LISTEN, PLAY, CREATE - II

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The activities with listening/videos, the Internet resources and the digital activities in this book can be found at the blog: http://listenplaycreate.blogspot.com.es/, classified by lessons.

Lesson 1.- The sound

1.- The sound

Every sound is a vibration. This vibration propagates as a wave through a solid, liquid or gas.

The speed of sound depends on the medium the waves pass through. The speed of sound through the air is approximately 340 m/s, it's faster through the water (around 1500 m/s) and the fastest through the solids (around 5900 m/s in steel).

The sound can't travel through a vacuum because the waves don't have a medium to pass through.

A sound and a noise are physically the same. A noise is a sound that we don't like or that bothers us. It depends on our opinion.

Activity 1.- In your opinion, which of these are sounds and which ones noises?

the rain, a baby crying, somebody shouting, a dog barking,
the waves at the beach, someone laughing, the traffic, a whistle

Sounds	Noises

Activity 2.- Do you think electronic music is made of sounds or noises? Do you think that everybody agrees with you?

Activity 3.- Where are there more noises, in the city or in the country?

Activity 4.- Are these statements true or false?

- ✓ A sound is a vibration that travels as a wave through a solid, liquid or gas.
- ✓ The sound speed through the water is 340 m/s.
- ✓ A noise is a sound that we like.
- ✓ There are sounds everywhere in the universe.

2.- THE FOUR PROPERTIES OF THE SOUND

A sound can be: high or low (pitch), long or short (duration), loud or soft (intensity) and different depending on the object that produces the sound (timbre).

2.1.- THE PITCH: HIGH OR LOW

The **pitch** depends on the frequency (the number of vibrations in a second). Its unit is the hertz (*Hz*).

The higher the frequency is the higher the sound is.

High sound

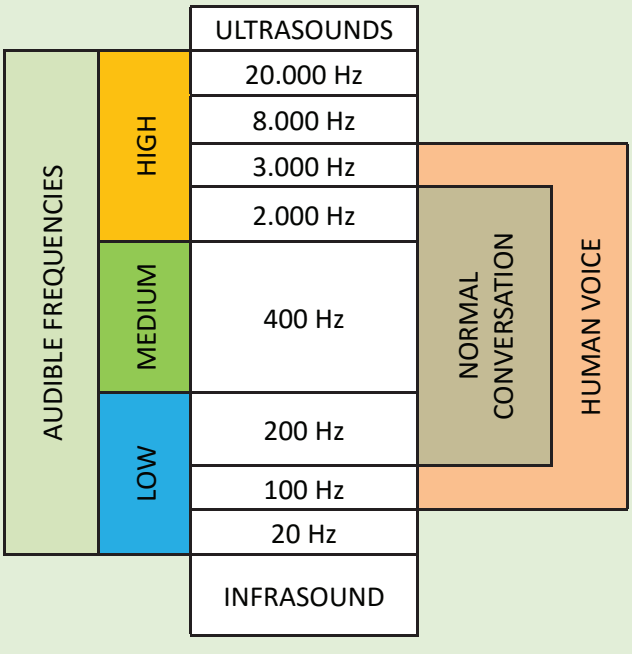
The lower the frequency is the lower the sound is.

Low sound

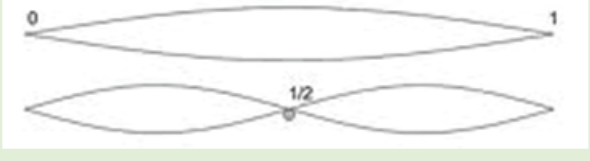
In general, large objects or instruments produce low frequencies (few vibrations per second) so their sounds are low, for example a bass. Small objects or instruments produce high frequencies (a lot of vibrations per second) so their sounds are high, for example a violin.

Not all sounds are audible for humans. We can hear between 20 Hertz and 20.000 Hz. We can't hear sounds lower than 20 Hz. They are called infrasound and some animals like dolphins and whales can hear them. We can't hear sounds higher than 20.000 Hz. They are called ultrasounds and dogs and bats can hear them).

The **tuning fork** is always 440HZ. That's what we call La .



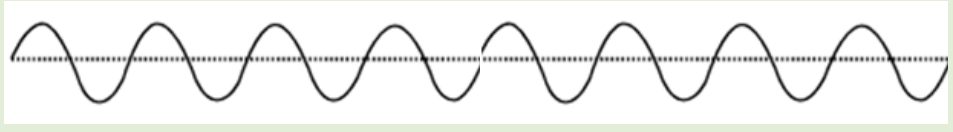
We don't name the different sounds by their Hertz but with letters or syllables (do re mi...ABC...). We just use 7 names. What a note has in common with a note with the same name but an octave higher or lower is that their Hertz are twice or half. We hear that as the same sound, although in a higher or lower pitch.



