شرح الدرس الثاني خصائص الموجة Properties Wave من الوحدة الأولى الاهتزازات والموجات

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف العاشر المتقدم ⇦ فيزياء ⇦ الفصل الأول ⇦ ملفات متنوعة ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2024-10-25 17:05:41

المزيد من مادة فيزياء:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

التواصل الاجتماعي بحسب الصف العاشر المتقدم

صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف العاشر المتقدم والمادة فيزياء في الفصل الأول

1	شرح الدرس الأول الحركة الدورية Motion Periodic من الوحدة الأولى الاهتزازات والموجات
2	الدروس المطلوبة للامتحان الوزاري منهج انسباير
3	حل أسئلة مراجعة عامة اختيار من متعدد منهج انسباير
4	ملخص الوحدات الأولى والثانية والثالثة نظام المقررات
5	حل أوراق عمل الدرس الأول Motion Periodic الحركة الدورية من الوحدة الأولى

MAINIDEA

Waves transfer energy without transferring matter.

K *What I Know*	**W** *What I Want to Find Out*	**L** *What I Learned*

Essential Questions

- What are waves?
- How do transverse and longitudinal waves compare?
- What is the relationship between wave speed, wavelength, and frequency?

Vocabulary

Review

- period

New

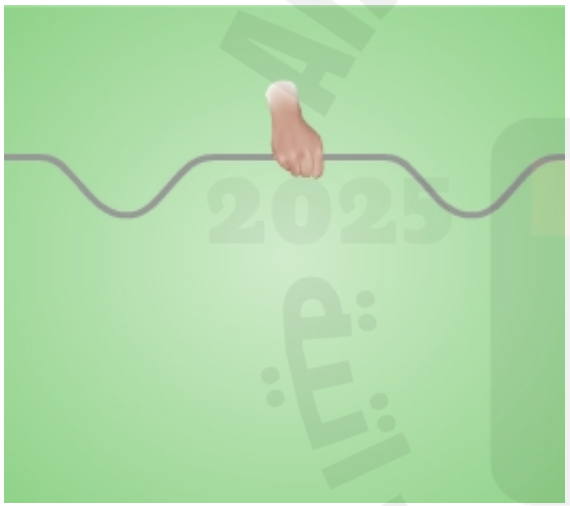
- wave
- wave pulse
- transverse wave
- periodic wave
- longitudinal wave
- surface wave
- trough
- crest
- wavelength
- frequency

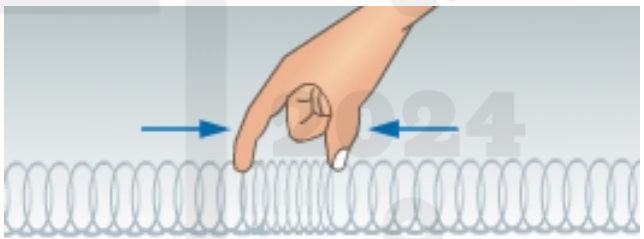
Mechanical Waves

- A wave is a disturbance that carries energy through matter or space.
- Mechanical waves require a medium, such as water, air, ropes, or a spring.
- A wave pulse is a single bump or disturbance that travels through a medium.
- If the disturbances continue at a constant rate, a periodic wave is generated.

Mechanical Waves

- A transverse wave is one that vibrates perpendicular to the direction of the wave's motion. Light is a transverse wave.
- A longitudinal wave is one that vibrates parallel to the direction of the wave's travel. Sound waves are longitudinal waves.



