

تم تحميل هذا الملف من موقع المناهج الإماراتية



الملف ملخص وشرح الدرس الأول Properties Wave خصائص الموجة

موقع المناهج ← المناهج الإماراتية ← الصف الثامن ← علوم ← الفصل الأول

روابط مواقع التواصل الاجتماعي بحسب الصف الثامن



روابط مواد الصف الثامن على تلغرام

[الرياضيات](#)

[اللغة الانجليزية](#)

[اللغة العربية](#)

[التربية الاسلامية](#)

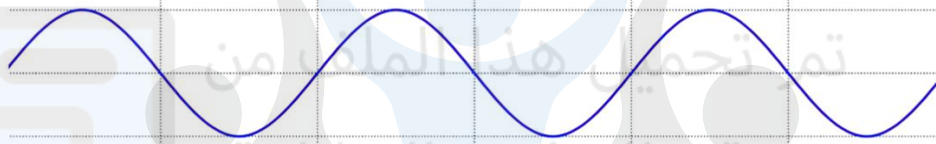
المزيد من الملفات بحسب الصف الثامن والمادة علوم في الفصل الأول

أسئلة الامتحان النهائي بريدج	1
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Lesson 1 Wave Properties

Dr. Mohamed Mostafa

- **Waves:** Waves are disturbances that transfer energy from one space to another without transferring matter

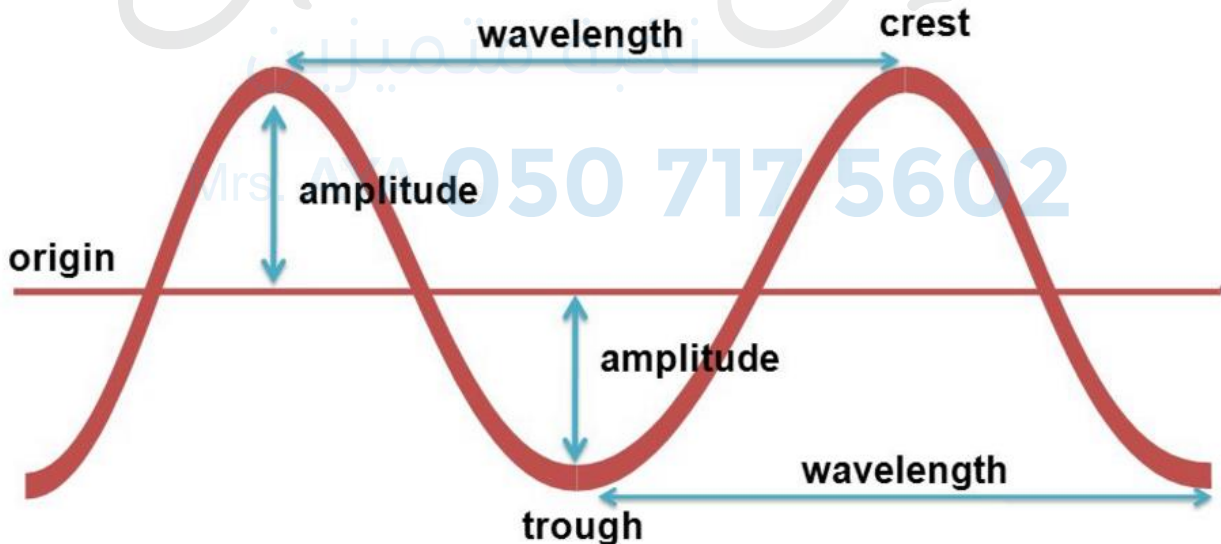


Q&A:

..... always begin with a source of energy that causes a back and forth OR up or down disturbance movement. (Final Exam 2021)

- **Medium (Matter):** A material through which a wave travels

wave parts:



1- Amplitude - the height of a wave, from resting position to crest

The **larger** the amplitude, the **more energy** the wave has

$$E=A^2$$

AMPLITUDE AND ENERGY

A wave's amplitude is the **maximum distance a wave varies from its rest position**.

