أسئلة تغطية مراجعة نهاية الفصل منهج انسباير



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ⇦ المناهج الإماراتية ⇦ علوم ⇦ الفصل الأول ⇦ ملفات متنوعة ⇦ الملف

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إعداد: Elhddad Ahmed

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UNITED ARAB EMIRATES · MINISTRY OF EDUCATION

GRADE 8 SCIENCE

ADVANCED INSPIRE · END OF TERM 1 (EOT1)

Coverage Practice Questions · 2026–27

Mr. Ahmed Elhddad "The 1st Sci Teacher"
0563720249

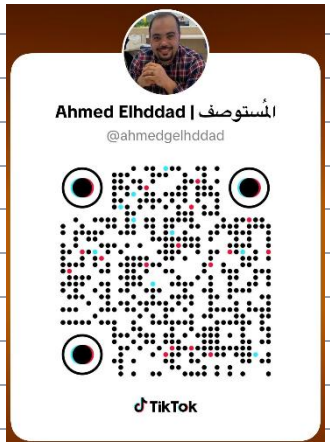
Student name: _____ Class: _____

Questions may appear in a different order in the actual exam. Each exam question below has its textbook reference and practice questions, followed by **extra questions (E1, E2, …)** taken from lesson checks and module tests that match the same outcome.

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Q1 MCQ

LEARNING OUTCOME

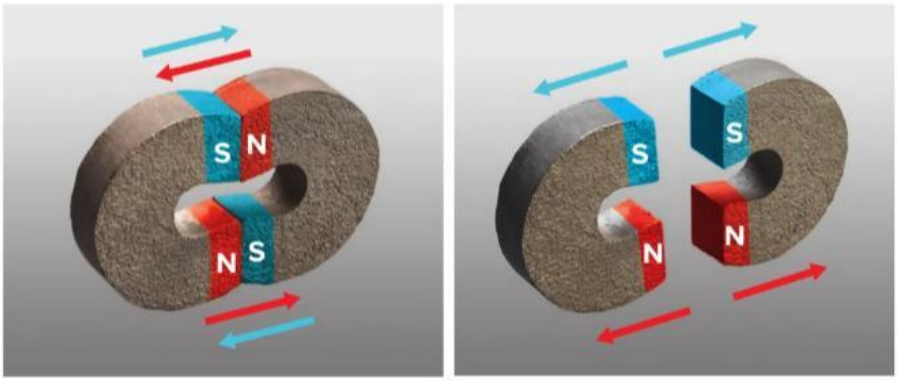
Identify the magnetic interaction between two magnets and determine whether an external force is required to separate them or bring them close to each other.

Textbook: Grade 8 Advanced p.181, 195

TEXTBOOK PRACTICE

Read the text.

The Forces Between Magnetic Poles A force exists between the poles of any two magnets. If similar poles of two magnets, such as north and north or south and south, are brought near each other, the magnets repel. This means that the magnets will push away from each other. If the north pole of one magnet is brought near the south pole of another magnet, the two magnets attract. This means the magnets will pull together. In other words, similar poles repel, and opposite poles attract.



1. **When do two magnets repel each other?**.....
2. **When do two magnets attract each other?**.....

EXTRA QUESTIONS

E1. The magnetic domain is the area around a magnet where the magnetic force acts. *[Module Test: Electromagnetic Forces]*

True / False

E2. When you bring the south ends of two magnets close together, they repel each other. *[Module Test: Electromagnetic Forces]*

True / False

E3. As a nail approaches the south pole of a magnet, what happens to its magnetic domains? *[Module Test: Electromagnetic Forces]*

A. The north poles of the domains point toward the magnet.
B. The south poles of the domains point toward the magnet.
C. The domains spin, but end up in no particular pattern.
D. The domains remain unaffected by the magnet.

E4. The south pole of a magnet _____. *[Module Test: Electromagnetic Forces]*

A. attracts another south pole
B. repels a paper clip
C. attracts a north pole
D. repels a north pole

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E5. Which of the following describes both an electromagnet and a permanent magnet? *[Module Test: Electromagnetic Forces]*

A. The poles can be reversed.
B. The strength of the magnetic force can be controlled.
C. The magnetic force can be turned off and on.
D. It has a north pole and a south pole.

Q2
MCQ

LEARNING OUTCOME
Understand the role of magnetic fields in the operation of electric generators and the conversion of energy between mechanical and electrical forms.

Textbook: Grade 8 Advanced p.252, 253

TEXTBOOK PRACTICE

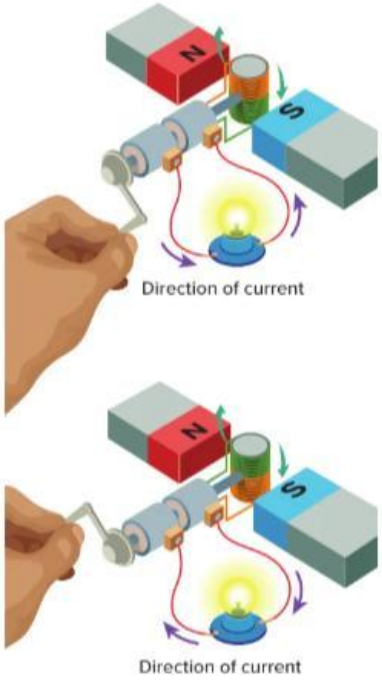
Read the text.

Electric Generators In a generator, the crank rotates a wire coil through the magnetic field of a small permanent magnet. This produces an electric current in the circuit. The current continues only as the crank rotates the coil within the magnetic field.

Mechanical Energy to Electric Energy A useful energy transfer occurs in a generator. As you turn a hand generator, it gains mechanical energy. When the wire coils rotate through a magnetic field, an electric current is produced. The rotating coils transfer mechanical energy to electric energy. The more mechanical energy put into the generator, the more electrical energy produced.

Types of Current The electric current produced by a battery differs from the current produced by a generator. The current produced by a battery flows in a circuit in only one direction. An electric current that flows in one direction is **direct current.**

The current produced by a generator changes direction as the poles of the rotating coil line up with the poles of the magnet. An electric current that changes direction in a regular pattern is **alternating current.** You may have seen an alternating current at work during the *Making Magnetic Fields* investigation.



1. **How is an electric current produced?**

   .....

2. **What energy change occurs in an electric generator?**

   .....

3. **What is the effect of rotating the crank faster on electrical energy produced?**

   .....

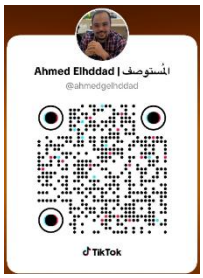
EXTRA QUESTIONS

E1. How can a wire and a magnet create an electric current? *[Module Test: Electromagnetic Forces]*

- **A.** The magnet moves inside the coil of wire.
- **B.** The coil of wire moves through a magnetic field.
- **C.** Neither a nor b will produce an electric current.
- **D.** Either a or b will produce an electric current.

E2. Devon was watching an old television show about people stranded on an island. One of the characters wanted to make an electric generator out of a bicycle. What does he need to find? (Choose two.) *[Module Test: Electromagnetic Forces]*

- **A.** two magnets
- **B.** a battery
- **C.** a coil of wire
- **D.** an electromagnet
- **E.** a light bulb



Q3
MCQ

LEARNING OUTCOME
Understand the characteristics of electric current produced by an electric generator.

Textbook: Grade 8 Advanced p.253

TEXTBOOK PRACTICE

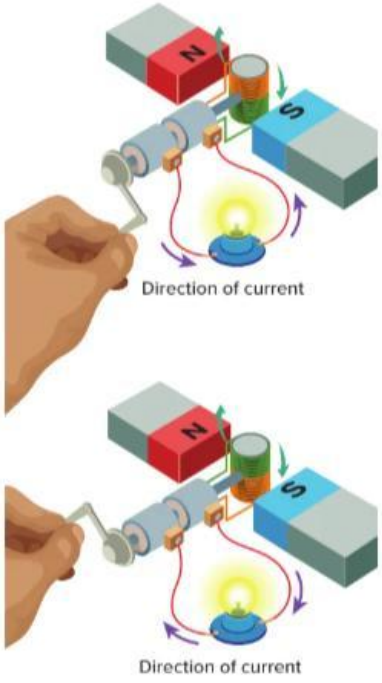
Use the text from Question 2.

Electric Generators In a generator, the crank rotates a wire coil through the magnetic field of a small permanent magnet. This produces an electric current in the circuit. The current continues only as the crank rotates the coil within the magnetic field.

Mechanical Energy to Electric Energy A useful energy transfer occurs in a generator. As you turn a hand generator, it gains mechanical energy. When the wire coils rotate through a magnetic field, an electric current is produced. The rotating coils transfer mechanical energy to electric energy. The more mechanical energy put into the generator, the more electrical energy produced.

Types of Current The electric current produced by a battery differs from the current produced by a generator. The current produced by a battery flows in a circuit in only one direction. An electric current that flows in one direction is **direct current.**

The current produced by a generator changes direction as the poles of the rotating coil line up with the poles of the magnet. An electric current that changes direction in a regular pattern is **alternating current.** You may have seen an alternating current at work during the *Making Magnetic Fields* investigation.



4. **An electric current that flows in one direction is _____.**
5. **An electric generator produces current that changes direction in a regular pattern called _____.**

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Q4
MCQ

LEARNING OUTCOME

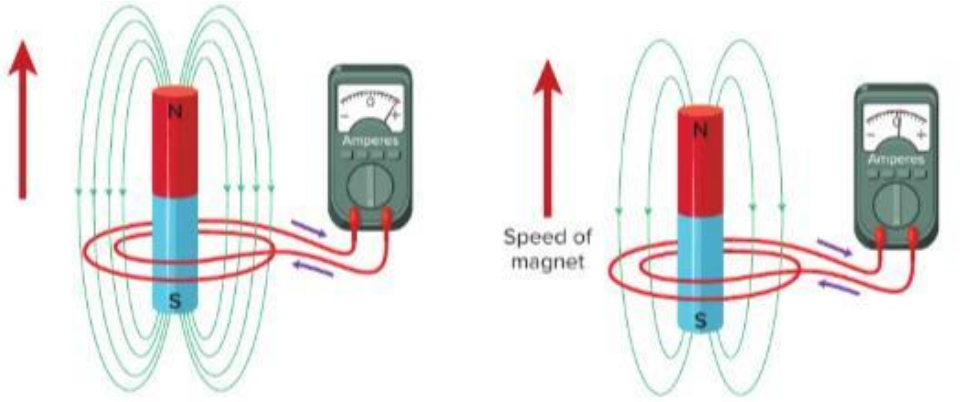
Predict how changes in the strength of a magnet, its speed of movement relative to a coil, its orientation and the number of turns in the coil, affect the magnitude of the induced voltage and induced current.

Textbook: Grade 8 Advanced p.255, 256

TEXTBOOK PRACTICE

4A

Image 1 shows a magnet passing through a coil which is connected to an ammeter.



1. **What is the effect on the current if a stronger magnet is used, as shown in image 2?**

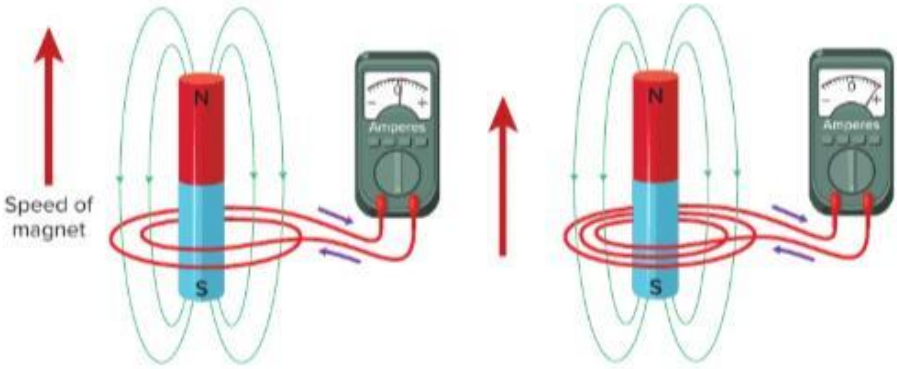
   .....

2. **What would be the effect on the current if a weaker magnet were used?**

   .....

4B

Image 1 shows a magnet passing through a coil which is connected to an ammeter.

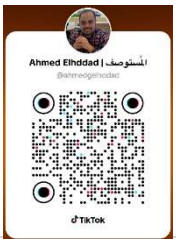


1. **What is the effect on the current if the number of turns (loops) in the wire is increased, as shown in image 2?**

   .....

