

UNIT 1: Sound: qualities of sound

CONSOLIDATION ACTIVITIES-PAGE 8

1. Observe the information in the table:

Speed of propagation of sound		
Physical medium	Speed (m/s)	Speed (km/h)
Air	340	
Water	1,450	
Wood	3,900	
Iron	5,190	

a) Copy and complete the right column of the table in your notebook. Calculate the speed of sound expressed in kilometers per hour.

Speed of propagation of sound		
Physical medium	Speed (m/s)	Speed (km/h)
Air	340	1,224
Water	1,450	5,220
Wood	3,900	14,040
Iron	5,190	18,684

b) If you put your ear to the table and hit the Wood gently with your fingers, you'll notice how well sounds propagate through solid objects. Try to make it louder and softer putting your ear away from the table. Write your conclusions in your notebook.

Students make a small research work analyzing the steps followed in the procedure and writing down their conclusions. This experience can also motivate reflection on other experiences that they have been able to observe in other situations. It would be interesting to have the collaboration of the Department of Natural Sciences that, without a doubt, can support the experience with other proposals.

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2. Reflect on the sounds and noises of your environment and draw a table in your notebook.

All kinds of examples may appear. The music they listen to will possibly appear in the sound column, while traffic, shouts and other noises will appear on the right column (noises).

3. Do you think music can be made using noises? Find information and give examples.

Avant-garde music of the 20th century employs noises within the musical compositions themselves, such as the compositions for '*intonarumori*' by Luigi Russolo. Other modern percussion ensembles such as Mayumaná or Stomp include sounds of balls, casseroles, drums, etc... in their works.

LISTENING ACTIVITIES-PAGE. 10

J. S. Bach. *Tocatta and fugue in D minor*

4. Listen to the beginning of the piece following the score:

- Which instrument performs it?
- Find the rests on the score.
- This fragment consists of several short musical phrases, can you recognize them? Point them out on the score.
- Complete with information of the composer:



Name: _____
 Born: _____ Died: _____
 Nationality: _____
 Era or musical style: _____
 Important works: _____

- It is performed by the organ
- A thirty-second rest, a sixteenth rest and an eighth rest appear in the first three measures. In the fourth measure there is a quarter rest and in the fifth measure there is a quarter rest, an eighth rest and a sixteenth rest.
- It is a piece of improvised character with virtuous and fast passages, which precedes the fugue and is based on the systematic imitation of a subject. This subject would be a single phrase that is repeated in different pitches and with slight variations.
- Name: Johann Sebastian Bach.
 Born: 1685. Died: 1750.
 Nationality: German.
 Era or musical style: Baroque.
 Important works: *The Well-Tempered Clavier, Goldberg Variations, Cello Suites...*

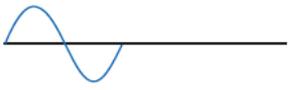
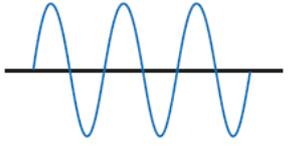
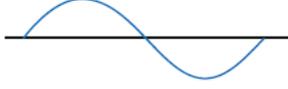
CONSOLIDATION ACTIVITIES-PAGE 11

5. In pairs, choose four sounds and describe them according to the qualities of sound.

Students are placed in pairs and choose four sounds. Sounds can be of their environment, musical instruments, animals, etc. They must indicate pitch, intensity, duration and timbre for each sound.

CONSOLIDATION ACTIVITIES-PAGE 12

6. Copy on your notebook and match the waves with their corresponding sounds:

1.		a) Short
2.		b) High
3.		c) Long
4.		d) Low
5.		e) Loud
6.		f) Soft

1-a; 2-f; 3-b; 4-e; 5-d; 6-c.

7. Look at the pictures and identify the four qualities of sound:

	Pitch	Duration	Intensity	Timbre
				
				
				

	Pitch	Duration	Intensity	Timbre
	High	Short	Soft	Bird

	High	Long	Soft	Violin
	High	Long	Loud	Siren

CREATION ACTIVITIES-PAGE 14

8 Write your own musical composition using alternative graphic notation:

- First, think about the environment you want to represent. You can compose a soundtrack that reflects, for example, the sounds of the city, the country, the sea, an action scene, etc.**
- Choose the timbre with which you are going to represent all the elements of your soundtrack. You can choose among the instruments of your class, voice or instruments you can make with various objects. Create a symbol for each instrument which identifies it clearly.**
- Draw two axes (vertical and horizontal) in order to write your score. On the vertical line you will indicate the intervention of the different instruments or voices. On the horizontal line you will indicate the durations on a scale expressed in seconds.**
- Ask your classmates for help to be able to perform your score and dare to conduct your composition.**

