**EMERALD ROYAL INTERNATIONAL SCHOOL, MPAPE ABUJA**

**LESSON PLAN AND NOTE FOR WEEK 3 ENDING FRIDAY: 27th JANUARY, 2023**

**TERM:** 1st

**WEEK:** 3rd

**DATE** : 23th – 27th January 2023

**SUBJECT:** Physics

**CLASS:** SS 2

**TOPIC: Application of Sound Waves**

**SUB - TOPIC:** i. Wind instruments

ii. String instruments

**PERIOD:** 5th

**TIME:** 11:10 - 11:50am

**DURATION:** 40 minutes

**AVERAGE AGE:** 16 years

**NUMBER IN CLASS:** 5

**SEX:** Mixed

**SPECIFIC OBJECTIVES:** By the end of the lesson, students should:

1. Define wind instruments
2. Explain string instruments
3. Define percussion instruments

**RATIONALE:** To enables students understand the concept of forced vibrations

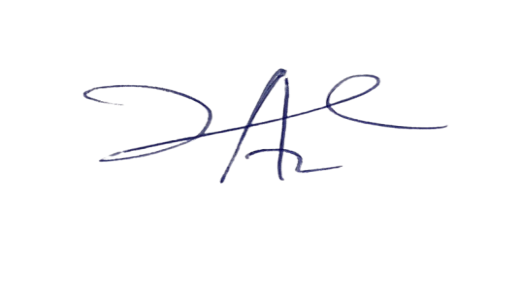
**PREVIOUS KNOWLEDGE:** Students have being taught sound waves

**INSTRUCTIONAL RESOURCES:** Charts showing sources and transmission of sounds

**REFERENCE:** Senior Secondary School Physics by P.N. Okeke et al, New School Physics for Senior Secondary Schools by Anyakoha, M.W, Comprehensive Certificate Physics by Olumuyiwa Awe and Okunola, O.O, Science Teachers Association of Nigeria Physics for Senior Secondary School, Book 1. New Edition and Melrose Physics for Senior Secondary School, Book 1 by Akano, O and Onanuga, O.O.

**LESSON DEVELOPMENT**

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| **STEPS** | **TEACHER’S ACTIVITIES** | **STUDENTS’ACTIVITIES** | **LEARNING POINTS** |
| **INTRODUCTION** | The teacher introduces the lesson by asking the following questions:   1. What are wind instruments? 2. Explain string instruments 3. What are percussion instruments? | The students respond based on their previous knowledge | To arouse the students interest toward the lesion. |
| **STEP 1** | The teacher explains wind instruments with examples | The students pay attention. | To keep them focus. |
| **STEP 2** | The teacher explains string instruments with examples | The students listen carefully | To encourage critical thinking |
| **STEP 3** | The teacher list and explain the characteristics of percussion instruments | The students participate in the class discussion | To encourage students retentiveness |
| **BOARD SUMMARY** | **Sub topic 1: Wind instruments**  Wind instruments are classified as aero phones. They produce sounds when air is blown into them. Sound is produced in these instruments because the air column in them vibrates. Whether the instrument is a closed pipe or an open pipe, the air column determines the quality of the note produced. The frequency ‘f’ of the note depends mainly on the length ‘’ of the vibrating column and it is inversely proportional to it, i.e . a short column of air will produce a high pitch while a long column of air will produce a high pitch. Typical examples of wind instruments are, flutes, clarinets, saxophones, trumpets, mouth organ e.t.c  **Trumpets**  **Saxophone**  **Sub topic 2: String instruments**  String instruments are also called chordophones. They are instruments that use stretched strings or chords and operates based on the equation:  . This means that the frequency is inversely proportional to the length ‘ ‘of the string, directly proportional to the square root of the tension ‘T’ on the string and inversely proportional to the square root of the mass ‘m’ per unit length of the string. For example vibrating length of a thick and loose guitar string will produce a low frequency note. But thin, short and taut strings will produce high frequency notes. These instruments produce sound as a result of the vibrations of the strings in them. The strings of these instruments can vibrate as a whole and also in loops so that both fundamental and various harmonics are produced. The quality of the sound produced is upon the combination of the fundamental harmonic and other harmonics. Typical examples of string instruments are; sonometer, the guitar, the piano, violin, harps.    **Harp, Guitar, Violin**  **Sub topic 3: Percussion instruments**  These are musical instruments that you can hit, strike, or scrape. They produce sound when they vibrate. Instruments under this category include; xylophone, talking drum, tambourine, bell, xylophone, e.t.c    **Talking drum, Steel Drum, Tambourine**  **Bell and Xylophone**  **BEAT**  When two notes of nearly equal frequency are sounded together, the resulting sound is a periodic rise and fall in loudness. These alteration in loudness are known as beats. Beats are due to interference of the wave produced by two notes.  The frequency f of beats is the number of intense sound heard per second.  **Uses of Beats**  1. It is used to determine the frequency of a tuning fork or to measure an unknown frequency.  2. Beats could be used to tune an instrument. E.g, piano.  DOPPLER EFFECT.  When the siren on a moving police car buzzes at the car passes a stationary observer, the sound shifts from a lower pitch roar to a high pitch screen as the car approaches but shift from a high-pitch sound to a lower pitch sound as the car moves away. This characteristic shift in frequency of sound due to relative moving between a sound of a wave and the observer is called DOPPLER EFFECT. This effect was first studied in detailed by an Austrian Physicist and Mathematician Christian Johann Doppler (1803-1853)  **Doppler effect can be define as an alteration in the observed frequency of a sound due to motion of either the source or the observer.**  The doppler effect occurs to only for sound but for any wave when there is relative motion between the observers and the source. There are doppler shifts in the frequency of sound light and water waves. Doppler shift can be used to determine velocity such as when ultrasound is reflected from blood in a medical diagnostic. The recession of galaxies is determined by the shift in the frequencies of light received from them and has implied much about the origins of the universe.  For a stationary observer and a source moving at speed v  fs – frequency of the wave  c - speed of the wave  v – speed of the source  (Note: use minus when the source is moving toward to observer. Use plus when the source is moving away from the observer)  for a stationary source and a moving observer  (note: use minus when the observer is moving away from the source. Use plus when the observer is moving toward the source) | The students copy notes into their exercise book | For future reference. |
| **Evaluation** | The teacher evaluates the students with the following questions:   1. Define wind instruments 2. Explain string instruments 3. Define percussion instruments | The students attempt the questions. | To ascertain their level of understanding. |
| **Conclusion** | The teacher concludes the lesson by making corrections where necessary and go through their notes. | The students copy the note on the board. | For future use. |
| **Assignment** | The teacher evaluates the students as follows:   1. What is the difference between percussion and string instruments? 2. Mention 3 wind instruments 3. Mention 3 string instruments 4. Mention 3 percussion instruments | The students copy assignment solve at home and submit for marking endorsement. | To encourage further studying at home. |



7/3/2023

Principal Head Instructor