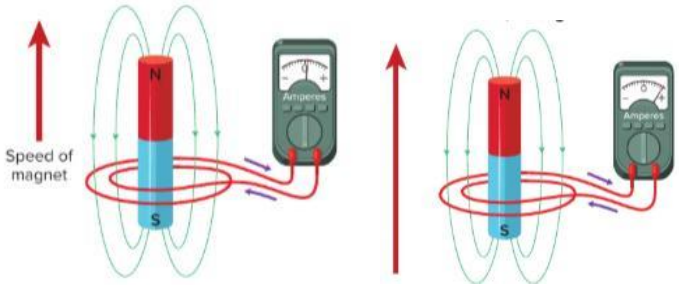
2. **What would be the effect on the current if the number of turns (loops) in the wire were decreased?**

   .....



4C

Image 1 shows a magnet passing through a coil which is connected to an ammeter.



1. **What is the effect on the current if the speed of the magnet is increased?**

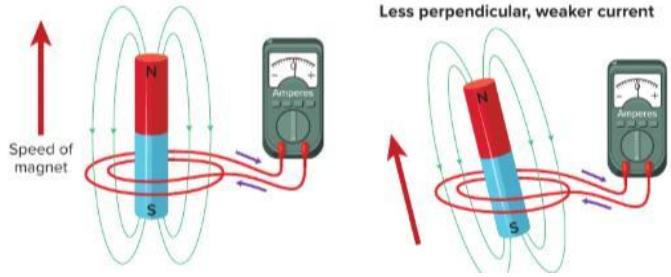
   .....

2. **What would be the effect on the current if the speed of the magnet were reduced?**

   .....

4D

Image 1 shows a magnet passing through a coil which is connected to an ammeter.



1. **What is the effect on the current if the magnet is tilted as it passes through the coil, as shown in image 2?**

EXTRA QUESTIONS

E1. Which of the following conditions is necessary for a magnet inside a wire loop to produce an electric current? *[Lesson Check: Electromagnetism]*

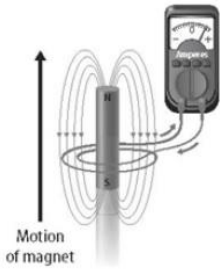
A. The magnet must be stationary.
B. The wire loop must be part of an open circuit.
C. The wire loop must already have a current running through it.
D. The magnet must be in motion.

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E2. Which statement is false? *[Lesson Check: Electromagnetism]*

A. The direction a magnet moves through a coil of wire determines the direction of the electric current.
B. The direction a coil of wire moves through a magnetic field determines the direction of the electric current.
C. Current will flow through a wire as long as the magnetic field around the coil is changing.
D. Current will not flow through a wire if the magnet is outside the coil.

E3. Which is the best prediction for what will happen to the reading on the meter when the magnet stops and then is moved down through the loop of wire? *[Lesson Check: Electromagnetism]*



A. The reading will not change.
B. The reading will drop to zero and then return to the same reading.
C. The reading will drop to zero and then move in the negative direction.
D. The reading will drop to zero and remain there.

Q5
MCQ

LEARNING OUTCOME
Classify common materials as electrical conductors or insulators.

Textbook: Grade 8 Advanced p.211

TEXTBOOK PRACTICE

Read the text.

Conductors and Insulators

To understand how charged particles can move from one object to another, you need to know about two basic types of materials—electric insulators and electric conductors. A material in which charges cannot easily move is an **electric insulator.** Glass, rubber, wood, and even air are good electric insulators. A material in which charged particles can easily move is an **electric conductor.** This is how a lightning rod works. The metal rod is a good conductor, so the charges can easily flow through the rod and safely to the ground. Most metals, such as copper and aluminum, are good electric conductors.



1. **What is an electric insulator?**

   ……..

2. **Give some examples of electric insulators.**

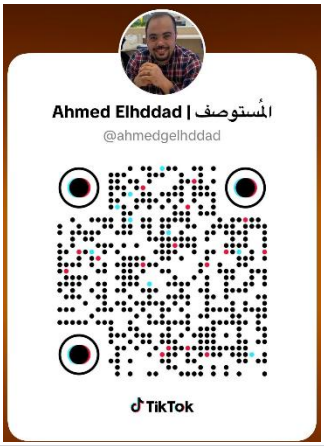
   ……..

3. **What is an electric conductor?**

   ……

4. **Give some examples of electric conductors.**

   ……



Q6 MCQ

LEARNING OUTCOME

Interpret graphical data to describe and compare magnetic field strengths at different distances from a current-carrying wire.

Textbook: Grade 8 Advanced p.241, 259

TEXTBOOK PRACTICE

6A

Read the text.

Increasing Magnetic Field Strength Around a Wire Magnetic fields around current-carrying wires are strongest closest to the wire. As you move away from the wire, the magnetic field becomes weaker.

The field around the wire becomes stronger as the current in the wire increases, or as more charged particles flow in the wire. Recall you can increase the current by increasing the voltage across the wire.

1. **The magnetic field strength is stronger closer to a wire.**
   True / False
2. **What happens to the strength of the magnetic field as you move away from the wire?**
   .....
3. **What happens to the magnetic field strength as the current in the wire increases?**
   .....
4. **According to the second paragraph, in what other way can you increase the current in the wire?**
   .....
5. **What conclusion can you draw about current and magnetic field strength?**
   .....

6B

Textbook activity: Three-Dimensional Thinking, Grade 8 Advanced p.251. The unit used in this task is micro-Tesla (μT).

EXTRA QUESTIONS

E1. Which statement is true? *[Lesson Check: Electromagnetism]*

- **A.** As the electric current through a wire increases, the magnetic field around the wire becomes stronger.
- **B.** As the electric current through a wire increases, the magnetic field around the wire becomes weaker.
- **C.** As the electric current through a wire increases, the magnetic field around the wire is unaffected.
- **D.** As the electric current through a wire decreases, the magnetic field around the wire becomes stronger.

E2. A current-carrying wire produces a magnetic field. *[Module Test: Electromagnetic Forces]*

True / False

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Q7 MCQ

LEARNING OUTCOME

Describe wave motion as the transfer of energy through a medium without the transfer of matter.

Textbook: Grade 8 Unit 3 p.12

TEXTBOOK PRACTICE

Read the text.

Waves A **wave** is a disturbance that transfers energy from one place to another without transferring matter. In the Lab *Making Waves*, the coil spring moved because your hand transferred energy to the spring.

All waves have an energy source. In the *Making Waves* lab, the source of energy came from your hand. In the photo on the right, the impact of the raindrops on the water is the source of energy for these water waves. Waves transfer energy away from the source of the energy. The source of energy is also known as a vibration. A vibration is a back-and-forth or an up-and-down movement of an object. Vibrating objects, such as a drum or a guitar string, are the sources of energy that produce sound waves.



1. **What is a wave?**

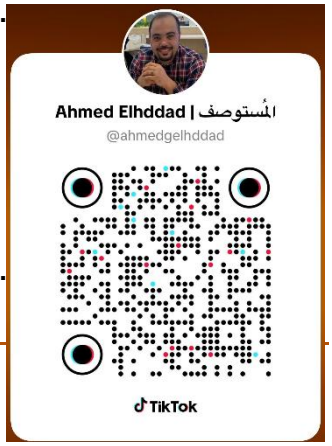
   .....

2. **All waves have an _____.**

3. **The source of energy is also known as a _____.**

4. **What type of motion is a vibration?**

   .....



EXTRA QUESTIONS

E1. To produce sound, an object must be _____. *[Lesson Check: Wave Properties]*

- **A.** moving
- **B.** heated
- **C.** in a gas
- **D.** vibrating

E2. Juana and Harry use a long rope to model a wave. They follow these steps: (1) Juana and Harry each hold one end of the rope while standing. (2) Juana moves her end of the rope up and down while Harry holds his end of the rope still. (3) Juana uses more energy to move her end of the rope up and down. *[Module Test: Introduction to Waves]*

a) Identify and describe one characteristic of the wave that will be affected by Juana using more energy to move the rope up and down.

.....

b) Describe how the characteristic in your answer to part (a) will be affected. Explain your reasoning.

.....

c) Explain why Harry has difficulty holding his end of the rope still when Juana uses more energy to move the rope up and down.

.....

Q8
MCQ

LEARNING OUTCOME
Correctly identify that mechanical waves include both transverse and longitudinal types.

Textbook: Grade 8 Unit 3 p.13

TEXTBOOK PRACTICE

Read the text.

Mechanical Waves The waves you just investigated transferred energy from one place to another without transferring any matter. Waves made with coiled spring toys, sound waves, and ocean waves are all mechanical waves. A **mechanical wave** is a wave that travels only through matter. Mechanical waves can travel through solids, liquids, and gases, but not through a vacuum. A material in which a wave travels is called a **medium.**



Transverse Waves Two types of mechanical waves are transverse waves and longitudinal waves. You created transverse waves in steps 3 and 4 of the Lab *Making Waves*. A **transverse wave** is a wave in which the disturbance is perpendicular to the direction the wave travels. Examples of transverse waves include a flag moving in the wind. Now, look at the figure below. Notice the repeating pattern of crests and troughs as the rope moves up and down away from its rest position. The wave travels from the hand to the doorknob as the rope moves up and down.

1. **What is a mechanical wave?**

   .....

2. **Name the states of matter through which a mechanical wave can travel.**

   .....

3. **A material in which a wave travels is called a _____.**

4. **What are the two types of mechanical waves?**

   .....

EXTRA QUESTIONS

E1. Transverse waves move particles back and forth along the same direction in which the waves travel. *[Lesson Check: Wave Properties]*

True / False

E2. Since sound is a mechanical wave it needs a _____ to travel through. *[Module Test: Introduction to Waves]*

E3. Explain why sound waves are mechanical waves. *[Module Test: Introduction to Waves]*

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Q9
MCQ

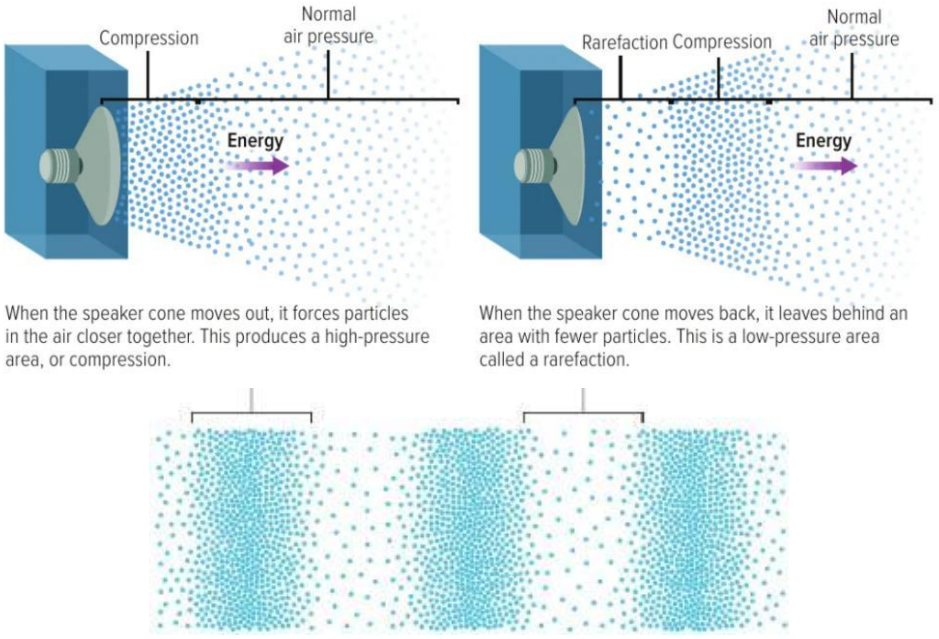
LEARNING OUTCOME

Describe the structure of longitudinal waves, including compressions and rarefactions, in sound propagation.

Textbook: Grade 8 Unit 3 p.14, 15

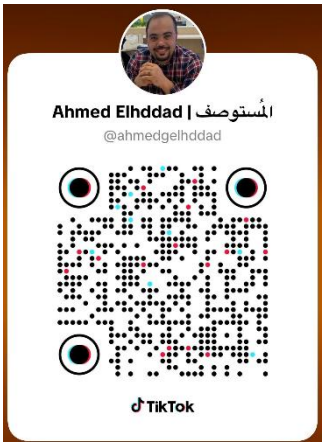
TEXTBOOK PRACTICE

The first image shows regions of rarefaction and compression as a sound wave travels through air. Use it to help you answer the questions about the second image.