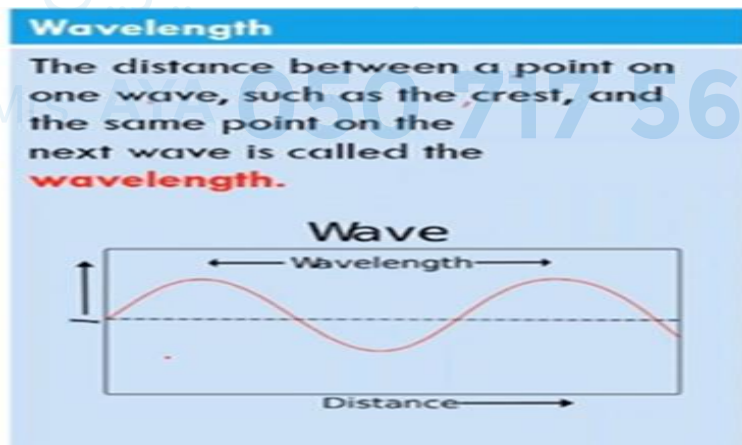
For mechanical waves, amplitude is the maximum distance the particles of the medium move from their rest positions as a wave passes.

The more energy a mechanical wave has, the larger its amplitude.



2- Wavelength - distance from any point on a wave to an identical point on the next wave

The shorter the wavelength the more energy the wave has

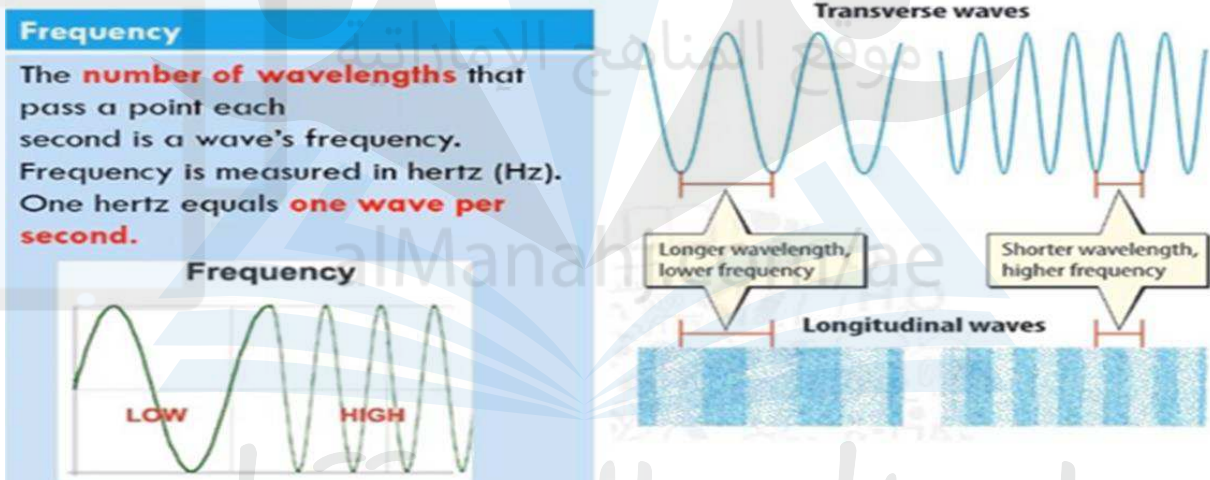


3- Frequency - the number of waves produced in a given amount of time.

a. measured in hertz (Hz) 1 Hz = 1 wave per second

Note that:

Frequency and wavelength are inversely related, which means as one decreases the other increases (and vice versa)



Exam questions Tricks:

- 1- The larger the amplitude, the more energy the wave has
- 2- The shorter the wavelength the more energy the wave has
- 3- Frequency and wavelength are inversely related, which means as one decreases the other increases (and vice versa)

There are two types of waves:

1. Mechanical wave
2. Electromagnetic wave

Mechanical wave:

- Travel only through matter
- They need a medium**
- Solid – liquid – gas For example: Water – air – sound

Electromagnetic wave:

- Travel through empty space (vacuum) or through matter
- For example: only light

Mechanical waves have two types:

1. Transverse wave
2. Longitudinal wave

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1- Transverse wave:

Waves in which the medium moves at right angles to the direction of the wave **perpendicular** to the direction the wave travels

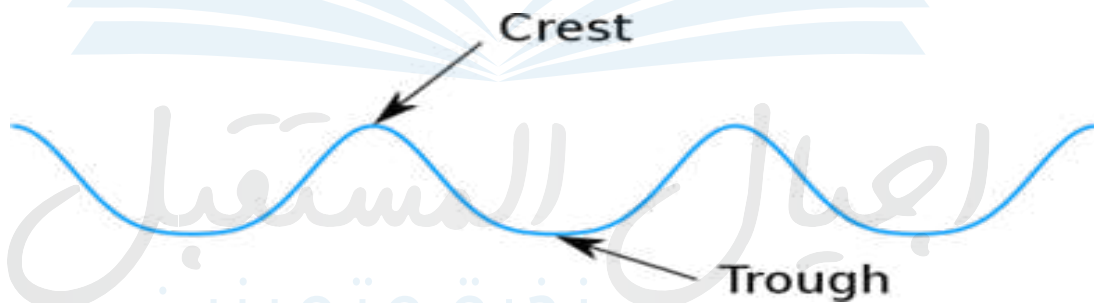
For example: water



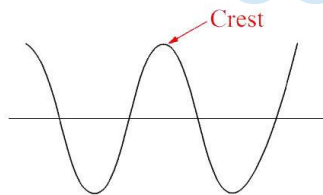
Parts of transverse waves:

