

LESSON PLAN 1 [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Concept of waves and types of waves

Expected Learning Outcome:

- ⇒ Define the term sound.
- ⇒ Understand and describe the propagation of sound waves in day to day life
- ⇒ Define and understand wave motion.
- ⇒ Define and give examples for types of waves.
- ⇒ Describe an activity to show that sound is a mechanical wave.

Expected skill development:

Comprehension, understanding, critical thinking, description, virtual thinking.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Will review the previous knowledge with the following questions: (5min)

- What do you mean by periodic motion?
- Give some examples showing periodic motion
- What is the basic difference between vibration and oscillation?
- Give at least one example of vibration and oscillation each

CONTENT (Discussion and questionnaire method)

- ⇒ Define sound. (20 min)
- ⇒ Description of propagation of sound waves in daily life:- vibration of particles in atmosphere
- ⇒ Define wave and wave motion.
- ⇒ Description of the activity of a bell jar showing that sound wave is a mechanical wave
(Bell ringing inside the jar having vacuum is not audible)

THINK LINE: -what is transferred by wave motion from one place to another, matter or energy. Give one example in support of your answer

CLOSURE:

How does the sound produced by a vibrating object in a medium reach your ear?

Explain how sound is produced by your school bell? (5 min)

Is sound wave mechanical energy? Justify.

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ How is sound produced? ➤ In how many basic categories all the different forms of energy are divided? ➤ What is the basic of this categorization?	
Evaluation/Assessment: Oral questionnaire Sound is mechanical energy? Justify.	
Learners on the way Does sound need a medium to travel?	Advanced Learners When a stone is thrown on the surface of water, a wave spreads out. From where does the energy come from?
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students get confused in the difference between types of waves and wave-motion	Addressing the misconceptions: Students get confused in the difference between types of waves and wave-motion

Home Assignments:

(5 min)

- What is sound and how is it produced?
- Describe with the help of a diagram, how compressions and rarefactions are produced in air near a source of sound.
- Cite an experiment to show that sound needs a material medium for its propagation.

LESSON PLAN 2 [2019 - 2020]



DLF Public School

THE LEARNING ACADEMY

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Types of wave motion

Expected Learning Outcome:

Students will be able to

- ⇒ Understand and describe the types of wave motion.
- ⇒ Define crest and trough in a transverse wave with displacement-distance graph.
- ⇒ Define rarefaction and compression in a longitudinal wave with displacement-distance graph.
- ⇒ Differentiate between transverse and longitudinal waves.

Expected skill development:

Comprehension, critical thinking, correct usage of scientific vocabulary

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of homework questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What is a wave?
- How many types of waves are there?
- What is the basis of their categorization?

CONTENT (Discussion and questionnaire method)

(20 min)

- ⇒ Two types of wave motion:-
 - a) transverse waves and b) longitudinal waves
- ⇒ Define transverse waves with examples.
- ⇒ Define longitudinal waves with examples.
- ⇒ Define crest and trough in a transverse wave.
- ⇒ displacement-distance graph of a transverse waves showing crest and trough.
- ⇒ Define rarefaction and compression in a longitudinal wave.
- ⇒ displacement-distance graph of a transverse waves showing rarefaction and compression.
- ⇒ Differentiate between transverse and longitudinal waves on the basis of the following parameters:
 - a) Definition

- b) parts
- c) displacement-distance graphs
- d) Types of mediums through which they can pass
- e) examples

Think line:- How would you infer that sound waves are longitudinal waves?

CLOSURE:

Recapitulation of the concept by discussion of the following questions step wise (5 min)

- How many types of wave motion are there?
- What are their differences (longitudinal and transverse waves?)
- Draw their displacement time graphs?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ How many types of wave motion are there? ➤ Write 4 differences between them? ➤ Define crest and trough? ➤ Define rarefaction and compression?
Evaluation/Assessment: Differentiate between longitudinal and transverse wave motion.
DIFFERENTIATED CLASSROOM

Learners on the way ➤ How many types of wave motion are there?	Advanced Learners ⇒ Define crest and troughs ⇒ Define rarefaction and compression
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students gets confused about how transverse wave is actually different from longitudinal	Addressing the misconceptions: By explaining the difference in their origin.

