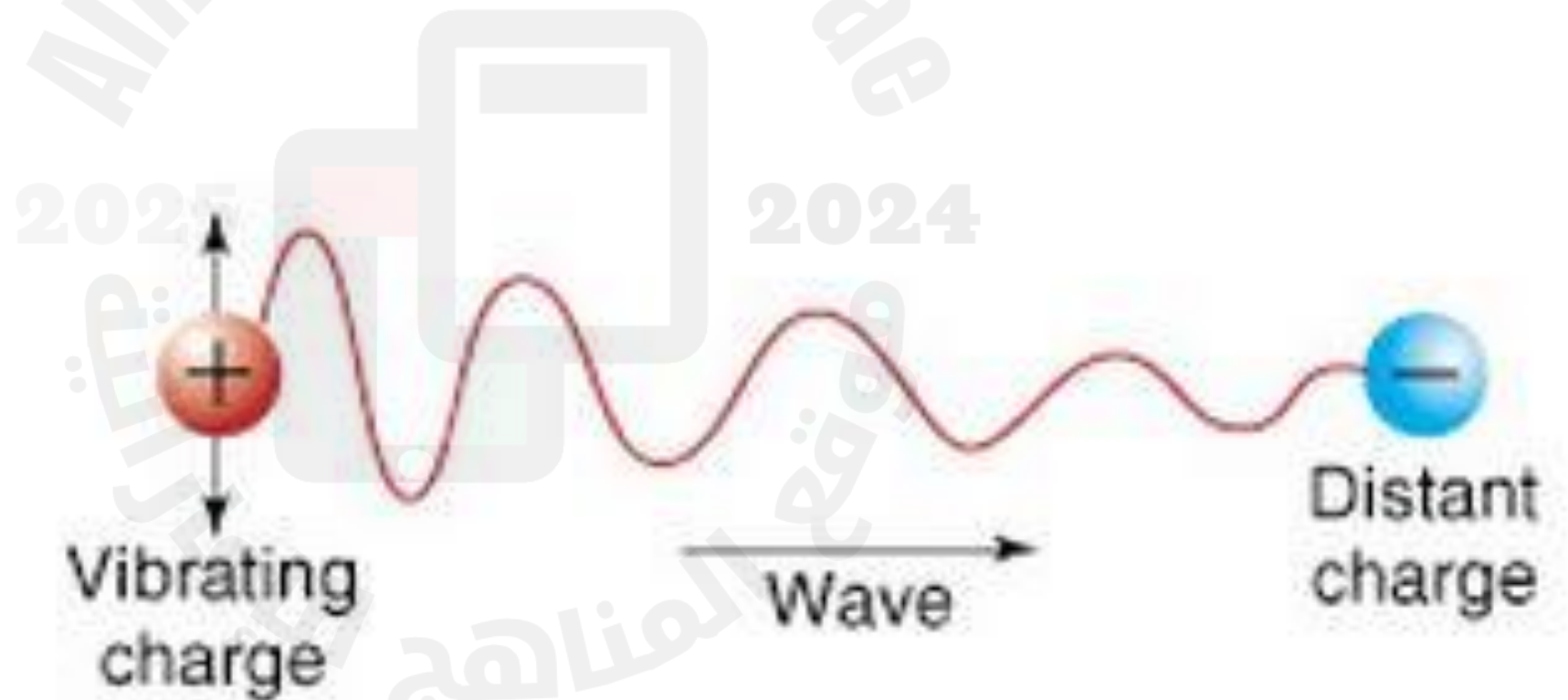


Lesson 13: What are electromagnetic waves?



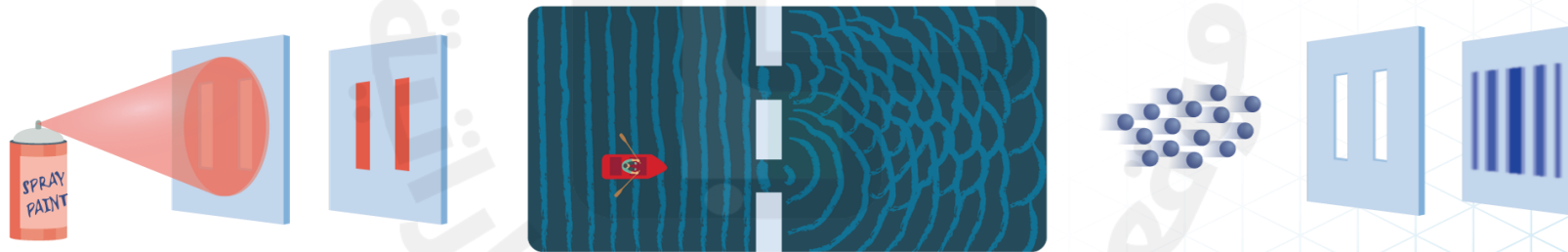
What are electromagnetic waves?