1. **Identify the region X. Compression / Rarefaction**

2. **Identify the region Y. Compression / Rarefaction**



Q10 MCQ

LEARNING OUTCOME

Identify and interpret the characteristics of transverse waves using diagrams, including amplitude, wavelength, crests, troughs and the rest position.

Textbook: Grade 8 Unit 3 p.19, 20

TEXTBOOK PRACTICE

10A

Read the text.

Amplitude and Energy Think back to when you struck the tuning fork sharply in the activity at the beginning of the lesson. A loud sound was produced. Placing the loud, vibrating tuning fork into the bowl of water produced waves with higher crests and deeper troughs than the softly vibrating tuning fork. This means the loud tuning fork caused water to move a greater distance from its rest position, producing a wave with a greater amplitude. The **amplitude** of a wave is the maximum distance that the wave moves from its rest position.



1. **Define the amplitude of a wave.**

   ……

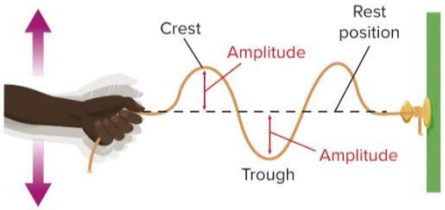
2. **Sketch a transverse wave to show the rest position, amplitude and wavelength of a transverse wave.**

   ……

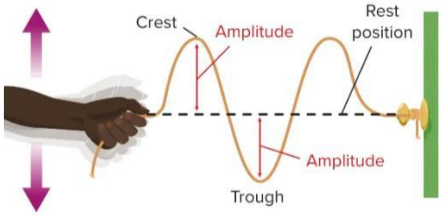


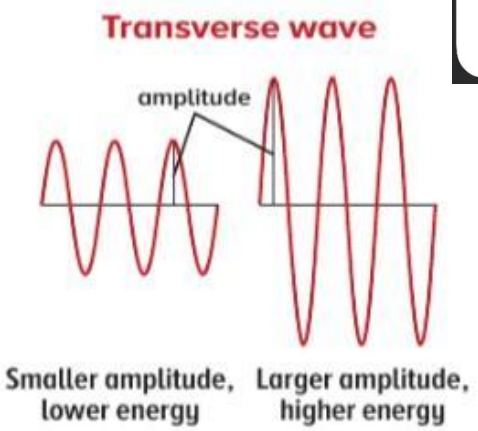
10B

Study the images below.



This wave has a smaller amplitude and carries less energy.





1. **Identify the amplitude of a transverse wave in each of the images.**

EXTRA QUESTIONS

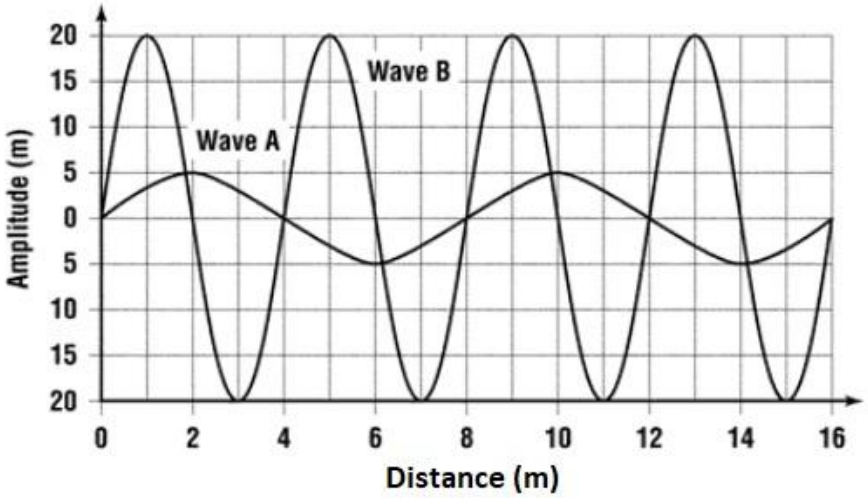
E1. The amplitude of a wave is the distance between a point on one wave and the identical point on the next wave. *[Lesson Check: Wave Properties]*

True / False

E2. The amplitude of a wave is _____. *[Module Test: Introduction to Waves]*

- **A.** the distance the wave moves in one second
- **B.** the distance between one crest and the next crest
- **C.** half the distance from a crest to a trough
- **D.** the distance equal to one wavelength

Use the graph of Wave A and Wave B to answer the questions marked with this figure.



E3. What is the wavelength of Wave A? *[Module Test: Introduction to Waves]*

A. 4 m
B. 5 m
C. 8 m
D. 20 m

E4. What is the wavelength of Wave B? *[Module Test: Introduction to Waves]*

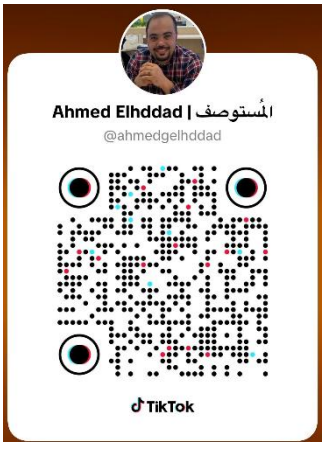
A. 4 m
B. 5 m
C. 8 m
D. 20 m

E5. What is the amplitude of Wave A? *[Module Test: Introduction to Waves]*

A. 4 m
B. 5 m
C. 8 m
D. 20 m

E6. What is the amplitude of Wave B? *[Module Test: Introduction to Waves]*

A. 4 m
B. 5 m
C. 8 m
D. 20 m



Q11 MCQ

LEARNING OUTCOME

Recall the definition of intensity.

Textbook: Grade 8 Unit 3 p.23

TEXTBOOK PRACTICE

Read the text.

Amplitude, Intensity, and Loudness The smartphone alarm got quieter as it was moved farther away from the sound-level meter. As the particles of air in front of the phone vibrated back and forth, they collided with, and transferred energy to, surrounding particles of air. As the energy spread out among more and more air particles, the intensity of the wave decreased. **Intensity** is the amount of sound energy that passes through a square meter of space in one second.

1. **What happens to the intensity as the energy spreads out?**

   .....

2. **Define intensity.**

   .....

EXTRA QUESTIONS

E1. The intensity of a sound wave increases as the wave spreads out from the source of the sound. *[Module Test: Introduction to Waves]*

True / False

E2. The brightness of a light is determined by _____. *[Lesson Check: How Light Travels]*

A. air temperature
B. intensity of light waves
C. wavelength
D. wave speed

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Q12 MCQ

LEARNING OUTCOME

Interpret and apply the decibel scale to compare sound intensities in real-world contexts.

Textbook: Grade 8 Unit 3 p.23, 33

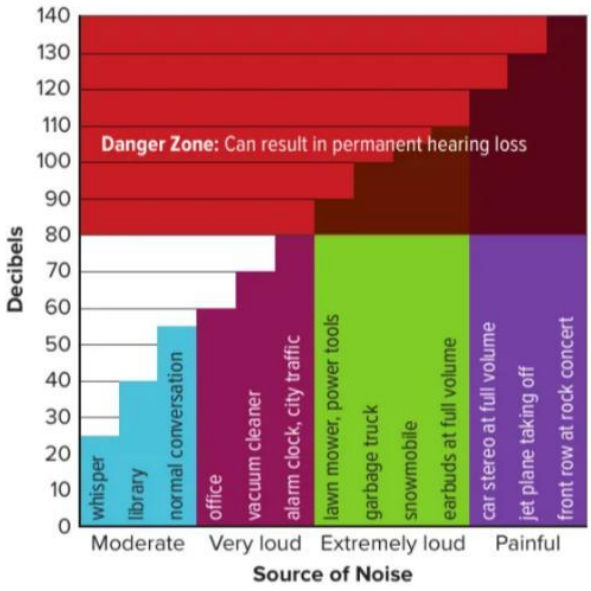
TEXTBOOK PRACTICE

12A

Read the text.

As a sound wave travels farther from the phone, there is a larger area of air particles sharing the same amount of energy that left the phone. Therefore, the farther the smartphone was from the sound-level meter, the less energy passed through one square meter. This resulted in the intensity of the wave decreasing. As intensity decreased, amplitude decreased. Therefore, loudness decreased.

The unit decibel (dB) describes the intensity and, in turn, the loudness of sound. Decibel levels of common sounds are shown to the right. Each increase of 10 dB causes a sound about twice as loud. As the decibel level goes up, the amount of time you can listen to the sound without risking hearing loss gets shorter.



1. **According to the first paragraph, what happened to the intensity of the wave as the sound wave traveled?**

   ……

2. **Why did the intensity of the wave decrease?**

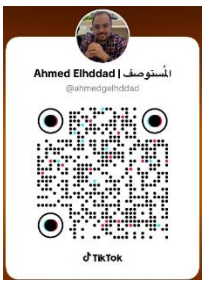
   ……..

12B

The loudness in a library is 20 dB. The street outside is 40 dB loud. How many times greater is the sound intensity (loudness) of the street compared to the library?

12C

The loudness of rain on a rainy day was found to be 40 dB. A dishwasher is 70 dB loud. How many times greater is the sound intensity (loudness) of the dishwasher compared to the sound of rain?



Q13 MCQ

LEARNING OUTCOME

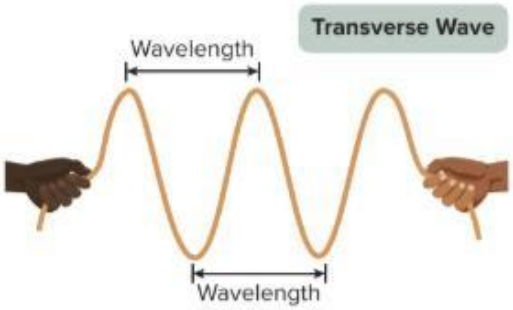
Identify wavelength of a transverse wave as the distance between two crests (or troughs).

Textbook: Grade 8 Unit 3 p.26

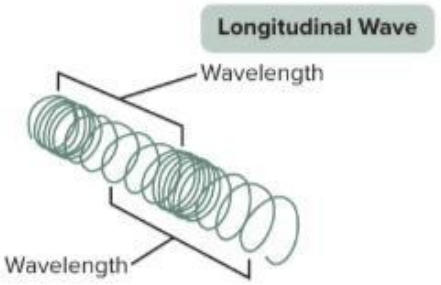
TEXTBOOK PRACTICE

Read the text.

Wavelength You measured transverse waves from one crest to the next and from one trough to the next in the Lab *Ride the Wave*. The distance between one point on a wave to the same point on the next wave is the **wavelength.** Longitudinal waves are measured from one compression to the next compression or from one rarefaction to the next rarefaction. View the figure below to see the differences between the two wavelengths. For either wave type, the wavelength repeats as long as the energy remains constant. Wavelength is measured in units of distance, such as meters.



Wavelength is the distance from one crest to the next crest or from one trough to the next trough.



Wavelength is the distance from one compression to the next compression or from one rarefaction to the next rarefaction.

1. **What is the wavelength of a wave?**

   ……..

2. **How is the wavelength of a wave measured in a longitudinal wave?**

   ……

3. **Look at the transverse wave and state two ways in which you could measure the wavelength of a transverse wave. (Hint: What are the top and bottom of the wave called?)**

   ……

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Q14
MCQ

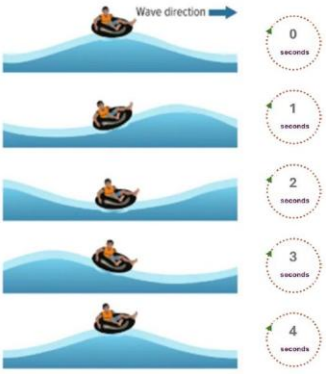
LEARNING OUTCOME
Determine the period of a wave from a sequence of images showing its motion over time and use it to calculate the frequency.

Textbook: Grade 8 Unit 3 p.26, 27

TEXTBOOK PRACTICE

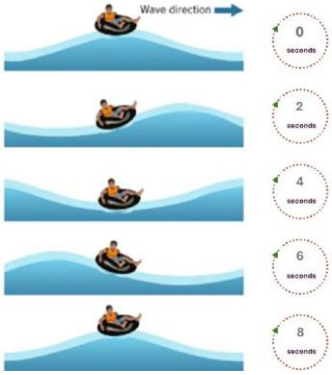
14A

What is the frequency of the wave shown in the image below?