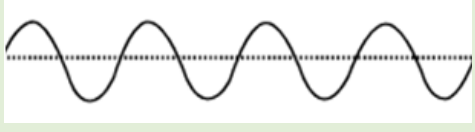
do and do'

2.2.- THE DURATION: LONG OR SHORT SOUNDS

It is the time that we are listening to a sound from the beginning to the end of it. We measure the time in seconds, minutes, hours, but music has its own system to express the durations. The elements in this system are relative and dependent.



Long sound

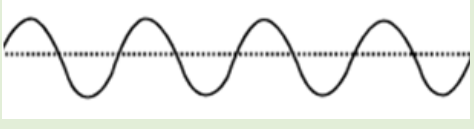


Short sound

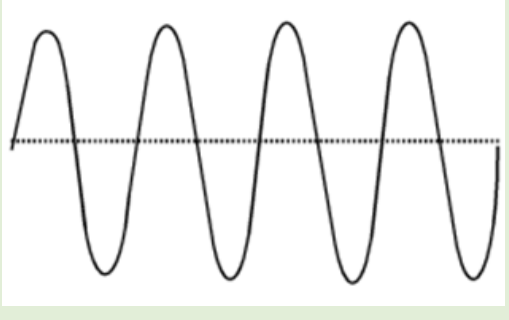
2.3.- THE INTENSITY: LOUD OR SOFT SOUNDS

Its unit is the decibel. (dB) It depends on the amplitude of the wave.

Soft sound

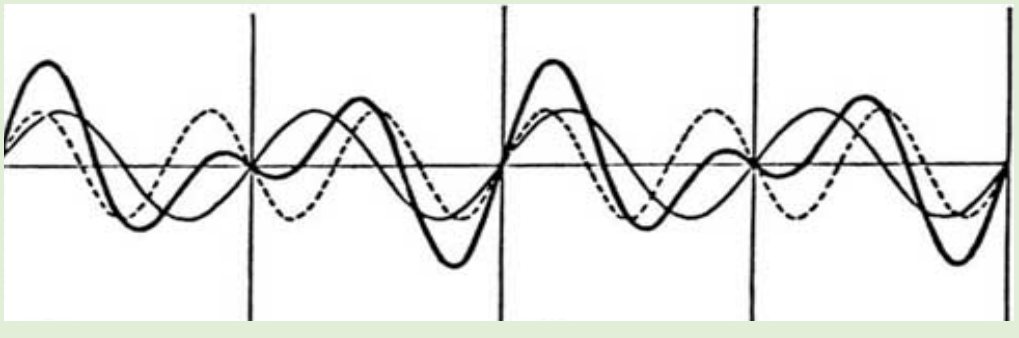


Loud sound



2.4.- TIMBRE

Every sound is different. We know what produces a sound thanks to the **timbre**. It depends on the different components of the wave.



Activity 5.- Are human beings able to hear all the sounds? Compare with other animals.

Activity 6.- What do two notes with the same name but different octaves have in common?

Activity 7.- Why a violin is higher than a bass?

Activity 8.-Fill in the blanks:

Timbre	***Pitch***	***Duration***	***Intensity***
Cymbals	High	Long	Loud
Bass	Low	Short	Soft
Bell			
Snapping of fingers			
Knocking on the door			
Piano sound 1			
Piano sound 2			

Activity 9.- Fill in the blanks:

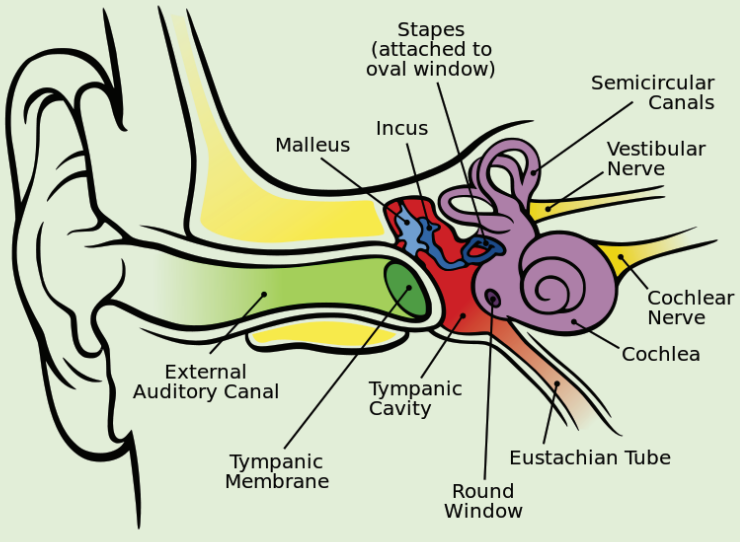
Properties of the sound	***The sound can be***	

3.- THE AUDITORY SYSTEM

Vibrations are received by the outer ear and arrive at the tympanic membrane. The vibration of the eardrum travels through the middle ear and is transformed into nerve impulses in the inner ear.
These nerve impulses are perceived by the brain.