- Electromagnetic waves is the type of waves that don't need a medium to travel in.
- **Electromagnetic** waves are made by vibrating electric charges.
- Example: protons and electrons

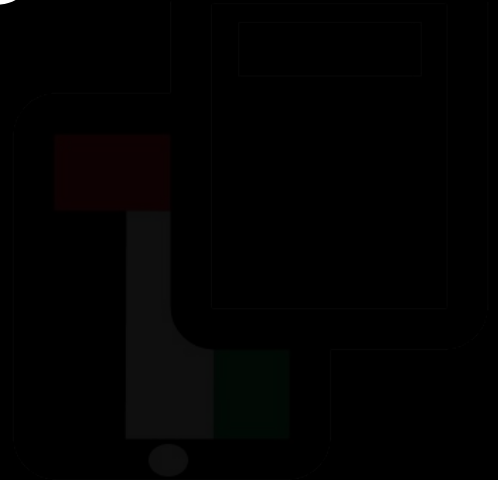


Waves and Particles

- Electromagnetic waves can behave as particles called photons. A **photon** is a massless bundle of energy that behaves like a particle.
- Particles such as electrons can behave as waves. As shown below on the right, electrons form interference patterns typical of waves.

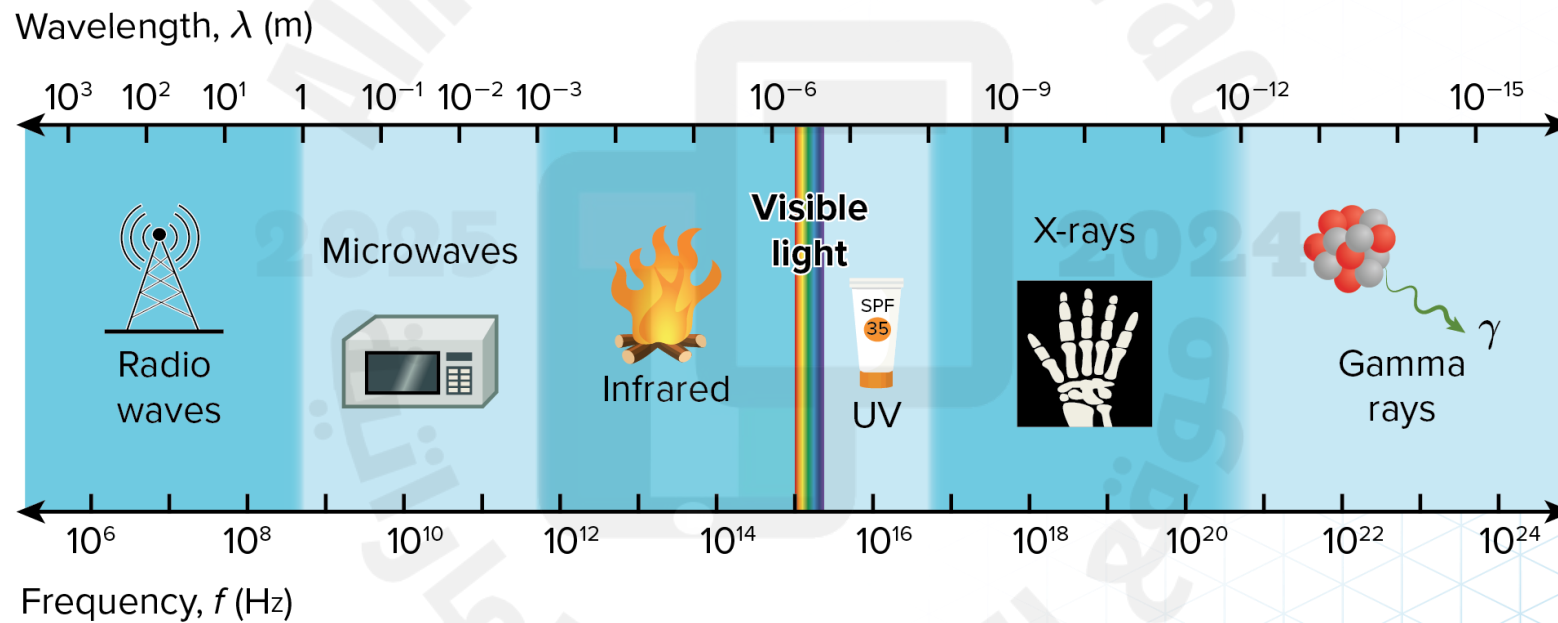


Lesson 14: The Electromagnetic Spectrum



A Range of Frequencies

The entire range of electromagnetic wave frequencies is called the electromagnetic spectrum.



Lesson 3

Radio Communication

2025

2024

المناهج الإلكترونية
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Radio Transmissions

- An electromagnetic wave with the specific frequency that a station is assigned is called a **carrier wave**.
- A radio station sends information by converting sounds into electric signals. The electric signals are called the signal wave. It is used to modify the carrier wave.
- The process of adding the signal wave to the carrier wave is called **modulation**.