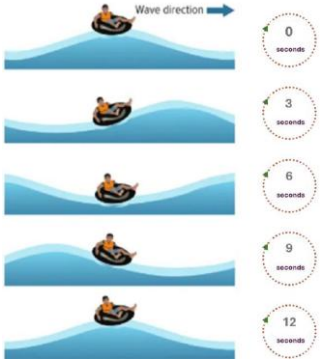
14B

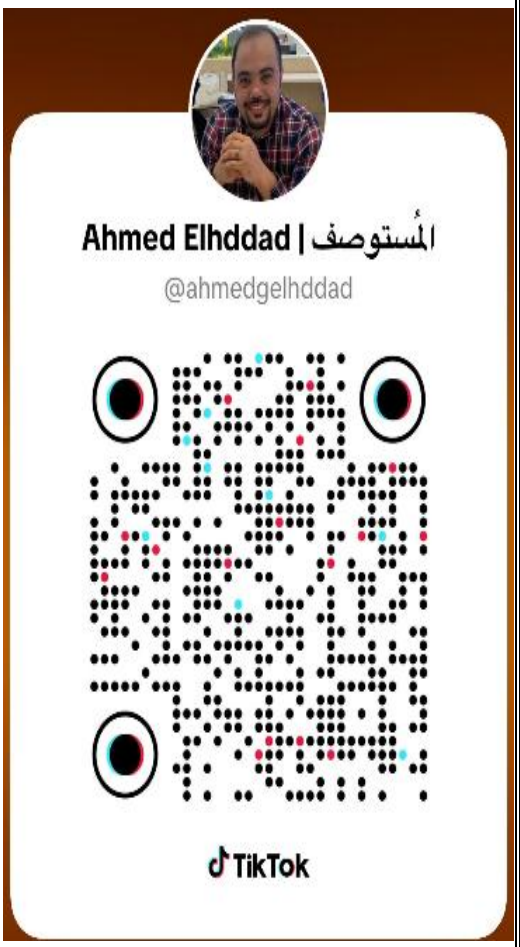
What is the frequency of the wave shown in the image below?



14C

What is the frequency of the wave shown in the image below?





EXTRA QUESTIONS

E1. Humans can hear frequencies as low as 21 Hz. If the sound is measured during 3 seconds, how many wavelengths pass? *[Module Test: Introduction to Waves]*

A. 7
B. 24
C. 63

D. 18

Q15 MCQ

LEARNING OUTCOME

Understand the relationship between sound properties and their physical causes, specifically that pitch is determined by frequency.

Textbook: Grade 8 Unit 3 p.30

TEXTBOOK PRACTICE

15A

Read the text.

Frequency Waves have another property called frequency. The **frequency** of a wave is the number of times the pattern repeats in a given time. Frequency is related to how rapidly the object or material producing the wave vibrates. Each vibration of the object produces one wavelength. The frequency of a wave is the same as the number of vibrations the vibrating object makes each second. The SI unit for frequency is hertz (Hz). A wave with a frequency of 2 Hz means that two wavelengths pass a point each second. The unit Hz is the same unit as 1/s.

The amount of energy transferred by waves in a given time is proportional to the wave's frequency. If the frequency of the waves doubles, the energy of the wave also doubles. Similarly, if the frequency decreases by half, the energy will also decrease by half.

1. **What is the frequency of a wave?**

   .....

2. **What is the SI unit of frequency?**

   .....

3. **State another unit that could be used for frequency.**

   .....

4. **What happens to the energy of the wave if the frequency doubles?**

   .....



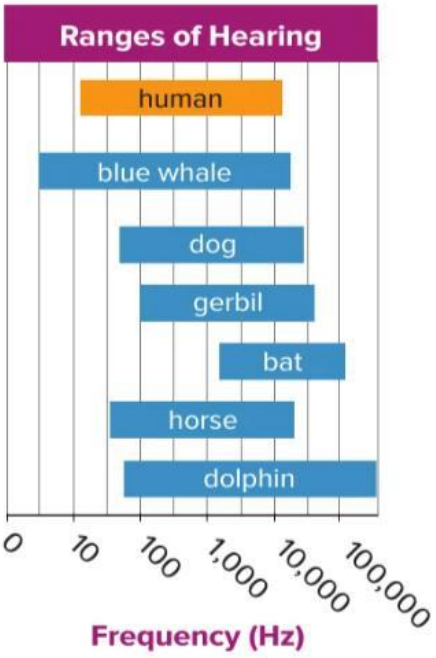
15B

Read the text.

Pitch The perception of how high or low a sound seems is **pitch.** In the Lab *Fever Pitch* you determined that the sound changed based on how long the string was and by how much force you applied. The length of the string changed the pitch and the frequency. Recall that frequency is the number of times the pattern repeats in a given amount of time. When talking about sound waves, frequency is often referred to as beats per second.

A higher frequency produces a higher pitch. For example, an adult male voice might range from 85 Hz to 155 Hz. An adult female voice might range from about 165 Hz to 255 Hz. Humans can hear thunder frequencies between 20 Hz and 120 Hz.

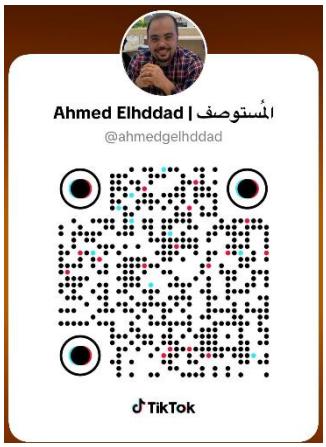
The human ear can detect sounds with frequencies between about 20 Hz and 20,000 Hz. Frequencies above this range are called ultrasound. The range of sounds heard by various animals is shown in figure to the right.



1. **The perception of how high or low a sound seems is called _____.**

2. **According to the first paragraph, which physical quantity does pitch depend on? (Hint: the physical quantity is measured in Hz.)**
   ……..

3. **According to the third paragraph, what is the range of frequencies that a human ear can detect?**
   ……



Q16 MCQ

LEARNING OUTCOME

Interpret diagrams and descriptions to identify and explain the behaviour of sound waves when interacting with materials and barriers.

Textbook: Grade 8 Unit 3 p.43

TEXTBOOK PRACTICE

16A

Read the text.

Absorption Did you notice that the wave that reflected off the barrier in the Lab *Crashing Waves* was not as big as the first wave you made? After a while the wave would stop bouncing off of surfaces and it would disappear. What happened to the energy the wave was carrying? Sometimes when a wave hits a barrier, some of its energy is absorbed by the barrier. **Absorption** is the transfer of energy by a wave to the medium through which it travels. The amount of energy absorbed depends on the type of wave and the material in which it moves. In the figure on the right the sound from the cell phone is absorbed by the insulation in the wall.



1. **The process in which the energy of a wave is absorbed by a barrier is called _____.**
2. **Look at the image. Would you expect to hear the phone ringing loudly or not? Why?**

.....

.....

16B

Read the text.

Transmission You also might have noticed a small wave appear on the other side of the barrier in the Lab *Crashing Waves*. Sometimes when a wave interacts with matter, the matter does not absorb all of the energy. The matter can transmit some of the energy to the other side of the barrier and it will continue as a wave. **Transmission** is the passage of a wave through a medium. The sound from a cell phone in the figure on the right transmits easily through an uninsulated wall. Mechanical waves can also travel through liquids and gases. Without transmission we would not hear sound waves on the other side of doors.



1. **The process in which a wave travels through a medium is called _____.**
2. **Look at the image. Would you expect to hear the phone ringing loudly or not? Why?**

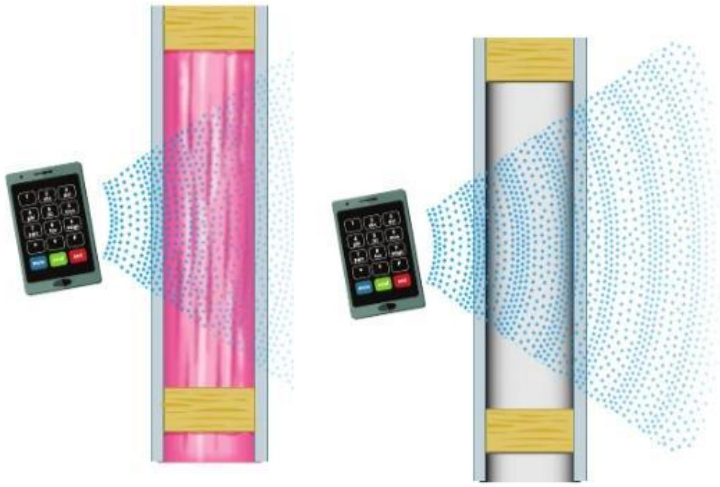
.....

.....

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16C

Study images 1 and 2.



1. In which image do you expect to hear the phone ringing softly? Explain in detail by comparing the two images.

EXTRA QUESTIONS

E1. Reflection occurs when a wave moves through matter. *[Lesson Check: Mechanical Wave Interactions]*

True / False

E2. You can hear sounds around the corner of a door due to the wave interaction called diffraction. *[Lesson Check: Mechanical Wave Interactions]*

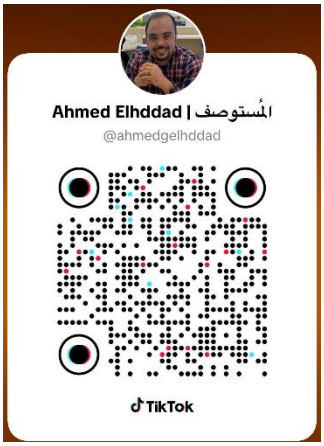
True / False

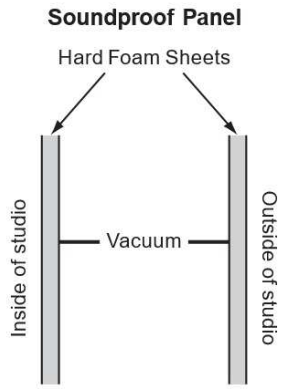
E3. Movie theaters use soundproofing to reduce echoes. Soundproofing materials are designed to _____ the sound. *[Lesson Check: Mechanical Wave Interactions]*

E4. Which of the following is NOT a way that waves interact with matter? *[Lesson Check: Mechanical Wave Interactions]*

A. Waves can be reflected by matter.
B. Waves are affected by gravity.
C. Waves can change direction when they travel from one material to another.
D. As waves pass through matter, some of the energy they carry can be transferred to matter.

E5. An architect is designing a recording studio for a musician. The studio needs to be soundproof to keep out noise. The architect plans to use soundproof panels for the walls, ceiling, and floor. Each soundproof panel is made from two sheets of hard foam with a vacuum in between them, as shown in the diagram. Describe three ways the soundproof panel works to keep out noise. *[Lesson Check: Mechanical Wave Interactions]*





E6. How do waves interact with matter? *[Module Test: Introduction to Waves]*

……

E7. When light strikes a transparent material, most of the light is reflected. *[Lesson Check: How Light Travels]*

True / False

E8. People tint windows dark to encourage _____. *[Lesson Check: How Light Travels]*

A. transmission
B. absorption
C. reflection
D. transfusion

E9. Light passes through glass windows because of _____. *[Lesson Check: How Light Travels]*

A. absorption
B. reflection
C. transmission
D. transfusion

E10. Light waves can interact with matter by being transmitted, absorbed, or _____. *[Lesson Check: How Light Travels]*

E11. Describe the path of the waves in each of the following: (1) the interactions of a light wave with a piece of cardboard, and (2) the interactions of a sound wave with a piece of cardboard. Be sure the description includes two ways that the interactions of a light wave with a piece of cardboard are similar to the interactions of a sound wave with a piece of cardboard, and one way that the interactions are different. *[Lesson Check: How Light Travels]*

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Q17 MCQ

LEARNING OUTCOME

Understand that sound travels at different speeds through different media and compare the speed of sound in solids, liquids, and gases.

Textbook: Grade 8 Unit 3 p.47, 53

TEXTBOOK PRACTICE

17A

Read the text.

Speed of Sound In the Lab *Echo, Echo* you were able to calculate the speed of sound through air. Recall that for sound to be transmitted energy must pass from particle to particle. The material, or medium, that sound passes through affects how fast the sound moves. Two factors that influence the speed of sound waves are the density and the temperature of the medium.

Gas particles are far apart and collide less often than particles in a liquid or a solid. As shown in the table on the right, a gas takes longer to transfer sound energy between particles. In a solid where the particles are packed very close together, the particles collide and transfer energy very quickly. The more dense a medium, the faster sound will travel through it.