Home assignments:

(3 min)

Write three differences between transverse and longitudinal waves.

Why are sound waves called mechanical waves?

Why is sound wave called a longitudinal wave?

LESSON PLAN 3 [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY

Managed By Darbari Lal Foundation

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Waves formed in slinky and tuning fork and characteristics of a wave.

Expected Learning Outcome:

Students will be able to

- ⇒ Formation of wave in a tuning fork
- ⇒ Formation of both types of waves in a slinky.
- ⇒ Description of various parameters related to a wave along with their SI unit and nature.
- ⇒ Relation between time period and frequency of a wave.

Expected skill development:

Comprehension, understanding, critical thinking, drawing/illustration

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- How many types of wave motions are there?
- What is the basis of their categorization?
- What is a slinky?

CONTENT (Demonstration and Discussion method)

(20 min)

- ⇒ Diagrammatic representation of longitudinal waves formed in a tuning fork.
- ⇒ Diagrammatic representation of longitudinal waves formed in a slinky when given parallel vibrations.
- ⇒ Diagrammatic representation of transverse waves formed in a slinky when given perpendicular vibrations.
- ⇒ One by one description of the following parameters relates to a wave with their symbol, SI units and their nature:
 - I. Amplitude of a wave
 - II. Frequency of a wave
 - III. Wavelength of a wave
 - IV. Time period
- ⇒ Relation between frequency and time period
 $F=1/T$

THINK-LINE: Suppose you and your friend are on the Moon. Will you be able to hear any sound produced by your friend?

CLOSURE:

Recapitulation of the concept by discussion of the following questions step wise (5 min)

- How many types of waves can be formed in a slinky?
- Where is the difference to obtain the two different waves?
- How many parameters are there in a wave?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ Define amplitude and what is its SI unit? ➤ Define frequency and what is its SI unit? ➤ Define time period and what is its SI unit? ➤ Define wavelength and what is its SI unit?	
Evaluation/Assessment: Graphical representation of wave with the help of displacement-distance graph. Identify amplitude, wavelength.	
Learners on the way Define amplitude, frequency, time period and wave length.	Advanced Learners Relate frequency with time period of a wave.
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students will get confused when we get longitudinal waves and transverse waves with the same slinky. Students get confused by units of amplitude, frequency and wavelength.	Addressing the misconceptions: By realizing them the fact that parallel and perpendicular motion lead to different kinds of wave in the same slinky. Regular practice is required for learning units.

- Home Assignments: (3 min)
 - A person is listening to a tone of 500HZ sitting at a distance of 450m from the source of the sound. What is the time interval between successive compressions from the source?
 - What are wavelength, frequency of a sound waves related to its speed?
 - Flash and thunder are produced simultaneously. But thunder is heard a few seconds after the flash is seen, Why?

LESSON PLAN 4 [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Relation between the frequency, velocity and wavelength of a wave.

Expected Learning Outcome:

Students will be able to:

- ⇒ Derive the relation between frequency, wavelength and velocity of a wave.
- ⇒ Comprehend and solve numerical based on the relation of time period and frequency.
- ⇒ Comprehend and solve numerical based on the relation between frequency, wave length and velocity of a wave.

Expected skill development:

Comprehension, Problem solving, critical thinking.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (3min)

- What is frequency of a wave?
- What is time period?
- How frequency and time period are related?

CONTENT (discussion method and demonstration by students)

- ⇒ Step by step derivation of the relation between frequency, wavelength and velocity of a wave. (5 min)

Velocity=distance travelled /time taken

So, velocity= wavelength/time period

$$V = \lambda / T$$

$$V = \lambda \times f$$

Students will solve following numerical related to it one by one on the board: (15min)

- Calculate the wavelength of a sound wave whose frequency is 220 Hz and speed is 440 m/s in a given medium?
- A person is listening a tone of 500 Hz sitting at 450m from the source of the sound. What is the time interval between successive compressions from the source?
- A person has a hearing range from 20 Hz to 20,000 Hz what are the typical wavelengths of sound waves in air corresponding to these frequencies? Take the speed of sound in air as 344 m/s.