Crest: the highest point of the wave

Trough: the lowest point of the wave



1- Crest: The highest point on a transverse wave



- **longitudinal wave:**
- **longitudinal waves:** waves in which the medium moves back and forth in the same direction as the wave parallel to the direction the wave travels



Parts of longitudinal waves:

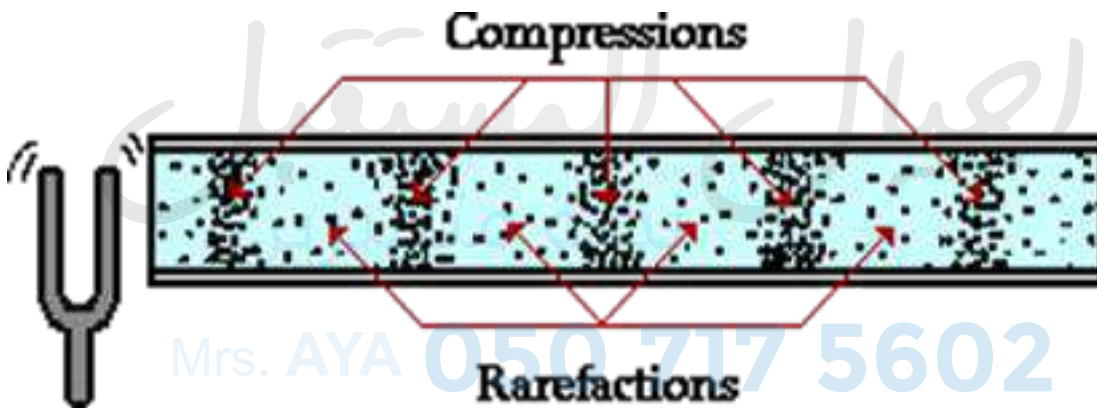
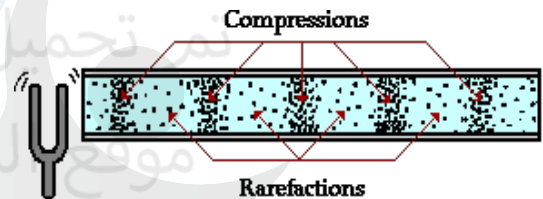
Compression: where the particles are close together

Rarefaction: where the particles are spread apart

What is the difference between compression regions and rarefaction region?

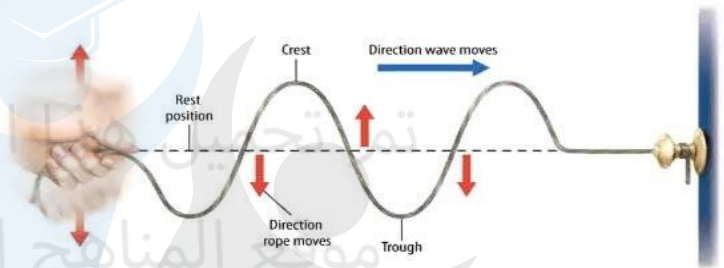
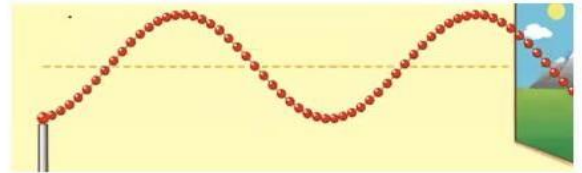
Compression regions where the particles of the medium are closest together

Rarefaction regions where the particles are farthest apart.