Particles move faster and collide more often as the temperature of a gas increases. This increase in the number of collisions transfers more energy in less time. Temperature has the opposite effect on liquids and sounds. As liquids and solids cool, the molecules move closer together. They collide more often and transfer energy faster.

The Speed of Sound

Medium	Speed (m/s)
Air (0°C)	331
Air (20°C)	343
Water (20°C)	1,481
Water (0°C)	1,500
Seawater (25°C)	1,533
Ice (0°C)	3,500
Iron	5,130
Glass	5,640

1. **Name the two factors that affect the speed of sound.**

   .....

2. **Does sound travel faster in a denser medium or a less dense medium?**

   .....

3. **Consider the following: air at 20 °C, water at 20 °C, iron bar at 20 °C. I. In which medium would sound travel fastest? Explain. II. In which medium would sound travel slowest? Explain.**

   .....

17B

In which of the following, solid, liquid or gas, does sound travel fastest?

17C

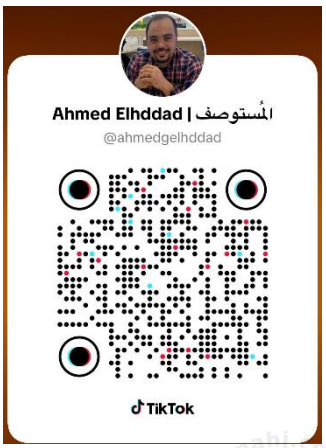
In which of the following, solid, liquid or gas, does sound travel slowest?

17D

In which of the following, air, water or iron, does sound travel fastest?

17E

In which of the following, air, water or iron, does sound travel slowest?



EXTRA QUESTIONS

E1. **Sound travels faster in _____ than in liquids.** *[Lesson Check: Mechanical Wave Interactions]*

E2. **Sound travels faster at higher temperatures.** *[Lesson Check: Mechanical Wave Interactions]*

True / False

E3. **Use the table to answer the question. What conclusion can you draw from the information shown in this figure?** *[Lesson Check: Mechanical Wave Interactions]*

Material	Approximate speed (m/s)
Air (20 °C)	350
Glass	5,600
Steel	5,900
Water (25 °C)	1,500
Rubber	1,600
Diamond	12,000
Iron	5,100

A. Sound intensity is greater in water than in air.
B. Sound waves can move more quickly through liquids than through solids.
C. The frequency of sound increases with wave speed.
D. The speed of sound varies with the material in which the waves travel.

E4. **Based on the table above, sound waves travel most slowly through which of the following?** *[Lesson Check: Mechanical Wave Interactions]*

A. air
B. glass
C. rubber
D. water

E5. **Sound travels through substances as energy is transferred from one particle to the next. The diagrams represent the particles of three substances: air (gas), water (liquid), and steel (solid).** *[Lesson Check: Mechanical Wave Interactions]*



Air (Gas) Water (Liquid) Steel (Solid)

a) Predict the speed of sound traveling through each substance in relation to one another. Support your prediction with information provided in the diagrams.

……
……

b) What happens to the speed of sound in air as the temperature of the air increases? Explain your reasoning.

……
……

E6. **Sound travels fastest in a _____.** *[Lesson Check: Wave Properties]*

A. solid
B. liquid
C. gas
D. vacuum

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E7. The speed of sound in wood is _____ the speed of sound in water. *[Module Test: Introduction to Waves]*

- **A.** less than
- **B.** greater than
- **C.** the same at all temperatures as
- **D.** the same at high temperatures as

E8. How does the speed of sound vary based on the density of the material the sound is traveling through? *[Module Test: Introduction to Waves]*

Q18 MCQ

LEARNING OUTCOME

Understand the relationship between wavelength and frequency of electromagnetic waves across the electromagnetic spectrum.

Textbook: Grade 8 Unit 3 p.83

EXTRA QUESTIONS

E1. As the frequency of a wave increases, the wavelength increases. *[Lesson Check: Wave Properties]*

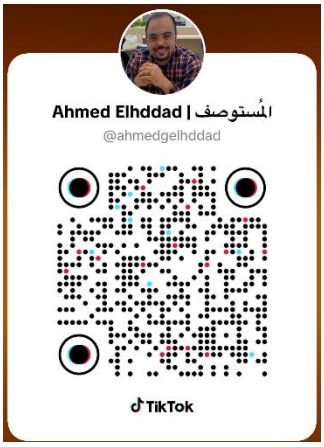
True / False

E2. An instrument plays a frequency of 266 Hz. Another identical instrument plays a frequency of 400 Hz. How do the wavelengths of each of these sound waves compare? *[Lesson Check: Wave Properties]*

E3. As the frequency of a wave increases, the wavelength _____. *[Module Test: Introduction to Waves]*

E4. Which statement correctly describes the relationship between wavelength and frequency? *[Module Test: Introduction to Waves]*

- **A.** As wavelength decreases, frequency increases because more waves pass a point each second.
- **B.** As wavelength decreases, frequency increases because fewer waves pass a point each second.
- **C.** As wavelength increases, frequency increases because more waves pass a point each second.
- **D.** As wavelength increases, frequency increases because fewer waves pass a point each second.



Q19
MCQ

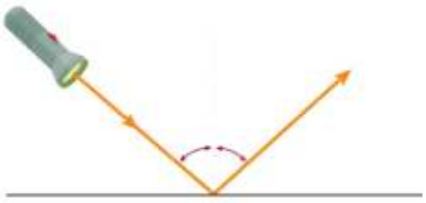
LEARNING OUTCOME
Interpret ray diagrams of light reflection.

Textbook: Grade 8 Unit 3 p.93

TEXTBOOK PRACTICE

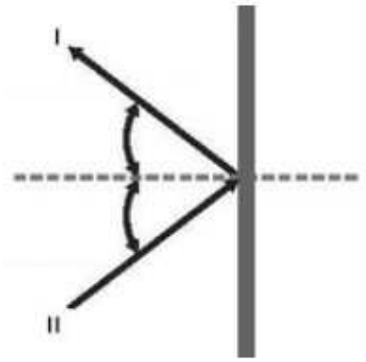
Complete the task shown in the box.

THREE-DIMENSIONAL THINKING
Label the rays and the angles in the **model** below. Indicate the location of the normal.



EXTRA QUESTIONS

E1. Which is FALSE about the diagram? *[Lesson Check: Reflection and Mirrors]*



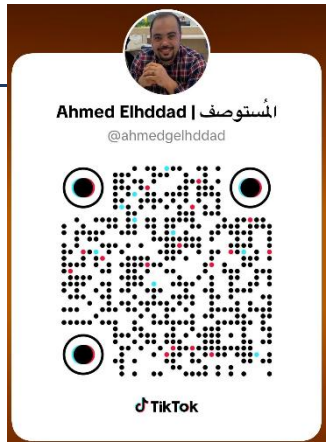
A. The two angles are equal.
B. Line I is the normal.
C. Line II is the incident ray.
D. The mirror being modeled is a plane mirror.

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Q20
MCQ

LEARNING OUTCOME
Understand how light reflects from different surfaces and distinguish between regular and diffuse reflection.

Textbook: Grade 8 Unit 3 p.100, 103

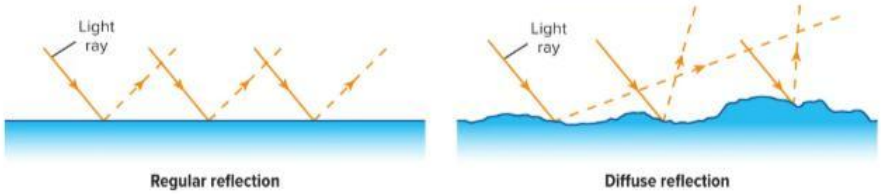


TEXTBOOK PRACTICE

20A

Read the text.

Regular and Diffuse Reflection You see objects when light reflects off them into your eyes. Why can you see your reflection in smooth, shiny surfaces but not in a piece of paper or a painted wall? The law of reflection applies whether the surface is smooth or rough. Reflection of light from a smooth, shiny surface is called **regular reflection.** Look at the figure on the left below. The three incident rays and the three reflected rays all are parallel. You see a sharp image when parallel rays reflect into your eyes. When light strikes an uneven surface, as shown on the right below, the angle of reflection still equals the angle of incidence at each point. However, rays reflect in different directions. Reflection of light from a rough surface is called **diffuse reflection.**



1. **What is regular reflection?**

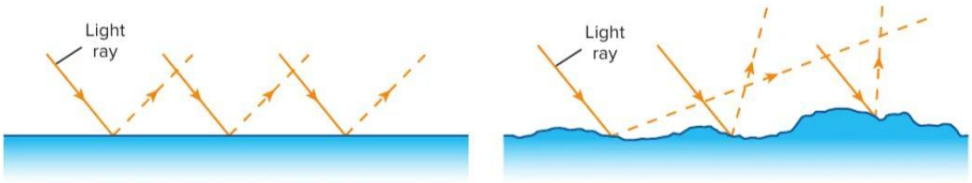
   .....

2. **What is diffuse reflection?**

   .....

20B

Study images 1 and 2 given below.



1. **Which image shows diffuse reflection?**
2. **Which image shows regular reflection?**

EXTRA QUESTIONS

E1. A sharp image is formed when light reflects from a(n) _____ surface. *[Lesson Check: Reflection and Mirrors]*

- **A.** rough
- **B.** smooth
- **C.** absorbent
- **D.** black

E2. The reflection of light waves from a rough surface is _____ reflection. *[Lesson Check: Reflection and Mirrors]*

E3. Give an example of a phenomenon that results in the scattering of light. *[Lesson Check: Reflection and Mirrors]*

E4. Compare and contrast regular reflection and diffuse reflection. *[Lesson Check: Reflection and Mirrors]*

Q21
FRQ

LEARNING OUTCOME

Demonstrate an understanding of the fundamental properties of electric charge, electrostatic interactions, electrical neutrality, and the conservation of electric charge by distinguishing between scientifically correct and incorrect statements about these concepts.

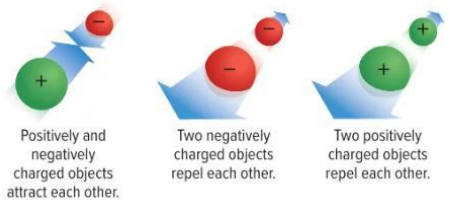
Textbook: Grade 8 Advanced p.204, 211, 212

TEXTBOOK PRACTICE

21A

Read the text below.

Charges There are two types of electric charge—positive charge and negative charge. Oppositely charged particles attract each other. Similarly charged particles repel each other. How do charged objects apply electric forces to each other without touching? Scientists have found that there is a region around a charged object that applies an electric force to other charged objects. This invisible region around any charged object where an electric force is applied is an **electric field.** The electric force applied by an object's electric field will either attract or repel other charged objects. The electric force is a noncontact force. In the photo to the right, positive charges accumulate on the woman. The charges spread out and push away from each other. When the charges accumulate on hair, each hair will repel away from every other hair. This is why her hair sticks up.





1. **How many types of charges are there?**
2. **State the types of charges that exist.**
3. **When do charged particles repel each other?**
4. **When do charged particles attract each other?**
5. **Is the electric force a contact force or a noncontact force?**

21B

Read the text below.

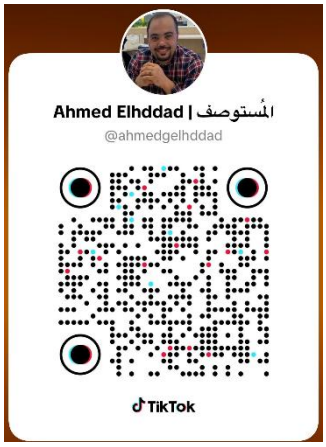
Conservation of Charge Notice that the amount of water did not change. The amount of water that started in the full container is the same as the amount of water after the two containers became equal. This is similar to the charged particles flowing between the two conductive objects. The total charge in a closed system does not change.

1. **Complete the sentence: The total charge in a closed system _____.**

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21C

Read the text below.



Neutral Objects All objects contain charged particles. When an object has equal amounts of positive charge and negative charge, the charges are balanced. An object with equal amounts of positive charge and negative charge is **electrically neutral.** Electrically neutral objects do not attract or repel each other. Neutral objects, such as the paper from the Lab *Paper Pick Up*, can be attracted to charged objects. When the negatively charged rod came near the paper, the negative charges in the paper were pushed away. The positively charged particles in the paper became attracted to the rod.