CLOSURE:

Discussion of the misconceptions/ common misconceptions while solving the numerical (5min)

Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ How wavelength is defined in terms of distance between crests/troughs or compressions/rarefaction? ⇒ How frequency and time period of a wave are related?	
Evaluation/Assessment: Oral questionnaire Relate frequency, time period and wavelength.	
Learners on the way How frequency and time period of a wave are related?	Advanced Learners ⇒ The frequency of a source is 100 Hz. How many times does it vibrate in a minute?
Materials needed/Resources: Chalk, duster, NCERT	
Common Misconceptions: Students generally forgets to convert the parameters into their SI unit.	Addressing the misconceptions: By reminding them again and again.

- Home Assignments: (2 min)

- ⇒ If velocity of sound in air is 340 m/s, calculate
- Wavelength when frequency is 256 Hz.
 - Frequency when wavelength is 0.85 m.

**LESSON PLAN 5 [2019-- 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Relation between the frequency, velocity and wavelength of a wave. Extra numerical on the relation.
Expected Learning Outcome: Students will be able to: ⇒ Comprehend and solve numerical based on the relation of time period and frequency. ⇒ Comprehend and solve numerical based on the relation between frequency, wavelength and velocity of a wave.						
Expected skill development: Comprehension, Problem solving, critical thinking.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (3min)

- What is frequency of a wave?
- What is time period?
- How frequency and time period are related?
- What is the relation between velocity, frequency and wavelength of a wave?

CONTENT (discussion method and demonstration by students)

Students will solve following numerical related to it one by one on the board: (20min)

- d) If the period of small ripples on water is 0.1s and their wavelength is 5cm, then what is the speed of the waves?
- e) Waves of frequency 100Hz are produced in a string as shown in the figure. Give its:
 1. Amplitude
 2. Wavelength
 3. Velocity
 4. Nature?

- f) A boat at anchor is rocked by waves whose crests are 100m apart and whose velocity is 25 m/s. how often do the crests reach the boat?

THINK-LINE: Does a 220HZ sound wave move faster, slower, or at the same speed as a 440HZ sound wave?

CLOSURE:

(5min)

Discussion of the misconceptions/ common misconceptions while solving the numerical

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ⇒ How wavelength is defined in terms of distance between crests/troughs or compressions/rarefaction? ⇒ How frequency, velocity and wavelength of a wave are related? ⇒ What is the distance between a consecutive compression and rarefaction? ⇒ What is the distance between a consecutive compression and rarefaction?	
Evaluation/Assessment: Written questionnaire Difference between compression and rarefaction. Write an expression to relate wavelength, frequency and time period.	
Learners on the way ⇒ How frequency, velocity and wavelength of a wave are related?	Advanced Learners ⇒ The distance between a crest and the next trough in a transverse wave is 10 cm. if 50 such crests and troughs are produced by the source in 0.5 s, then find the wavelength and velocity of the wave.
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students gets confused how to comprehend the numerical and identify the parameter given in the question.	Addressing the misconceptions: By giving them practice for such type of numerical.

- Home Assignments:

(2 min)

- ⇒ In a ripple tank, ten ripples are produced /s. if the distance between a trough and a neighboring crest is 12cm, calculate the frequency, wavelength and velocity of a wave.

LESSON PLAN 6 [2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Speed of sound and audible range for humans.
Expected Learning Outcome: Students will be able to ⇒ Compare the speed of sound with light. ⇒ Compare Speed of sound in different types of medium. ⇒ Define and give examples for infrasonic and ultrasonic waves. ⇒ Define a sonic boom.						
Expected skill development: Comprehension, critical thinking, analysis						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (3min)

- What is the speed of light in vacuum?
- What do you mean by frequency of a wave?