This exercise is about observing and appreciating not just the students' creative abilities, but also their autonomy regarding the creation of codes and symbols that can reflect musical ideas. It is also about checking their understanding of the basic concepts of the qualities of sound. It is as well a first and encouraging approach to the experience of sound, to some voice techniques, and to the different instruments and objects around the class that will, without a doubt, pave the way for future activities. We will value creativity, the use of all possible resources (high sounds, low sounds, long sounds, short sounds, loud sounds, soft sounds, and the variety of sources of sound), the connection between graphic notation symbols and sound, planning and teamwork. We suggest that you record the different compositions of the class in order to make the students perform with care, and to be able to analyze the piece afterwards.

PERFORMANCE-PAGE 15

1. Pay attention to the instructions of the chart below and perform this piece with the whole class.

The freedom that the alternative graphic notation symbols offer, will favor the creative ability of the students regarding the group performance. We will emphasize the two main reading axes: the vertical axis for an approximated representation of the pitch of sound; and the horizontal axis for the duration (in seconds).

We will individually analyze each instrument with its symbols, and separately rehearse the possible performances of each voice.

We will evenly distribute the different voices among all the students of the group. The vocal part will need a greater number of performers so that they can back each other up in a continuous emission and reach the strong dynamics that are indicated.

After the group performance, we will ask the students to give the composition a name that expresses the atmosphere that it suggested. The idea of the piece and, therefore, the hidden title, is *Storm in the sea*.

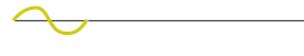
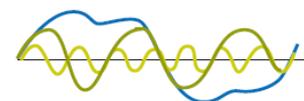
SELF-ASSESSMENT-PAGE 18

1. WORD SEARCH. Find (vertically and horizontally) all the concepts we have seen regarding the qualities of sound.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	K	S	O	F	T	H	A	R	M	O	N	I	C	S
B	A	P	L	O	W	L	O	V	O	I	C	E	B	P
C	M	R	O	D	U	R	A	T	I	O	N	A	F	G
D	P	I	N	S	T	R	U	M	E	N	T	K	M	J
E	L	N	G	O	U	Q	M	W	P	I	T	C	H	G
F	I	S	R	P	E	R	S	I	S	T	E	N	C	E
G	T	H	J	Q	I	N	T	E	N	S	I	T	Y	T
H	U	O	L	T	I	M	B	R	E	E	L	O	U	D
I	D	R	W	F	R	E	Q	U	E	N	C	Y	T	N
J	E	T	U	C	R	R	H	I	G	H	Z	D	K	C

Amplitude, short, long, soft, harmonics, low, voice, duration, instrument, pitch, persistence, intensity, timbre, loud, frequency, high.

2. FILL IN THE TABLE. Complete using the terms of the word search.

Qualities	Distinction	Produced by
Pitch	low	 wave frequency (Hz)
	high	
Duration	long	 wave persistence
	short	
Intensity	loud	 wave amplitude (dB)
	soft	
Timbre	voices	 harmonic sounds
	intruments	

Students should create a complete table similar to the one on page 11 of the book, indicating the name of each of the qualities of sound, the opposing concepts that define them and the physical phenomenon responsible for each of them.

SELF-ASSESSMENT-PAGE 19

3. SPOT THE MISTAKES. Find out the mistakes of the following statements and write them correctly in your notebook. Then, swap your exercise with your partner to correct it.

- a) The qualities of sound are: pitch, duration, intensity and time.
- b) Sound propagates through air at 340 kilometers per minute.
- c) The pitch of sound depends on the wave persistence.
- d) The duration allows us to distinguish between low and short sounds.
- e) Conventional music notation intends to represent the size of sound.
- f) The intensity of sound allows us to distinguish between loud and high sounds.
- g) The timbre allows us to distinguish between loud and soft sounds.
- h) The human ear perceives frequencies between 20 Hz (infrasound limit) and 20,000 Hz (ultrasound limit).
- i) Sound and noise are differentiated by wave frequency.
- j) 120 Hz is the maximum intensity that the human ear can resist. That limit is called hearing threshold.

- a) The qualities of sound are: pitch, duration, intensity and timbre.
- b) Sound propagates through air at 340 meters per second.
- c) The pitch of sound depends on the wave frequency.
- d) The duration allows us to distinguish between long and short sounds.
- e) Conventional music notation intends to represent the pitch, duration, intensity and timbre of sound.
- f) The intensity of sound allows us to distinguish between loud and soft sounds.
- g) The timbre allows us to distinguish between voice and instruments.
- h) The human ear perceives frequencies between 20 Hz (infrasound limit) and 20,000 Hz (ultrasound limit).
- i) Sound and noise are differentiated by the periodicity of the wave.
- j) 120 dB is the maximum intensity that the human ear can resist. That limit is called pain threshold.