1. **An object is electrically neutral. What does this mean?**

   ……

2. **Can electrically neutral objects attract or repel each other?**

   ……

EXTRA QUESTIONS

E1. **As the amount of charge on either of two charged objects increases, the electric force between the objects decreases.** *[Module Test: Electromagnetic Forces]*

True / False

E2. **Two objects will experience an electric force of attraction when they have _____.** *[Module Test: Electromagnetic Forces]*

- **A.** like charges
- **B.** opposite charges
- **C.** the same amount of charge
- **D.** no charge

E3. **If the distance between two charged objects increases, the electric force between them _____.** *[Module Test: Electromagnetic Forces]*

- **A.** decreases
- **B.** increases
- **C.** remains the same
- **D.** stops

E4. **Which of the following statements about the forces between charged objects is not true?** *[Module Test: Electromagnetic Forces]*

- **A.** As the distance between charged objects decreases, the electric force between them decreases.
- **B.** If one object is positively charged and another is negatively charged, the objects will attract each other.
- **C.** Two negatively charged objects will repel each other.
- **D.** As the amount of charge on either object decreases, the electric force between them decreases.

E5. **When the amount of positive charge on an object equals the amount of negative charge on an object, the object is electrically neutral.** *[Module Test: Electromagnetic Forces]*

True / False

E6. **Mr. Ramirez demonstrates that objects can exert forces on each other even when the objects are not touching. He removes two long pieces of clear plastic tape from a tape dispenser. He holds a piece of tape in each hand so that they are hanging down. As he moves his hands closer together, the pieces of tape repel each other. His students then plan an investigation to study the forces exerted by the pieces of tape.** *[Module Test: Electromagnetic Forces]*

a) **Identify two factors that may affect the forces exerted by the pieces of tape. Explain your reasoning.**

……
……

b) **Describe how the effect of one of the factors you identified in part (a) could be tested. Be sure to include a description of how the effect would be measured and how the collected data would be analyzed.**

……
……



Q22
FRQ

LEARNING OUTCOME

1. Identify the instrument used to measure voltage in an electrical circuit and state the unit of measurement. 2. Use differences in lamp brightness to compare the electrical energy supplied by batteries under the same conditions.

Textbook: Grade 8 Advanced p.227

TEXTBOOK PRACTICE

22A

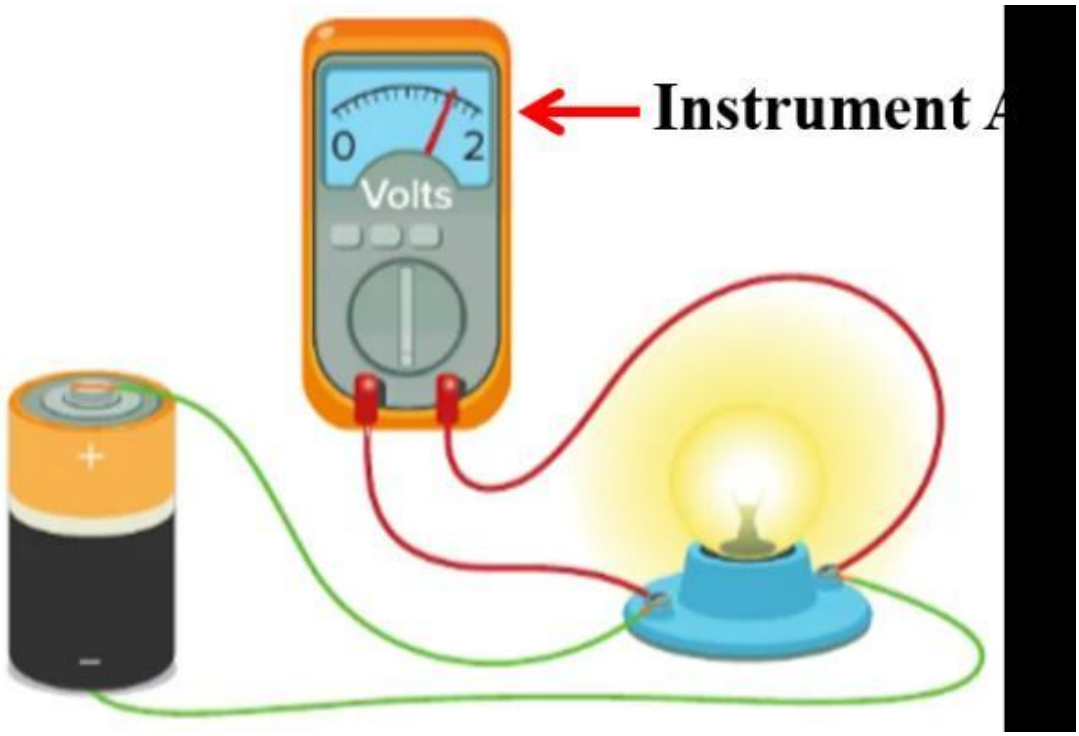
Read the text below.

THREE-DIMENSIONAL THINKING

Isabella uses a voltmeter to measure the voltage of a battery. The voltage reads 9 V when she measures both sides. Make an argument about what the reading will be if she measures the same side of a battery. Use evidence to support your argument.

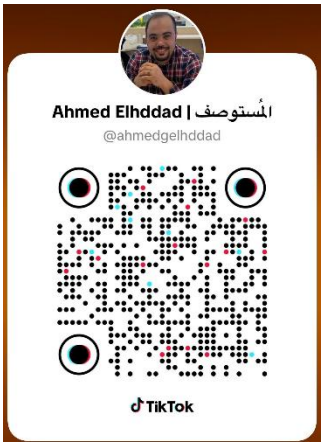
1. What does Isabella use to measure the voltage of the battery?

22B



1. What is instrument A called?

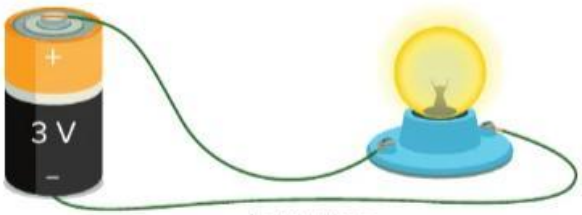
2. What does A measure?



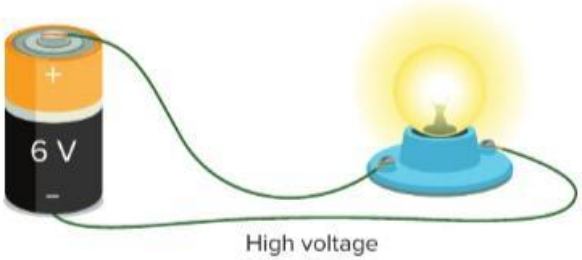
22C

Read the text.

Voltage You probably have heard the term *volt*. You use 1.5 V batteries in a flashlight. You plug a hair dryer into a 120 V outlet. But, what does this mean? In the Lab *Power Up*, a battery created an electric current in a closed circuit. Energy stored in the battery moves charged particles in the circuit. As the charged particles move through the circuit, the amount of energy transformed by the circuit depends on the battery's voltage. Recall that electrical potential energy is stored energy due to the interactions of charges in an electric field. **Voltage** is the electrical potential energy difference between two places on a circuit.



Low voltage



High voltage

The measure of the potential energy difference is made in volts (V). For example, a 9 V battery has a potential energy difference of 9 V between the positive and negative side. A circuit with a high voltage source transforms more electric energy to other energy forms than a circuit with a low voltage source. For example, a light bulb connected to a 9 V battery produces about six times more light and thermal energy than the same light bulb connected to a 1.5 V battery.

1. **What is a battery used for in a closed circuit?**

   .....

2. **The amount of energy transformed by the circuit depends on the battery's _____.**

   .....

3. **Voltage is the _____ between two places on a circuit.**

   .....

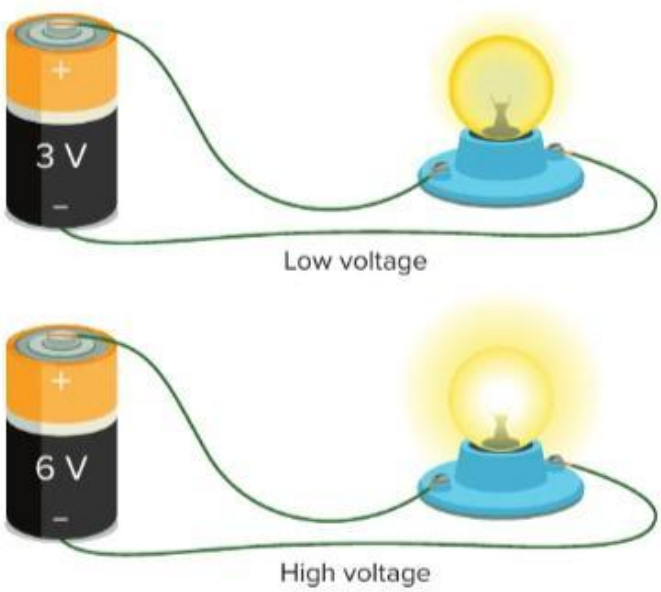
4. **Compare the 3 V battery to the 6 V battery in the image above. Which one converts more electrical energy into light energy? Explain your answer. (Hint: Think about brightness.)**

   .....

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22D

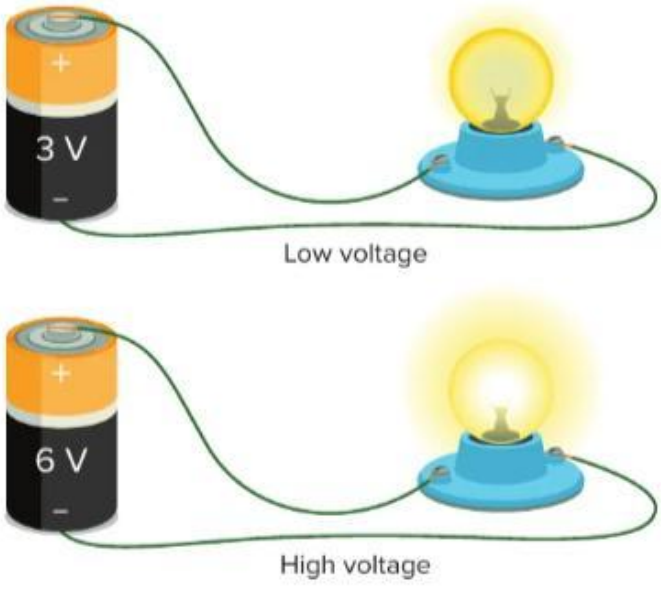
The same lamp is connected to two different batteries as shown below.

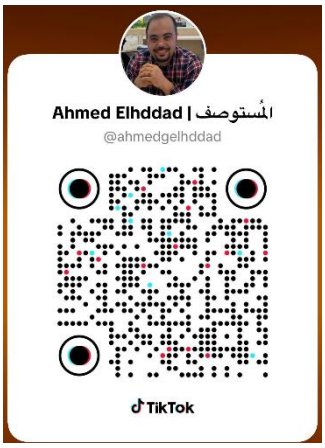


1. Why does the lamp shine brighter when connected to the 6 V battery?

22E

The same lamp is connected to two different batteries as shown below.





1. Why does the lamp, when connected to the 3 V battery, shine less bright?

Q23
FRQ

LEARNING OUTCOME

1. Predict and explain how changes in the number of turns in a coil, the presence of an iron core, and the applied voltage affect the strength (of the magnetic field) of an electromagnet. 2. Describe the energy conversion that occurs in an electric motor, identifying electrical energy as the input and mechanical energy as the output.

Textbook: Grade 8 Advanced p.242, 246

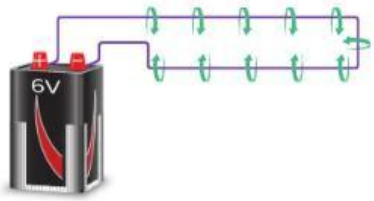
TEXTBOOK PRACTICE

23A

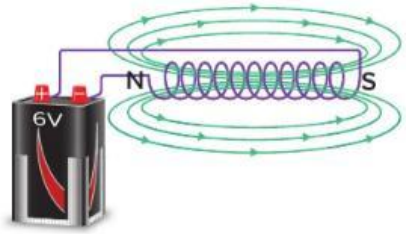
Read the text.