CONTENT (Discussion and questionnaire method)

(20 min)

- ⇒ Speed of light = 3×10^8 m/s and the speed of sound at STP = 340m/s
So, light travels faster.
- ⇒ Speed of sound is fastest in solids and slowest in gases.
- ⇒ Two factors on which the speed of sound in a medium depends: -
1.elasticity of medium. 2.density of medium.
- ⇒ Audible range for human ear is 20-20,000 Hz.
- ⇒ Define infrasonic waves and give examples of animals which can create these waves.
- ⇒ Define ultrasonic waves and give examples of animals which can create these waves.
- ⇒ Define sonic boom.

Think line:- what will happen to the speed of sound if temperature of the medium increases?.

CLOSURE:

Recapitulation of the concept by asking the following questions:

(5 min)

- Which is faster: light or sound?
- What are infrasonic waves?
- What are ultrasonic waves?

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ Which is faster: light or sound? ➤ What are infrasonic waves? ➤ What are ultrasonic waves?
• Evaluation/Assessment: Written questionnaire Difference between infra and ultrasonic sounds.
DIFFERENTIATED CLASSROOM

Learners on the way Which is faster sound or light.	Advanced Learners ⇒ How more density of a medium can help in faster vibrations?
Materials needed/Resources: Chalk, duster, ncert book.	
Common Misconceptions: Students get confused with the misconception that sound travels faster in gases, as there is more space for the particle to vibrate there	Addressing the misconceptions: By making them realize this fact that closer particles will transfer the energy fast.

Home assignments:

(2 min)

Explain why flashes of lightening are visible first before we can hear the thunder during storm.

LESSON PLAN 7[2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Characteristics of sound and its law of reflection

Expected Learning Outcome:

Students will be able to

- ⇒ Define all the 3 characteristics of sound.
- ⇒ Explain the various factors on which these characteristics individually depend.
- ⇒ Define reflection of sound.
- ⇒ State the two laws of reflection for sound waves.

Expected skill development:

Comprehension, critical thinking

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- Which is faster: light or sound?

CONTENT (Discussion and questionnaire method)

(20 min)

- ⇒ Define the loudness of sound and its dependence on amplitude of a sound wave.
Loudness of sound $\propto$ amplitude
- ⇒ Define the pitch of sound and its dependence on frequency of a sound wave.
Pitch of sound $\propto$ frequency.
- ⇒ Define the quality(timbre) of sound and its dependence on pleasantness of a sound wave.
quality of sound $\propto$ pleasing nature (rich quality)
and noisy nature (poor quality)
- ⇒ Define reflection of sound using concept of reflection of sound waves.
- ⇒ State laws of reflection of sound using concept of laws of reflection of sound wave.

THINK-LINE: Will a vibrating source always produce sound?

CLOSURE:

Recapitulation of the concept by discussion of the following questions step wise (5 min)

- Define the loudness of sound? On what factor does it depend?
- Define the pitch of sound? On what factor does it depend?
- Define the quality of sound? On what factor does it depends?

• Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ Define the loudness of sound? On what factor does it depend? ➤ Define the pitch of sound? On what factor does it depend? ➤ Define the quality of sound? On what factor does it depend? ➤ State laws of reflection of sound? ➤ Define reflection of sound?
• Evaluation/Assessment: Difference between loudness, pitch and quality of sound.
DIFFERENTIATED CLASSROOM

Learners on the way ➤ State laws of reflection of sound? ➤ Define reflection of sound?	Advanced Learners ⇒ Compare the loudness and pitch of sound produced by guitar, tabla?
Materials needed/Resources: Chalk, duster, ncert book.	
Common Misconceptions: Students get confused between pitch and loudness of any sound.	Addressing the misconceptions: It can be cleared by talking in terms of its frequency and amplitude of sound waves. More examples to be discussed.