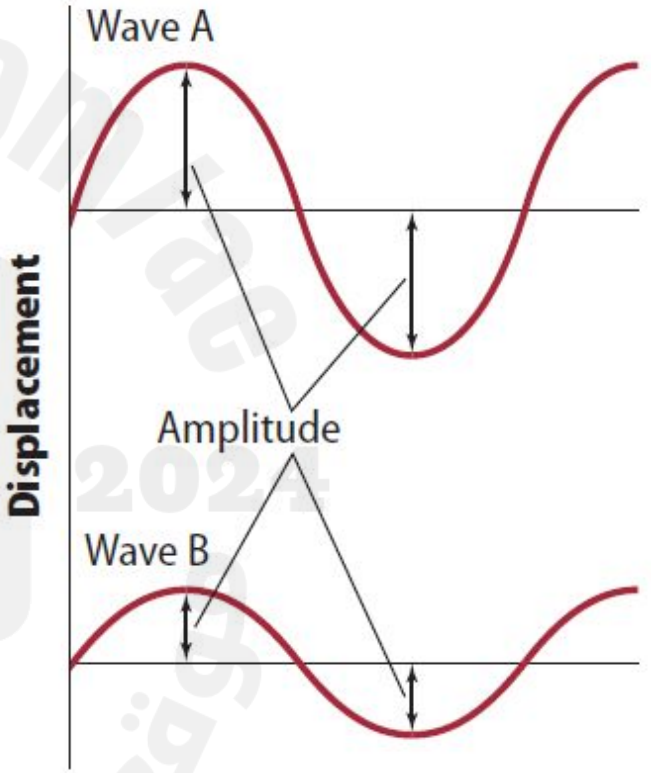


Mechanical Waves

- Waves that are deep in a lake or ocean are longitudinal; at the surface of the water, however, the particles move in a direction that is both parallel and perpendicular to the direction of wave motion, as shown in the figure below.
- Each of the waves is a surface wave, which has characteristics of both transverse and longitudinal waves.

Wave Properties

- The amplitude of periodic motion is the greatest distance from equilibrium.
- A transverse wave's amplitude is the maximum distance of the wave from equilibrium.
- Since amplitude is a distance, it is always positive.
- Waves with greater amplitudes transfer more energy.
- For waves that move at the same speed, the rate at which energy is transferred is proportional to the square of the amplitude.
- Doubling the amplitude of a wave increases the amount of energy that wave transfers each second by a factor of 4.

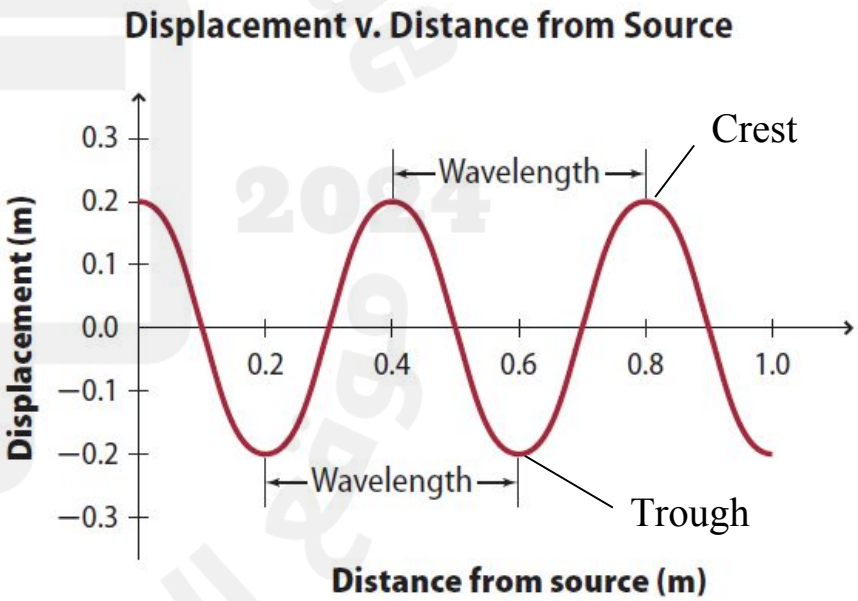


Wave Properties

- Each low point of a wave is called a trough.
- Each high point of a wave is called a crest.
- The shortest distance between points where the wave pattern repeats itself is called the wavelength (λ).
- Crests are spaced by one wavelength. Each trough is also one wavelength from the next.
- The speed of a wave is the distance that one of the wave's crests or compressions travels divided by the time interval.