Electromagnets You discovered in the Investigation *Making Magnetic Fields* that when you increase the number of coils in a current-carrying wire, the magnetic field around the coil increases. Another way to increase the strength of a magnetic field occurs when a magnetic material is placed within the coil. A temporary magnet made with a current-carrying wire coil wrapped around a magnetic core is called an **electromagnet.**

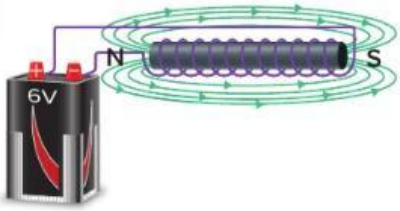
An electric current in a wire produces a magnetic field around the wire.



An electric current in a wire coil produces a magnetic field with a north pole and a south pole.



Placing an iron core within the coil greatly intensifies the magnetic field. This device is an electromagnet.



1. **What is the effect on the strength of the magnetic field of the electromagnet if the number of coils increases?**

   .....

2. **What is the effect on the strength of the magnetic field of the electromagnet if the number of coils decreases?**

   .....

3. **What is the effect on the strength of the magnetic field of the electromagnet if an iron core is placed within the coil?**

   .....

4. **What would happen to the strength of the magnetic field if the 6 V battery is replaced with a 4 V battery? Explain your answer.**

   .....

5. **What would happen to the strength of the magnetic field if the 6 V battery is replaced with an 8 V battery? Explain your answer.**

   .....

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23B

Complete the Three-Dimensional Thinking task shown below.

THREE-DIMENSIONAL THINKING

Model three **cause-and-effect** relationships that affect the strength of magnetic forces around current-carrying wires.



23C

Read the text below.

Electromagnets Electromagnets are useful because they can be controlled in ways other magnets cannot. First, an electromagnet's magnetic field can be turned off and on. Turning off the electric current in the coil turns off the magnetic field. Examine the strong electromagnet in the figure on the right. This electromagnet is used to separate magnetic materials from nonmagnetic materials. If it were permanent, it could not let go of the magnetic materials. Once it is turned off, the electromagnet will lose its magnetic field so it can release the magnetic materials.



This electromagnet can be turned on and off.

Second, the strength of an electromagnet can be controlled by the number of loops in the coil and the amount of electric current in the coil. And finally, the north and south poles of the electromagnet reverse if the current reverses. You will find out how this is useful in the next section.

1. **Name two ways in which electromagnets are useful.**

   .....

2. **Name two ways in which the strength of an electromagnet can be controlled.**

   .....

3. **How would you produce a larger electric current in the coil? (Hint: think about voltage.)**

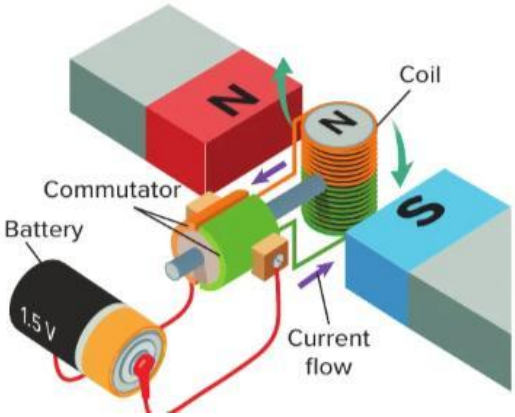
   .....

23D

Read the text below.

Magnets and Electric Motors Power tools, electric fans, hair dryers, computers, and even microwave ovens use electric motors. An **electric motor** is a device that uses an electric current to produce motion. A simple electric motor has three main parts. The main parts of an electric motor are a coil of wire connected to a rotating shaft, a permanent magnet, and a source of electric energy, such as a battery.

Some electric motors require a commutator. A commutator is a type of electrical switch that reverses the current in the coil.



1. Name the parts of an electric motor.

23E

Read the text below.

Using Electric Motors In an electric motor, electric energy is transformed to mechanical energy to produce motion. Electric motors are used in many devices from windshield wipers to CD players and even power windows on cars. Almost any device that needs to produce motion uses an electric motor. Electric motors can be tiny or very large. The strength of an electric motor depends on the strength of the permanent magnet, the voltage, and the number of wire coils.

1. What energy change takes place in an electric motor?

2. What does the strength of an electric motor depend on?

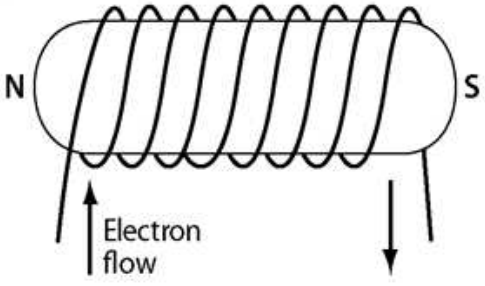
EXTRA QUESTIONS

E1. By changing the current in the wire, you can change the _____ of an electromagnet. *[Lesson Check: Electromagnetism]*

- **A.** strength and charge
- **B.** direction and coils
- **C.** charge and strength
- **D.** strength and direction

E2. Changing _____ of the current in a wire coil reverses an electromagnet's north and south poles. *[Lesson Check: Electromagnetism]*

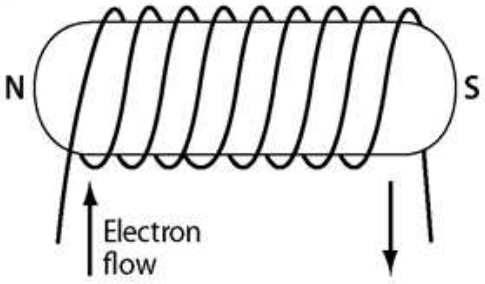
E3. In the figure shown, what happens when the amount of current flowing in the wire coil is increased? *[Lesson Check: Electromagnetism]*

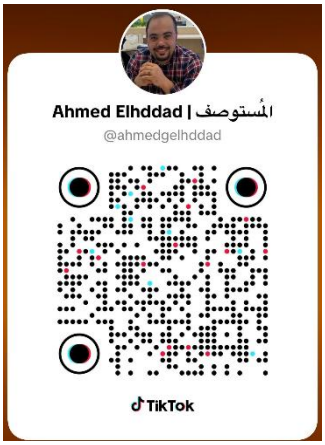


- **A.** The magnetic field becomes stronger.
- **B.** The magnetic field disappears.
- **C.** The position of the north and south poles is reversed.
- **D.** The strength of the magnetic field decreases.

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E4. **In the figure shown, what would happen if the direction of the current in the wire coil were reversed?** *[Lesson Check: Electromagnetism]*





A. The electromagnet would no longer work.
B. The north and south poles would switch places.
C. The strength of the magnetic field would increase.
D. The strength of the magnetic field would decrease.

E5. **An electromagnet is a current-carrying wire wrapped around a copper core.** *[Lesson Check: Electromagnetism]*

True / False

E6. **Describe three ways to increase the strength of an electromagnet.** *[Lesson Check: Electromagnetism]*

E7. **The strength of an electromagnet can be increased by reducing the number of turns on the wire coil so that more current can flow.** *[Module Test: Electromagnetic Forces]*

True / False

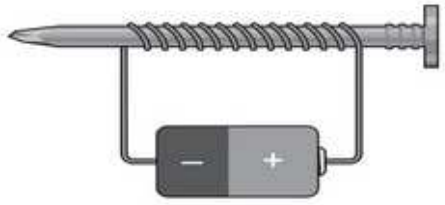
E8. **The more loops in a coil of wire around the core of an electromagnet, the stronger the magnetic force.** *[Module Test: Electromagnetic Forces]*

True / False

E9. **What makes an electric motor spin?** *[Module Test: Electromagnetic Forces]*

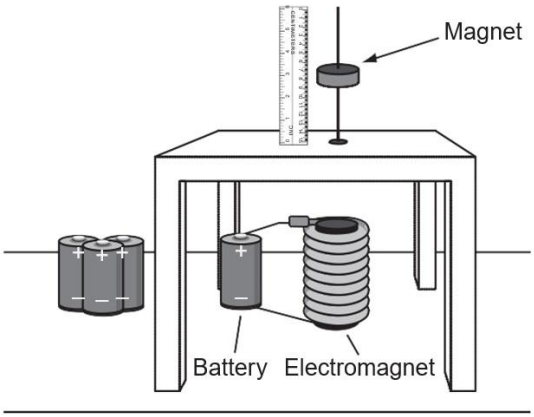
A. The permanent magnet and the electromagnet continuously attract each other.
B. The permanent magnet and the electromagnet continuously repel each other.
C. The permanent magnet and the electromagnet alternately attract and repel each other.
D. The permanent magnet and the electromagnet alternately attract and repel the power source.

E10. **A student created an electromagnet out of a piece of copper wire, a nail, and a battery, as shown. The student observed that the electromagnet could not lift paper clips off a desktop as expected. Which hypothesis will most likely help the student build an electromagnet capable of lifting paper clips?** *[Module Test: Electromagnetic Forces]*



A. Using a wooden stick instead of a nail will increase the number of paper clips that the electromagnet can pick up.
B. Adding more coils of copper wire to the nail will increase the number of paper clips that the electromagnet can pick up.
C. Pushing the coils of copper wire closer together will increase the number of paper clips that the electromagnet can pick up.
D. Using a battery that produces less electric current will increase the number of paper clips that the electromagnet can pick up.

E11. During an investigation, a teacher places a small permanent magnet with a hole in it onto a wooden rod. The magnet can slide freely up and down the rod. When the teacher places the magnet and rod on a tabletop above an electromagnet, the magnet slides up the rod as shown in the diagram. A student measures how far the magnet slides up the rod each time the teacher adds an additional battery to the electromagnet. Which question could most likely be answered by this investigation? *[Module Test: Electromagnetic Forces]*



A. How does the size of the magnet affect the distance the magnet travels up the rod?
B. How does the distance between the magnet and the electromagnet affect the strength of the magnetic force of the electromagnet?
C. How does the amount of the electric current affect the distance the magnet travels up the rod?
D. How does the direction of the electric current affect the strength of the magnetic force of the electromagnet?

E12. Six students each make an electromagnet for an investigation. Each student wraps copper wire around a nail and attaches each end of the wire to a 9-volt battery. The students use their electromagnets to pick up paper clips. The table shows the number of paper clips each student picks up with their electromagnet. *[Module Test: Electromagnetic Forces]*

Electromagnet Investigation

Student	Number of Paper Clips Picked Up
1	5
2	12
3	28
4	17
5	7
6	25

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a) Write one question about how the electromagnets were made that the students could answer that would help explain the differences in the numbers of paper clips picked up by the electromagnets. Explain your reasoning.

b) Identify one factor, other than how the electromagnets were made, that would affect the number of paper clips picked up by the electromagnet. Explain your reasoning.

Q24
FRQ

LEARNING OUTCOME

1. Apply the relationship between wave energy and the square of its amplitude to calculate wave energy or amplitude using given data. 2. Understand the physical characteristics of waves, including amplitude, wavelength and frequency. 3. Interpret graphical representation and wave diagrams to determine amplitude and wavelength. 4. Know how to calculate frequency of a wave.

Textbook: Grade 8 Unit 3 p.19, 20, 26, 32

TEXTBOOK PRACTICE

24A

Write down the relationship between the amplitude (A) of a wave and its energy (E).

24B

The table below shows the amplitude of 3 waves X, Y and Z.

Wave	Amplitude (Units)	Energy (Units)
W	1	
X	2	
Y	5	

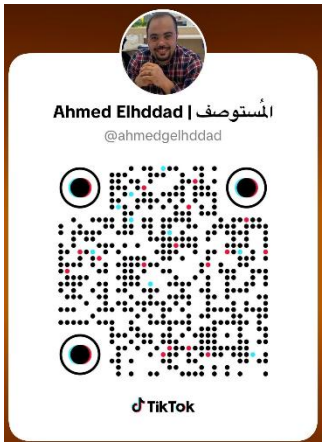
Determine the missing values of the energy of the waves, given that $Energy = Amplitude^2$.

24C

The table below shows the energy of 3 waves X, Y and Z.