Home assignments:

(3min)

1. Guess which has a higher pitch: a guitar or a car horn?
2. Which wave property determines (a) loudness (b) Pitch.
3. Which characteristic of sound helps you to identify your friend by his voice while sitting with others in a dark room?
4. Does sound follow the same laws of reflection as light does? Explain.

LESSON PLAN 8 [2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Echo and reverberation

Expected Learning Outcome:

Students will be able to

- ⇒ Define echo.
- ⇒ Compute the minimum distance between the observer and the obstacle for echo to be heard.
- ⇒ State and analyze 4 conditions required for an echo to be heard.
- ⇒ Define reverberation.
- ⇒ Enlist methods of avoiding the reverberation.

Expected skill development:

Comprehension, critical thinking, analysis

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class

(5 min)

Will review the previous knowledge with the following questions: (2min)

- What do you mean by reflection of sound?
- State two laws of reflection of sound?

CONTENT (Discussion and derivation method) (20 min)

- ⇒ Define echo.
- ⇒ Concept of persistence of hearing: brain takes $1/10$ s to interpret any sound.
- ⇒ Calculation of the minimum distance between the observer and the obstacle for echo to be heard.

Distance between observer and obstacle = d

Speed of sound = v

Time after which echo is heard = t

$$t = 2d/v$$

$$d = vt/2$$

$$= 343 \times 0.1/2$$

$$= 17.2 \text{ m}$$

- ⇒ Conditions required for an echo to be heard.

-
- ⇒ Define reverberation.
 - ⇒ Methods of avoiding the reverberation.

THINK-LINE: There are no echoes produced in small living rooms. Explain why echoes are produced only in large galleries and halls.

CLOSURE:

Recapitulation of the concept by discussion of the following questions step wise (5 min)

- Define echo?
- Define reverberation?
- Which is desired out of the two?
- How reverberation can be avoided?

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ Define echo? ➤ Define reverberation? ➤ Which is desired out of the two? ➤ How reverberation can be avoided? ➤ What is the difference between echo and reverberation? ➤ What is persistence of vision?
Evaluation/Assessment: Oral questionnaire Difference between echo and reverberation.
DIFFERENTIATED CLASSROOM

Learners on the way Difference between echo and reverberation.	Advanced Learners ⇒ Write 3 differences between echo and reverberation.
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students get confused with the concept of echo and reverberation	Addressing the misconceptions: By telling them the difference between them again and again.

Home assignments:

(3 min)

- When a sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound production remain the same. Do you hear echo sound on a hotter day?
- What is reverberation? How can it be reduced?

LESSON PLAN 9 [2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min + 35 min	Dec 2019	Sound	Applications of multiple reflection of sound and concept of SONAR and ultra sounds

Expected Learning Outcome:

Students will be able to

- ⇒ Understand the various applications of multiple reflections of sound.
- ⇒ Define ultrasound and application of ultrasound waves.
- ⇒ Understand and explain the working of sonar.

Expected skill development:

Comprehension, critical thinking, Team work.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

_Discussion of the homework given in previous class (5 min)

Will review the previous knowledge with the following questions: (5min)

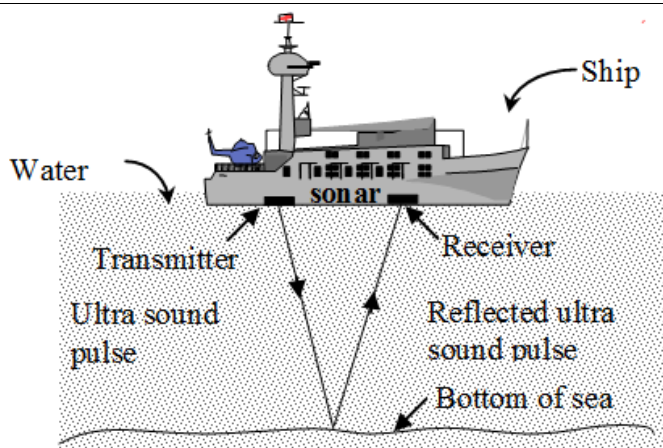
- What do you mean by reflection of a sound wave?
- State the laws of reflection of sound?