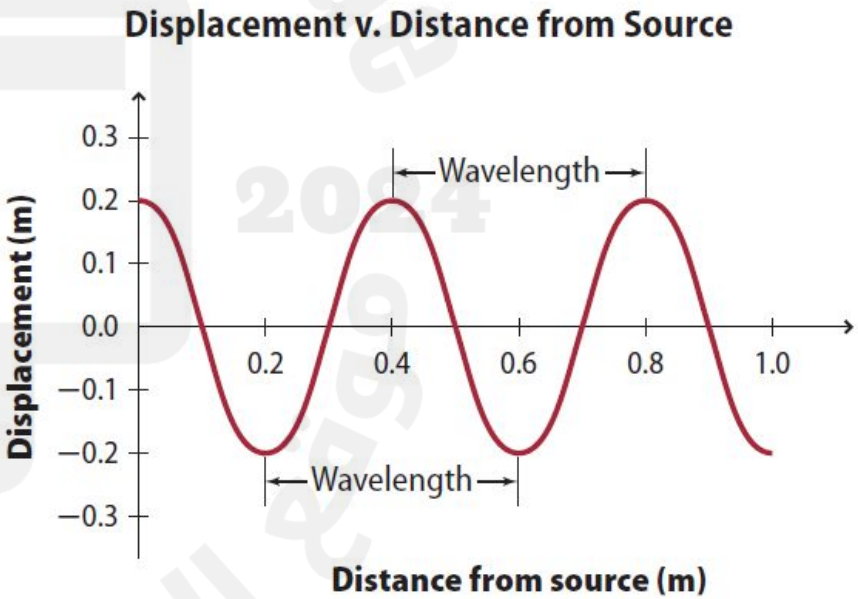
$$v = \frac{\Delta d}{\Delta t}$$

- For most mechanical waves (except water surface waves) the speed depends only on the medium through which the waves move.



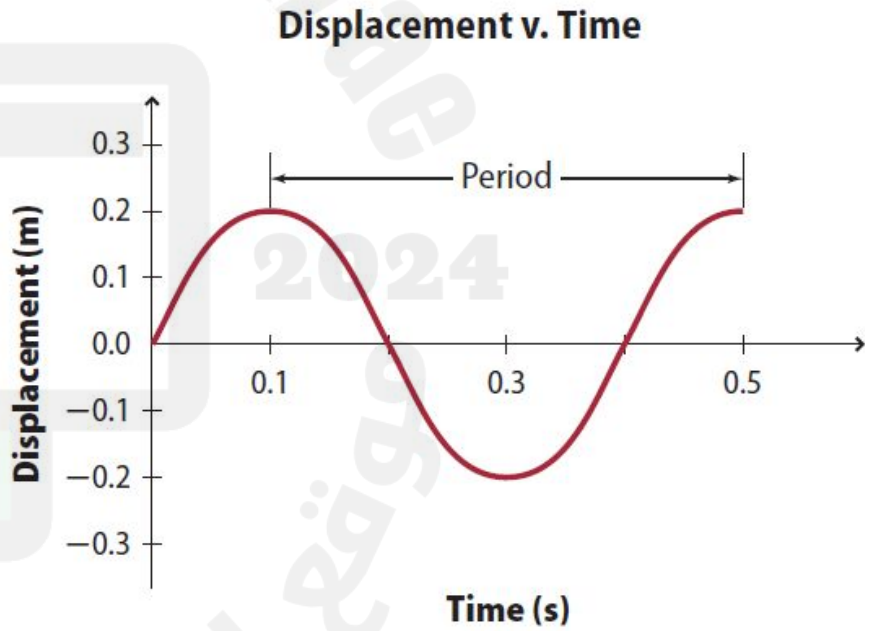
Wave Properties

- You can take a snapshot of the wave so that you can see the whole wave at one instant in time.
- Particles in the medium are said to be in phase with one another when they have the same displacement from equilibrium and the same velocity.
  - Any two points on a wave that are one or more whole wavelengths apart are in phase.
  - Particles in the medium with opposite displacements and velocities are 180° out of phase.
  - Two particles in a wave can be anywhere from 0° to 180° out of phase with one another.



Wave Properties

- If you record the motion of a single particle, that motion can be plotted on a displacement-versus-time graph. The period can be found using the time axis of the graph.
- The period of a wave is the time is takes a point to complete a complete cycle.
- The frequency of a wave (f) is the number of complete oscillations it makes each second.
- Frequency is measured in hertz. One hertz (Hz) is one oscillation per second.
- The frequency and period of a wave are inversely related.