So this is the way the sound follows:

Auditory canal-tympanic membrane-bony labyrinth-semicircular canals-cochlea-cochlear nerve-brain.



DAME EVELYN ELIZABETH ANN GLENNIE: A PROFOUNDLY DEAF PERCUSSIONIST

Dame Evelyn Elizabeth Ann Glennie, (born 19 July 1965) is a Scottish virtuoso percussionist. She was the first full-time solo percussionist in 20th-century western society.

Glennie has been profoundly deaf since age 11. This doesn't prevent her from performing at the international level. She played drums during the opening ceremony at the 2012 London Olympic Games. She regularly plays barefoot to "feel" the music better.

Glennie says that deafness is misunderstood by the public. She has learned to hear with parts of her body other than her ears. She published "Hearing essay" in which she talks about her condition.

Here you are some paragraphs:

1. Deafness is poorly understood in general. For instance, there is a common misconception that deaf people live in a world of silence. To understand the nature of deafness, first one has to understand the nature of hearing.

Hearing is basically a specialized form of touch. Sound is simply vibrating air which the ear picks up and converts to electrical signals, which are then interpreted by the brain. The sense of hearing is not the only sense that can do this, touch can do this too. If you are standing by the road and a large truck goes by, do you hear or feel the vibration? The answer is both. For some reason we tend to make a distinction between hearing a sound and feeling a vibration, in reality they are the same thing. It is interesting to note that in the Italian language this distinction does not exist. The verb 'sentire' means to hear and the same verb 'sentirsi' means to feel. Deafness does not mean that you can't hear, only that there is something wrong with the ears. Even someone who is totally deaf can still hear/feel sounds.

2. If we can all feel low frequency vibrations why can't we feel higher vibrations? It is my belief that we can. I spent a lot of time in my youth (with the help of my school Percussion teacher Ron Forbes) refining my ability to detect vibrations. I would stand with my hands against the classroom wall while Ron played notes on the timpani (timpani produce a lot of vibrations). Eventually I managed to distinguish the pitch of notes by associating where on my body I felt the sound. The low sounds I feel mainly in my legs and feet and high sounds might be particular places on my face, neck and chest.

3. It is worth pointing out at this stage that I am not totally deaf, I am profoundly deaf. Profound deafness means that the quality of the sound is not sufficient to be able to understand the spoken word from sound alone. For instance when a phone rings I hear a kind of crackle.

4. So far we have the hearing of sounds and the feeling of vibrations. There is one other element to the equation: sight. We can also see things vibrate. If I see a drum head or cymbal vibrate or even see the leaves of a tree moving in the wind then subconsciously my brain creates a corresponding sound.

5. To summarize, my hearing is something that bothers other people far more than it bothers me. There are a couple of inconveniences but in general it doesn't affect my life much. For me, my deafness is not more important than the fact I am female with brown eyes. Sure, I sometimes have to find solutions to problems related to my hearing and music but so do all musicians.

Activity 10.- Answer about every paragraph:

Paragraph 1

- ✓ *Does deafness mean to live in silence?*
- ✓ *Which other sense can hear too?*
- ✓ *Hearing a sound and feeling a vibration is the same. Is that true or false?*
- ✓ *In what language hearing and feeling is the same verb?*

Paragraph 2

- ✓ *Where does Evelyn feel the low frequencies/ low sounds?*
- ✓ *Where does she feel the high frequencies/high sounds?*

Paragraph 3

- ✓ *What does profoundly deaf mean?*
- ✓ *She can hear some sounds but with a different ....pitch/timbre?*

Paragraph 4

- ✓ *Which other sense helps Evelyn to hear? Give an example.*

Paragraph 5

- ✓ *Is the fact of being profoundly deaf very important in the life and work of Evelyn?*

Activity 11.- Complete the summary:

- Every **sound** is a _____. This vibration propagates as a _____ through a solid, liquid or ____.

wave	*gas*	*vibration*

The _____ of sound depends on the _____ the waves pass _____. The speed of sound through the _____ is approximately _____ m/s, it's faster through the _____ and the _____ through the solids.

through	*medium*	*speed*	*fastest*	*air*	*water*	*340*

Sound can't travel through a _____.