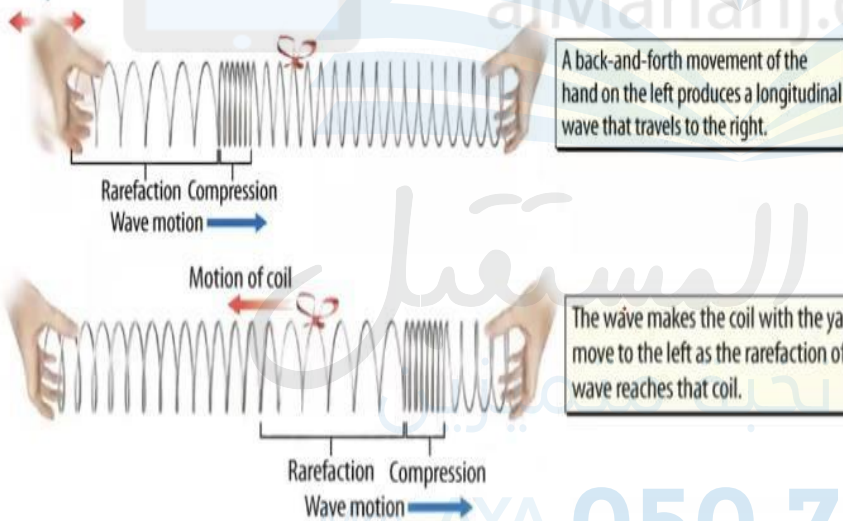


TRANSVERSE WAVES

- A **transverse wave** is a wave in which the disturbance (particles) is perpendicular (right angled), to the direction the wave travels.
- It is type of **mechanical wave**.
- The **highest** points on a transverse wave are **crests**.
- The **lowest** points on a transverse wave are **troughs**.



LONGITUDINAL WAVES



- The regions of a longitudinal wave where the particles in the medium are **closest** together are **compressions**.
- The regions of a longitudinal wave where the particles are **farthest** apart are **rarefactions**.

Note that :

In **transverse wave** Wave length is distance from crest to crest or from trough to trough

While in **longitudinal** waves wave length is distance between two successive compressions or two successive Rarefactions

Lessons Vocabulary meaning

wave	Is a disturbance distance that transfer energy from one place to another without transferring matter.
Transverse wave	Is a wave in which the disturbance is perpendicular to the direction the wave travels?
Longitudinal wave	Causes the particles in a medium to move parallel to the direction that the wave travels.
amplitude	Of a wave is the maximum distance that the wave moves from its rest position.
wavelength	of a wave is the distance from one point on a wave to the same point on the next wave
frequency	Of a wave is the number of times the pattern repeats in a given time.

Previous Exam questions on this Lesson:

Question 1 A
What is the mathematical relationship between amplitude and energy of a wave? $E=A^2$
Question 1 B
How energy carried by a wave corresponds to its amplitude? As the amplitude increases the Energy increases too.
Question 2 A
How does the wavelength change if the frequency of a wave decreases? The wavelength increases.
Question 2 B
What is the difference between wavelength and frequency? Wavelength: is the distance from a crest to crest. Frequency: number of waves that passes through fixed point in one second.



أكاديمية أجيال المستقبل

مرخصة من قبل دولة الإمارات العربية المتحدة

1) Tyrone gathers amplitude and energy data for four ocean waves, as shown in the table.

Four Ocean Waves

Wave	Amplitude (units)	Energy (units)
W	1	1
X	4	16
Y	7	49
Z	10	100

Which equation **best** represents the relationship between the amplitude (**A**) of an ocean wave and its energy (**E**), according to the data in the table?

- A) $E = A$
 B) $E = A^2$
 C) $\frac{1}{E} = A$
 D) $\frac{1}{E} = A^2$

تم تحميل هذا الملف من
موقع المناهج الإماراتية

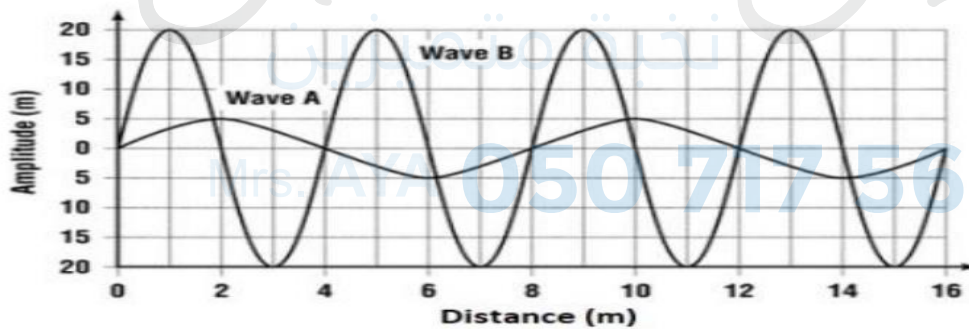
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Amplitude is directly proportional to energy.

