Properties of sound waves answer key

3, 4, 5, 6, 7, 8, 9, 10, 11, 12, Higher Education, Adult Education, HomeschoolPage 2 Since sound is a wave, we can associate sound properties with wave properties. The basic characteristics of the sound are: pitch, volume and tone. Figure 10.2: The pitch and volume of the sound. Sound B has a lower pitch (lower frequency) than Sound A and is softer (less amplitude) than Sound C. Pitch The frequency of the sound wave is what your ear understands as height. The higher frequency sound is higher and the lower frequency sound is lower. In Figure 10.2, the sound of A is higher than the sound of B. For example, a bird's chirping would have a high pitch, but the roar of a lion would have a low pitch. The human eye can detect a wide range of frequencies. Frequencies from 20 to 20,000 Hz are audible to the human ear. Any sound with a frequency of less than 20 Hz is known as an infrasound, and any sound with frequencies above \(\text{20,000}\) \(\text{Hz}\) is known as ultrasound. Table 10.2 lists the ranges of some common animals compared to humans. lower frequency (\(\text{Hz}\))upper frequency (\(\text{Hz}\))People\(\text{20}\)\(\text{20,000}\)Dogs\\(\text{50}{20} <0>\)\(\text{45,000}\)Cats\(\text{45}\)\(\text{85,000}\)No \(\text{20}\)\)\(\text{120,000}\)Dolphins\(\text{0.25}\)\(\text{200,000}) \)Elephants\(\text{5}\)\)\)\(\text{10,000}\) Table 10.2: Frequency Range Using the information in Table 10.2, calculate the lower and upper wavelengths that any species can hear. Let's say the airborne sound speed is \(\text{344}\) \(\text{m·s^{-1}}\). The loudness amplitude of a sound wave determines its volume or volume. A higher amplitude means louder sound, and a smaller amplitude means softer sound. In Figure 10.2, the C sound is louder than the B sound. Transmits energy to the medium via vibration. More energetic vibrations correspond to a higher amplitude. The molecules move back and forth more vigorously. The volume of the sound also depends on the sensitivity of the ear. The human eye is more sensitive to certain frequencies than to others. The volume we get depends both on the amplitude of the sound wave and on whether its frequency lies in a region where the body is more or less sensitive. High scores in science are the key to your success and future plans. Check out and learn more at Siyavula Practice.Register and check outJouly 10.1 Study the diagram below representing the note. Rera draw a diagram for a higher pitch note that is louder, and this is a softer solution not yet available The size and shape of the instruments affects the sounds that you are able to produce. Find several instruments that have different physical characteristics and compare their sounds. You can: Option 1: Vuvuzelas: Compare sounds made by blowing by vuvuzelas different You will need to find some different vuvuzelas. Take turns blowing blowing one at a time and record which you think is louder (amplitude), which has a higher jump (frequency). Option 2: Tuning forks: Compare sounds created by touching tuning forks of different sizes. You need to find several different tuning forks. Take turns tapping different, one by one and record which you think is louder (amplitude), which is a higher jump (frequency). Option 3: Signal Generator and Oscilloscope Use the function generator connected to the speaker to produce sounds of different frequencies and amplitudes and use a microphone connected to the oscilloscope to display the characteristics of the different sounds produced. Function Generator allows you to control the volume and frequency of sound produced by the speaker. It will have amplitude and frequency checks. The Microphone Generator oscilloscope can then pick up the sound and turn it into an electrical signal that can be displayed on the oscilloscope. The most common oscilloscope controls are amplitude, frequency, triggering, and channels. When the teacher helps you get the signal using the right channel and triggering you will use amplitude and frequency control to display the characteristics of the sound produced. Adjusting the amplitude of the oscilloscope determines how high the voltage data on the screen will be. The purpose of this adjustment is that you can see a very large or very small signal on the same screen. Oscilloscope Two different oscilloscopes track the frequency (or time) of adjusting the oscilloscope is how much time a certain distance on the screen will represent. The purpose of this adjustment is to be able to see a very fast changing or slowly changing signal on the same screen. Note: A transverse wave pattern appears on the oscilloscope display. This does not mean that sound waves are transverse waves, but only shows that the measured pressure fluctuates due to the pressure wave. You will be able to experiment with different amplitudes and frequencies using the function generator and see how the changes affect the course raised by the microphone. The feeling felt by our ears is called sound. It is a form of energy that makes us hear. We hear a few sounds around us in our daily lives. We know that sound moves in the form of a wave. A wave is a vibrating disorder in an environment that transfers energy from one point to another without direct contact between the two points. It can be said that the wave is produced by the vibrations of the particles of the medium through which it passes. There are two types of waves: longitudinal waves and transverse waves. Longitudinal waves: A wave in which particles of the medium vibrate back and forth in the same direction in which the wave moves. The medium can be solid, liquid or gauze. Therefore, sound waves are longitudinal waves. Transverse waves: Wave which the particles of the medium vibrate up and down at right angles to the direction in which the wave moves. These waves are produced only in the form of solids and liquids, but not in gases. Sound is a longitudinal wave that consists of compressions and thins moving through the medium. The sound wave can be described by five characteristics: wavelength, amplitude, time period, frequency and speed or speed. 1. Wavelength Source: www.sites.google.com Minimum distance at which the sound wave is repeated shall be called its wavelength. This is the length of one full wave. It is marked with the Greek letter λ (lambda). We know that in a sound wavelength, the total length of compression and the adjacent rarefaction is called its wavelength. In addition, the distance between the center of two consecutive compressions or two consecutive rarefactions is equal to its wavelength. Note: The distance between the means of compression and the adjacent deformation is equal to half the wavelength, i.e. the S.I. unit for measuring the wavelength is one meter (m). 2. Amplitude When a wave passes through the medium, the particles of the medium are temporarily ejected from their original undisturbed positions. The maximum displacement of medium particles from their original undisturbed positions when a wave passes through the medium is called wave amplitude. In fact, amplitude is used to describe the size of the wave. The unit of measurement of S.I. amplitude is a meter (m), although it is sometimes also measured in centimeters. Did you know that the amplitude of the wave is the same as the amplitude of the vibrating body producing the wave? 3. Time period The time required to produce one full wave or cycle or cycle is called the wave time period. Now one complete wave is produced by one complete vibration of the vibrating body. So we can say that the time that had to be completed is known as the period of time. It is marked with the letter T. Period unit of measure is the second (s). Why aren't speed and speed always equal in size? 4. Frequency source: www.media.openschool.com number of full waves or cycles produced in one second is called the wave frequency. Because one complete wave is produced by one full vibration of the vibrating body, we can say that the number of vibrations per second is called frequency. For example, if 10 complete waves or vibrations are produced in one second, the frequency of the waves will be 10 hertz or 10 cycles per second. Did you know that the frequency of the wave is constant and does not change even when it passes through various substances? The S.I frequency unit is hertz or Hz. Vibrating body emitting 1 wave per second is said to have a frequency of 1 hertz. This 1 Hz is equal to 1 vibration per second. Sometimes a larger frequency unit is known as kilohertz (kHz), which is 1 kHz = 1000 Hz. The frequency of the wave is frequency of the vibrating body that produces the wave. What is the relationship between the period and frequency of the wave? The time it takes to produce one full wave is called the wave time period. Suppose the wave time period is T seconds. In T seconds the number of waves produced = 1So, in 1 second, the number of waves produced will be = 1/TBut the number of waves produced in 1 second is called its frequency. Therefore, F = 1/Time-periodf = 1/Twhere f = waveT frequency = wave time period