A sound and a noise are physically the _____. A noise is a sound that we don't like or that _____ us. It depends on our _____.

same	*bothers*	*opinion*	*vacuum*

- **<u>The properties of the sound.</u>** A sound can be:

A. High or _____. This is the _____. Its unit is the _____ (Hz). It depends on the _____ (the number of vibrations in a second).
The higher the frequency is the higher the sound is and the lower the frequency is the lower the sound is.
Not all sounds are _____ for humans. We can hear between ___ Hertz and 20.000 Hz.
The tuning fork is always _____ Hz. That's what we call *La*.

hertz	*low*	*440*	*audible*	*pitch*	*frequency*	*20*

B. _____ or short. This is the _____. It's the time that we are listening to a sound from the beginning to the _____ of it.
C. _____ or soft. This is the **intensity**. Its unit is the _____ (dB) It depends on the _____ of the wave.
D. Every sound is _____. We know what produces a sound thanks to the _____. It depends on the different _____ of the wave.

timbre	*amplitude*	*end*	*duration*	*loud*	*long*
	different	*components*	*decibel*		

- **<u>The auditory system</u>**

The vibrations are received by the _____ ____ and arrive at the tympanic membrane. The vibration of the eardrum travels through the _____ ____ and is transformed into _____ _____ in the inner ear. These nerve impulses are perceived by the _____.

nerve impulses	*outer ear*	*middle ear*	*brain*

Activity 12.- Join the three related words:

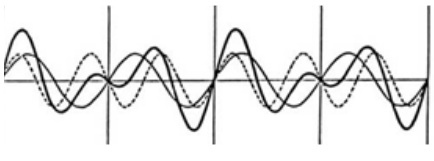
Hear	*Hertz*	*Intensity*
Frequency	*Middle ear*	*Pitch*
Amplitude	*Different sound*	*Auditory system*
Timbre	*Decibel*	*Timbre*
Outer ear	*Wave*	*Noise and sound*
Vibration	*Listen*	*Inner ear*

Activity 13.- Join the opposites:

Vacuum	*Short*
High	*Medium*
Loud	*Low*
Long	*Soft*

Activity 14.- Join the sound waves with their properties:

A:



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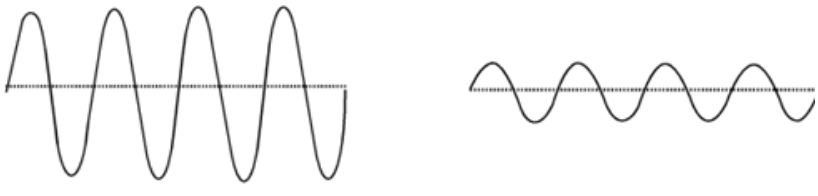

C:

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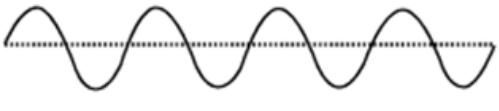

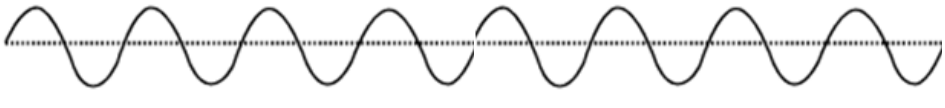

KEY VOCABULARY

Sound
Vibration
Wave
Solid
Liquid
Gas
Speed
Medium-vacuum
Fast-faster-the fastest
Noise-sound
Bother
Pitch: High-low
Frequency-Hertz-Hz
Duration: Long-short
Intensity: Loud-soft
Amplitude-Decibel-dB
Infrasound-ultrasounds
Tuning fork
Auditory system
Outer ear-middle ear-inner ear
Tympanic membrane
Nerve impulses

PRACTISE THE PROPERTIES OF THE SOUND

Work in pairs

After you have learned how to play this popular rhythm below you are going to play it with...

- ✓ Different pitches: high and low pitches. The high ones are written on the line and the low ones are written under the line). You can play the pitches that you prefer respecting that.

- ✓ Different durations: there are long sounds (crotchets) and short sounds (quavers) but you are going to play them as long or short as you decide.

- ✓ Different intensities: choose the intensity that you want.

- ✓ Different timbres: choose any instrument from the class.

Every couple is going to play his own version of the rhythm. We are going to record them with Audacity. Then we are going to vote for the best version.

Then every couple is going to make experiments with their recording using **Audacity**, changing the pitch, the duration, the intensities...As a result, the timbre changes.

Save your experiments and compare with the original recording, explaining the changes that you have made.