Energy is the square of Amplitude.

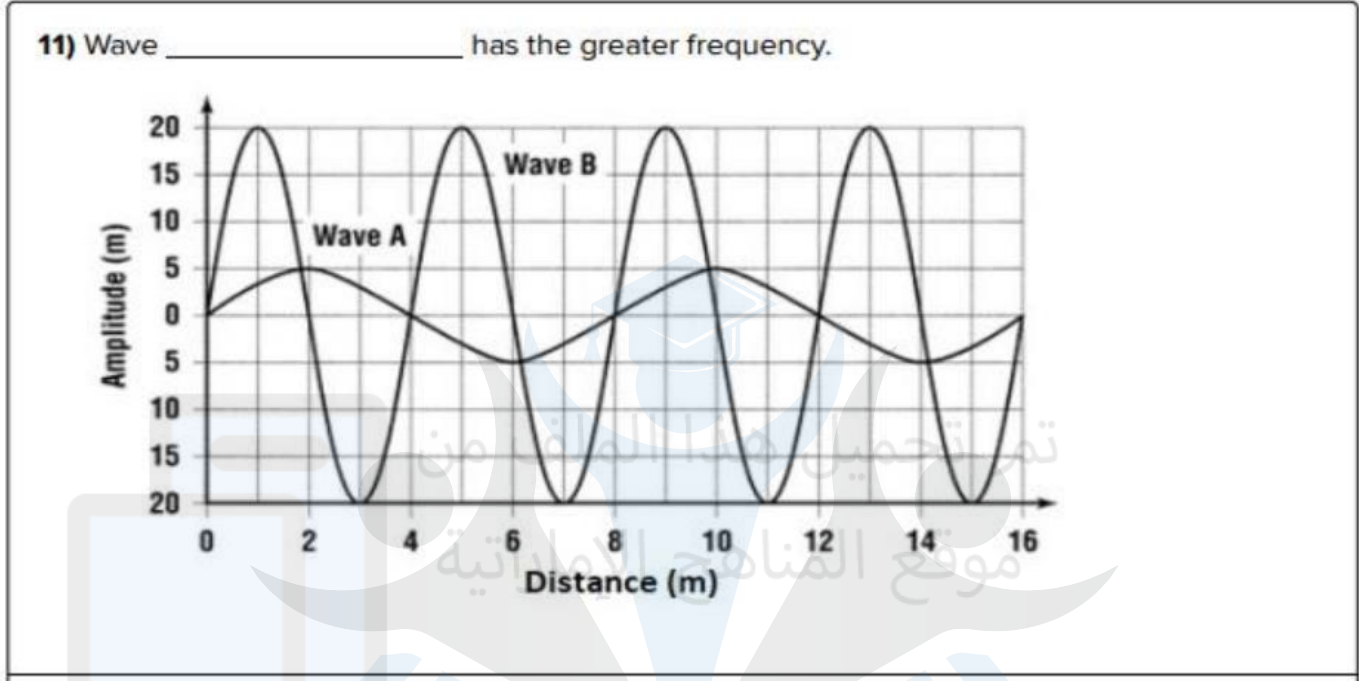
2

7) What is the wavelength of Wave A?



- A) 4 m
 B) 5 m
 C) 8 m
 D) 20 m

3.



Wave B Has the greater frequency

اجيال المستقبل
نخبة متميزين

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Last Minute Summary:

○ **Waves:** Waves are disturbances that transfer energy from one space to another without transferring matter

○ **Amplitude** - the height of a wave, from resting position to crest
the larger the amplitude, the more energy the wave has

$$\text{Mathematical Equation : } E=A^2$$

○ **Wavelength** - distance from any point on a wave to an identical point on the next wave

the shorter the wavelength the more energy the wave has

- **Frequency** - the number of waves produced in a given amount of time;

- **Note that :** frequency and wavelength are inversely related, which means as one decreases the other increases (and vice versa)

- **Wave Speed** - the speed at which a wave travels

to calculate: wave speed (s) = frequency (f) x wavelength

- **Medium (Matter):** A material through which a wave travels

- **Compression:** is a region where matter is more closely spaced in a longitudinal wave.

- **Crest:** The highest point on a transverse wave

- **Trough:** lowest point on transverse wave

Exam questions Tricks:

1- The larger the amplitude, the more energy the wave has

2- The shorter the wavelength the more energy the wave has

3- Frequency and wavelength are inversely related, which means as one decreases the other increases (and vice versa)