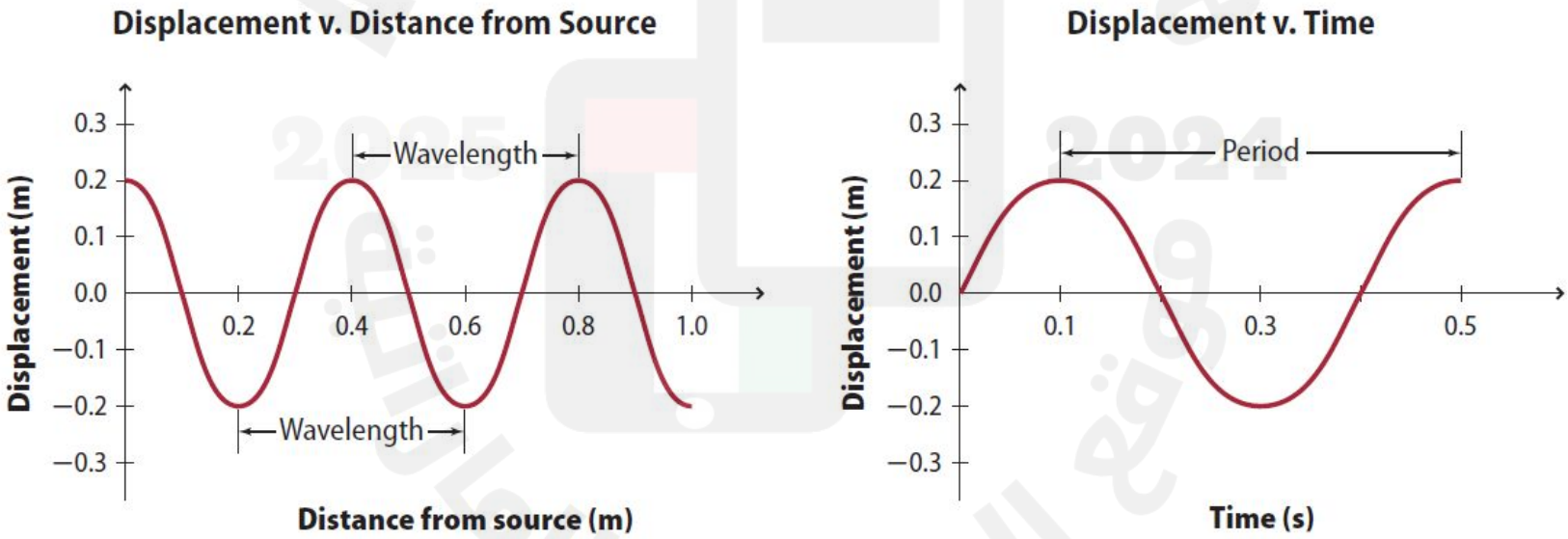


Frequency of a Wave $f = \frac{1}{T}$

Wave Properties

- Both the period and the frequency of a wave depend only on its source. They do not depend on the wave's speed or the medium.
- The wavelength, wavespeed, and the frequency are related.

Wavelength $\lambda = \frac{v}{f}$



Wave Properties

ADDITIONAL IN-CLASS EXAMPLE

Use with Example Problem 3.

Problem

An 855-Hz disturbance (wave) moves through an iron rail at a speed of 5130 m/s.

a. What is the wavelength of the wave?

b. What is the period of the wave?

Response

SKETCH AND ANALYZE THE PROBLEM

- List the knowns and unknowns.

KNOWN	UNKNOWN
$v = 5130$ m/s	$\lambda = ?$
$f = 855$ Hz	$T = ?$

SOLVE FOR THE UNKNOWN

a. Use the relationship among wave speed, wavelength, and frequency.

$$v = \lambda f$$

$$\lambda = \frac{v}{f} = \frac{5130 \text{ m/s}}{855 \text{ Hz}} = 6.00 \text{ m}$$

b. Use the relationship between period and frequency.

$$T = \frac{1}{f} = \frac{1}{855 \text{ Hz}} = 0.00117 \text{ s}$$

EVALUATE THE ANSWER

- The units are correct: Wavelength is in meters and the period is in seconds.

Review

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