CONTENT (Demonstration and discussion of students in groups) (35 min)

Class will be divided into five groups each of five to six students and topics will be allotted to them group wise.

⇒ Application of multiple reflection of waves and ultra sounds:

1. Stethoscope/Mega phone/Hearing aids/Stethoscope/Ear trumpet.
2. Curved ceiling and walls in large halls/Sound boards.
3. SONAR



4. Cleaning instruments and electronic components/ Detecting flaws and cracks in metal blocks.
5. Medical uses of ultrasound (Echocardiography, ultrasonography,)

CLOSURE:

Summarization of the group discussion (10 min)

- Proposed Questions (must include the questions asked in the classroom <u>and</u> the ones given as class-work in the notebook) ➤ What are the two applications of reflection of sound waves? ➤ What is SONAR? ➤ On what principle it is based? ➤ What are sound boards? ➤ Why the ceilings of halls are kept curved?	
- Evaluation/Assessment: Written assignment - What is SONAR? - On what principle it is based? - What are sound boards? - Why the ceilings of halls are kept curved?	(10 min)
DIFFERENTIATED CLASSROOM	

Learners on the way	Advanced Learners
By asking them to explain the working of different applications one by one.	How does the working of a RADAR is related to SONAR?
Materials needed/Resources:	

Chalk, duster, NCERT book.	
Common Misconceptions: Students get confused with the diagrams for every application	Addressing the misconceptions: . By asking them to explain the diagram after drawing them in terms of working of the application.

Home assignments:

(5 min)

1. Explain how bats use ultrasound to catch a prey.
2. How is ultrasound used for cleaning?
3. Explain the working and application of a sonar.
4. Explain how defects in a metal block can be detected using ultrasound.

**LESSON PLAN 10 [2019 - 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Numerical based on SONAR and ultra sound wave.
Expected Learning Outcome: Students will be able to ⇒ Comprehend and solve various numerical related to them.						
Expected skill development: Comprehension, critical thinking, problem solving.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

Will review the previous knowledge with the following questions: (2min)

- What do you mean by reflection of a sound wave?
- State the laws of reflection of sound?

CONTENT (Discussion method) (20 min)

Students will solve the following numerical one by one:

1. A sonar device on a submarine sends out a signal and receives an echo 5s later. Calculate the speed of sound in water if the distance of the object from the submarine is 3625m?
2. An echo returned in 3s. what is the distance of the reflecting surface from the source, given that the speed of sound is 342 m/s?
3. A stone is dropped from the top of the tower 500m high into a pond of water at the base of the tower. When is the splash heard at the top? Given $g = 10\text{m/s}^2$ and speed of sound = 340 m/s.

CLOSURE:

Discussion of the numerical solved by the learners. (5 min)

5. Proposed Questions (must include the questions asked in the classroom and the

ones given as class-work in the notebook) ➤ What are the two applications of reflection of sound waves? ➤ What is SONAR? ➤ On what principle it is based? ➤ What are sound boards? ➤ Why the ceilings of halls are kept curved? ➤ A sound wave travels at a speed of 339m/s. If its wavelength is 1.5cm, what is the frequency of the wave? Will it be audible?
6. Evaluation/Assessment: Numerical solved as class assignment Relation between speed of sound and distance.
DIFFERENTIATED CLASSROOM

Learners on the way	Advanced Learners
Principle behind SONAR.	Working of SONAR in detailed.
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students get confused with the diagrams for every application	Addressing the misconceptions: By asking them to explain the diagram after drawing them in terms of working of the application.

Home assignments:

(3 min)

1. It takes 2.4s to record the echo of sonar. If the speed of sound in water is 1450m/s, find the depth of the ocean floor.
2. A ship which is stationary is at a distance of 2900m from the seabed. The ship send ultrasound signal to the seabed and its echo is heard 4s. Find the speed of sound in water.