4. FIND THE ODD ONE. Identify the terms that do not belong to the series and explain why.

Purple series: the odd one is the word *high*, as the series is referred to intensity.

Yellow series: the odd one is the word *persistence*, as the series is referred to timbre.

Green series: the odd one is the word *noise*, as the series is referred to hearing limits.

Blue series: the odd one is the word *soft*, as the series is referred to pitch.

Orange series: the odd one is the word *harmonics*, as the series is referred to duration.

PERFORMANCE-PAGE 20

Sound cards

1 A low sound	2 A high sound	3 A long sound
4 A short sound	5 A loud sound	6 A soft sound
7 A low and long sound	8 A high and short sound	9 A loud and long sound
10 A high and soft sound	11 A long and soft sound	12 A short and loud sound
13 A low and soft sound	14 A short and soft sound	15 A low and loud sound
16 A short and low sound	17 A high, long and loud sound	18 A low, short and soft sound
19 Several short and soft sounds	20 Several short and loud sounds	21 Several short sounds from soft to loud
22 Several short sounds from loud to soft	23 Several short sounds from high to low	24 Several short sounds from low to high

- Your teacher will individually and secretly give you one of these cards to perform it.
- In order, one at a time, using your voice or an instrument of the class, you will perform the sound or the group of sounds your card indicates. Think twice if you decide to use an instrument, not all instruments have the same acoustic possibilities. You have to choose the best one.
- Your classmates will write it down to try to guess the card you perform.

This activity serves the purpose of consolidating the main concepts of the unit as well as several other goals: the comprehension and connection of different concepts with sound, the exploration of the different expressive possibilities of instruments and voice and listening discernment. The teacher will individually and secretly give each student the number of the card that he or she has to perform; or he/she could also give individual cards and point out other sound possibilities or groups of sounds.

The individual assignment of different instructions and their different levels of complexity will make it easier to manage many students. We can use this activity to further develop the expressive possibilities of the voice and the different sonorities of the instruments in the class. The students will have to think about (or check) the sound possibilities of the chosen instrument to carry out the performance.

LISTENING-PAGE 21

- Listen to these four musical pieces we present you:
- Holst. *The Planets. Jupiter.*

3: Brahms. *Symphony No. 3. Poco Allegretto.*

4: Beethoven. *Symphony No.7. Allegretto.*

5: Richard Strauss. *Thus spoke Zarathustra.*

We will use this exercise to briefly present the main information about each composer and their styles.

2. Match each track with its most highlighted quality:

• Pitch

• Duration

• Intensity

• Timbre

2: Timbre. 3: Pitch. 4: Duration. 5: Intensity.

3. Which of the following pictures would you choose to represent each track?

a)



c)



b)



d)



a) The representation of the *crescendo*: R. Strauss.

b) The representation of the rhythmic model quarter note–two eighth notes–quarter note– quarter note: Beethoven.

c) The representation of the melodic design: Brahms.

d) The representation of the blend of colors-timbres: Holst.

We can use the diversity of examples that we heard in order to work on the different emotional responses that the music provokes. We can expand the possibilities by using Annex 1, in page 184.

4. Complete using information of the composers.



Name: _____
Born: _____ Died: _____
Nationality: _____
Era or musical style: _____
Important works: _____



Name: _____
Born: _____ Died: _____
Nationality: _____
Era or musical style: _____
Important works: _____



Name: _____
Born: _____ Died: _____
Nationality: _____
Era or musical style: _____
Important works: _____



Name: _____
Born: _____ Died: _____
Nationality: _____
Era or musical style: _____
Important works: _____

The following data should appear on the table they will copy in their notebooks:

1. Name: Gustav Holst.

Born: 1874. Died: 1934.

Nationality: English.
Era or musical style: Postromanticism.
Important works: *The Planets*.

2. Name: Johannes Brahms.
Born: 1833. Died: 1897.
Nationality: German.
Era or musical style: Romanticism.
Important works: *Hungarian Dances*.

3. Name: Ludwig van Beethoven.
Born: 1770. Died: 1827.
Nationality: German.
Era or musical style: from Classicism until the beginning of Romanticism.
Important works: *Symphony No. 5*, *Symphony No. 9*.

4. Name: Richard Strauss.
Born: 1864. Died: 1949.
Nationality: German.
Era or musical style: Postromanticism, with classical influences.
Important works: *Thus spoke Zarathustra*, *Salome*, *Electra*.