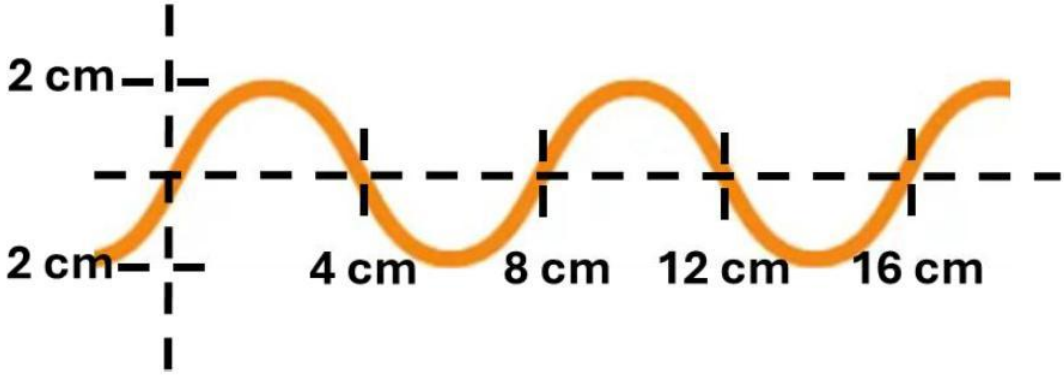
Wave	Amplitude (Units)	Energy (Units)
W		1
X		36
Y		64

Determine the missing values of the amplitude of the waves, given that $Energy = Amplitude^2$.



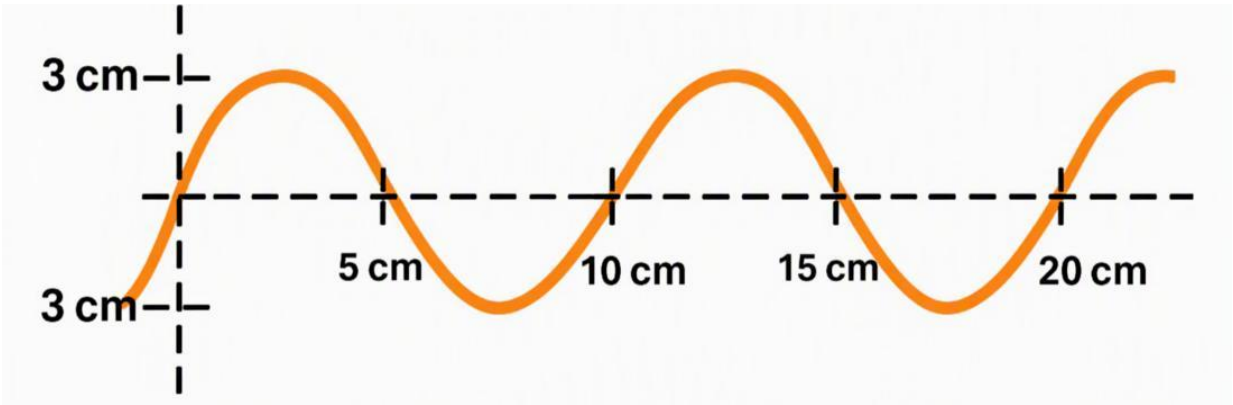
24D

Determine the amplitude and wavelength of the wave shown in the image below.



24E

Determine the amplitude and wavelength of the wave shown in the image below.



EXTRA QUESTIONS

E1. For a wave, the _____ the amplitude, the _____ energy the wave carries. *[Lesson Check: Wave Properties]*

- **A.** larger, more
- **B.** smaller, more
- **C.** larger, less
- **D.** smaller, same

E2. Tyrone gathers amplitude and energy data for four ocean waves, as shown in the table. 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? *[Lesson Check: Wave Properties]*

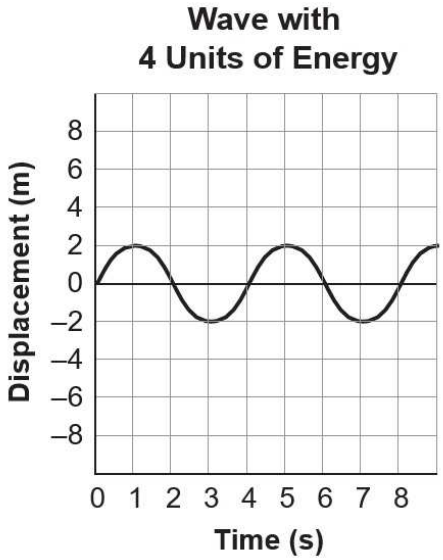
Four Ocean Waves

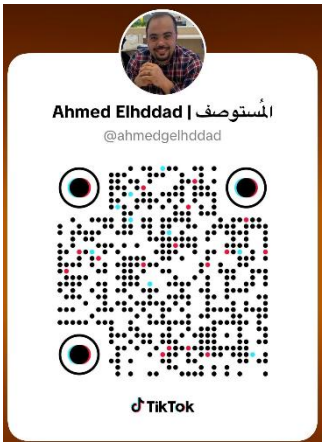
Wave	Amplitude (units)	Energy (units)
W	1	1
X	4	16
Y	7	49
Z	10	100

- **A.** $E = A$
- **B.** $E = A^2$
- **C.** $1/E = A$
- **D.** $1/E = A^2$

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E3. **This graph represents a wave with four units of energy at a certain frequency. Describe a new graph that represents a wave with four times greater energy but the same frequency. Include the amplitude, frequency, and the highest and lowest displacement values.** *[Lesson Check: Wave Properties]*



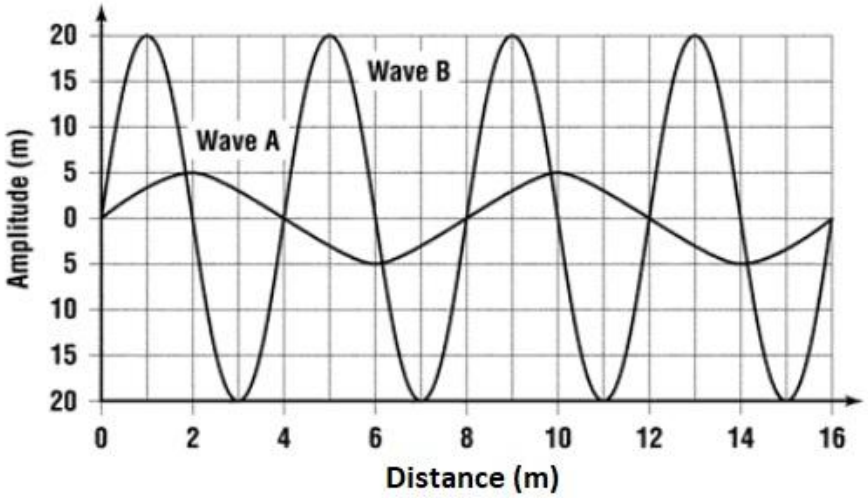


E4. **Margo participated in a surfing competition. During the competition, the height of the ocean waves increased from two feet to six feet.** *[Lesson Check: Wave Properties]*

a) Identify how many times greater the amount of energy carried by the six-foot wave was than the amount of energy carried by the two-foot wave. Explain your reasoning.

b) Margo notices that waves start passing her more often. What can she conclude about the frequency and wavelength of the waves?

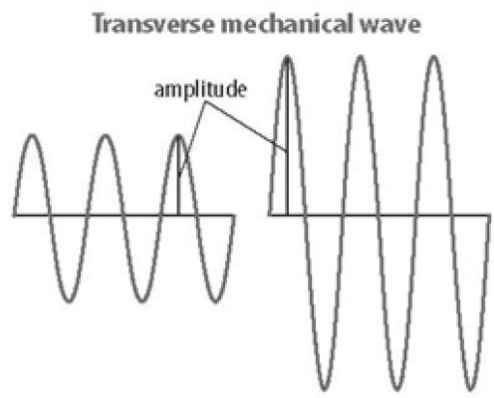
Use the graph of Wave A and Wave B to answer the questions marked with this figure.



E5. **Wave _____ has the greater frequency.** *[Module Test: Introduction to Waves]*

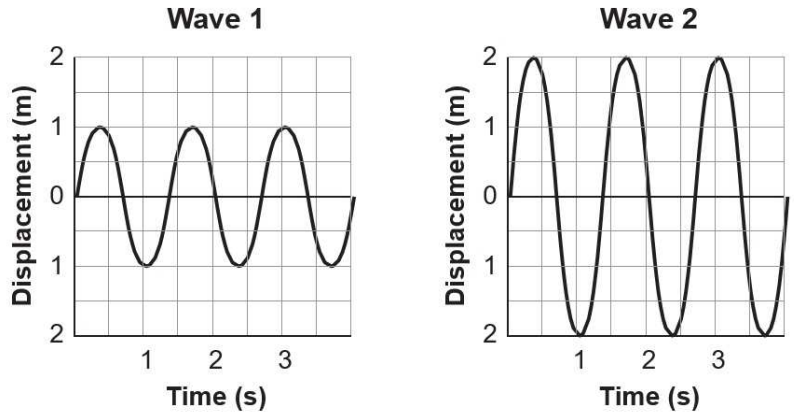
E6. **Wave _____ carries the smaller amount of energy.** *[Module Test: Introduction to Waves]*

E7. What change could explain the difference between the waves? *[Module Test: Introduction to Waves]*



A. The speed of the wave increased.
B. The source of vibrations increased the speed of vibrations.
C. The wavelength of the wave increased.
D. The energy provided by the source of vibrations increased.

E8. Weichung and Suzi use a long piece of rope to model wave motion. They each hold one end of the rope, and Weichung moves his end up and down, forming a wave. They form Wave 1 under one set of conditions and Wave 2 under a different set of conditions, as represented in the graphs. *[Module Test: Introduction to Waves]*



a) Compare each of the following wave characteristics for Wave 1 and Wave 2: wavelength, amplitude, and frequency. Use specific information from the graphs to support your comparisons.

b) Describe how many times greater the amount of energy carried by Wave 2 is than the amount of energy carried by Wave 1. Explain your reasoning.

E9. The energy of an electromagnetic wave is related to its amplitude. *[Lesson Check: How Light Travels]*

True / False

@ELHDDAD37

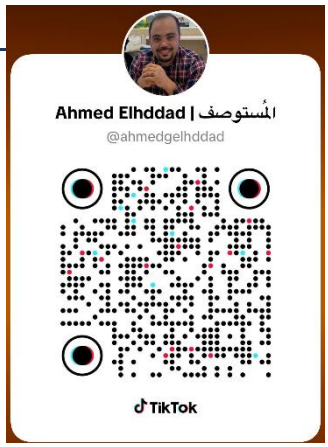
Q25 FRQ

LEARNING OUTCOME

1. Interpret ray diagrams to identify the incident ray, reflected ray, normal, and angles of incidence and reflection. 2. Recall and apply the law of reflection.

Textbook: Grade 8 Unit 3 p.91, 92

TEXTBOOK PRACTICE

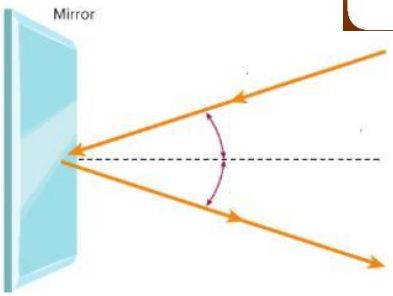


25A

Read the text below.

Law of Reflection Like the tennis ball, light behaves in predictable ways when it reflects. Recall that light moves in straight lines. These lines of light are represented in a model as straight arrows called rays. Scientists often use this model to trace the path of light. The rays in the ray diagram on the bottom right show how light reflects. An imaginary line perpendicular to a reflecting surface is called the normal. The light ray moving toward the surface is the incident ray. The light ray moving away is the reflected ray.

Notice the angle formed where an incident ray meets the normal. This is the angle of incidence. A reflected ray forms an identical angle on the other side of the normal. This angle is the angle of reflection. According to the **law of reflection,** when a wave is reflected from a surface, the angle of reflection is equal to the angle of incidence.



1. **State, in a complete sentence, the law of reflection of light.**

2. **Identify the following in the image: (a) angle of incidence, (b) angle of reflection, (c) incident ray, (d) reflected ray, (e) normal.**

25B

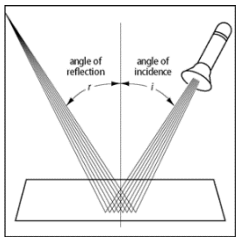
Textbook lab: Review Mirror, Question 10 (Grade 8 Advanced p.90).

EXTRA QUESTIONS

E1. You can see yourself in a mirror because light _____ off the surface of a mirror. *[Lesson Check: Reflection and Mirrors]*

- **A.** absorbs
- **B.** reflects
- **C.** transmits
- **D.** transfers

E2. In the figure shown, if angle i is increased, angle r will _____. *[Lesson Check: Reflection and Mirrors]*



- **A.** remain the same
- **B.** decrease by the same amount
- **C.** increase by the same amount
- **D.** decrease to zero

**********the end