**LESSON PLAN 11[2019 -- 2020]**

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Physics	35 min	Dec 2019	Sound	Human ear
Expected Learning Outcome: Students will be able to ⇒ Identify the various components of a human ear. ⇒ State the specific functions of each component of a human ear. ⇒ Explain step wise the working of the human ear.						
Expected skill development: Comprehension, critical thinking.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

WARM UP AND INTRODUCTION

Discussion of home work questions given in the last class (5 min)

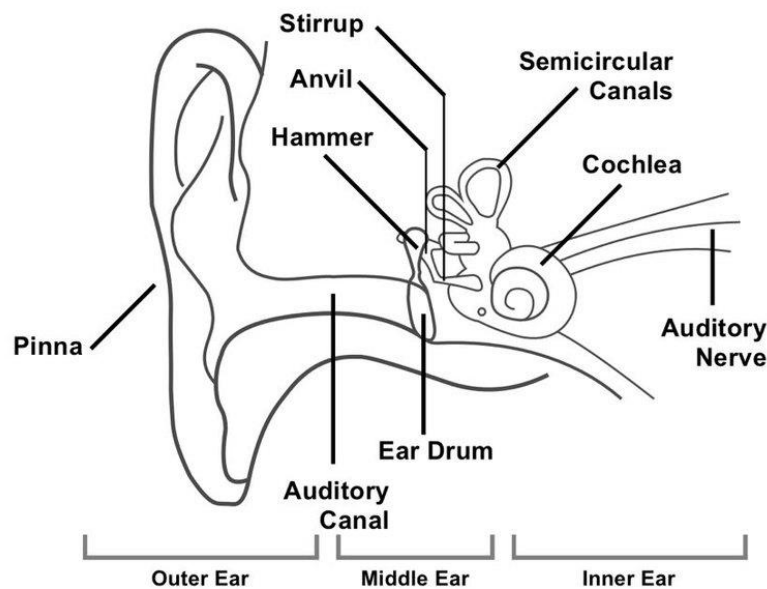
Will review the previous knowledge with the following questions: (2min)

- What is audible range of a human ear?
- What is infrasonic sounds?
- What is ultrasonic sounds?

CONTENT (Discussion and questionnaire method) (20 min)

- ⇒ Draw the well labeled diagram of human ear showing all the parts of the outer, middle and inner human ear.
- ⇒ The specific functions of each component of a human ear:
 - a) Pinna
 - b) Auditory canal
 - c) Ear drum
 - d) Tympanic cavity
 - e) Hammer
 - f) Anvil
 - g) Stirrup
 - h) Cochlea
 - i) Auditory nerves

j) Oval window



⇒ By joining the specific functions of each part, discuss step wise detailed working of the human ear.

THINK-LINE: Why do we hear the sound produced by the humming bees while the sound of vibrations of pendulum is not audible?

CLOSURE:

Recapitulation of the concept by discussion of the following questions (5 min)

- How many parts a human ear consists of?
- What is function of
 - I. Cochlea
 - II. Tympanum
 - III. Tympanic cavity
 - IV. Auditory canal
 - V. Auditory nerves

7. Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook)

- How many parts a human ear consists of?
- What is function of
 - Cochlea
 - Tympanum
 - Tympanic cavity
 - Auditory canal
 - Auditory nerves
 - Pinna
- How we can hear a voice. Explain

8. Evaluation/Assessment: Illustration of the human ear.
DIFFERENTIATED CLASSROOM

Learners on the way ➤ How we are able to hear a voice. Explain	Advanced Learners ⇒ Write difference between auditory nerve and auditory canal? ⇒ What is the significance of tympanic cavity?
Materials needed/Resources: Chalk, duster, NCERT book.	
Common Misconceptions: Students get confused with the working of human ear.	Addressing the misconceptions: By telling them the function of each part separately and then connecting these functions to get the complete working of human ear.

Home assignments:

(3 min)

Home assignments:

- ⇒ Draw a neat labeled diagram of human ear.
- ⇒ Explain how the human ear works