A WORLD OF SOUNDS A

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TABARCA
ECIR
MARFIL

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UNIT 1. SOUND

A world full of sounds

BLOCK 1 MUSICAL AND CULTURAL CONTEXTS. LISTENING

1.1. SOUND

In your daily life you are surrounded by sound, wherever you go. You hear some of these sounds all the time – at home, in class, in the street. Others are closer to you, like your breathing or your heartbeat. Whatever it is, the world of sound accompanies you every day.

Sound is a sensation in our brains produced through the ears which pick up vibrations of sound-producing bodies. Whenever there is a sound, there is an object that vibrates in some way.

Projection 1

Therefore, sound is a physical phenomenon consisting of a sound wave transmitted through the air, water or other bodies.

Sound travels at approximately **343 metres per second** through **air** (1,235 kph)

Sound travels at approximately **1,500 m/s** second through **water** (5,400 kph)

Sound travels at approximately **5,100 m/s** second through **steel** (18,360 kph)

The speed of sound depends on the medium through which the sound waves travel. The higher the density of the medium, the greater the speed of the sound waves.

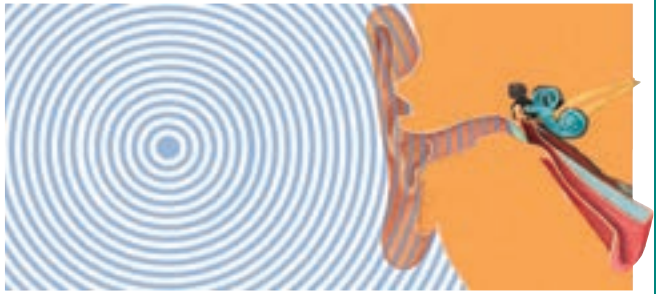
Research into all phenomena related to sound is part of the science of **acoustics** (from the Greek, «akouo», meaning «to hear») and one important part of this is the audio and the noise control industries: in cinemas, discotheques, auditoriums, using soundproofing materials in construction.

Projection 2

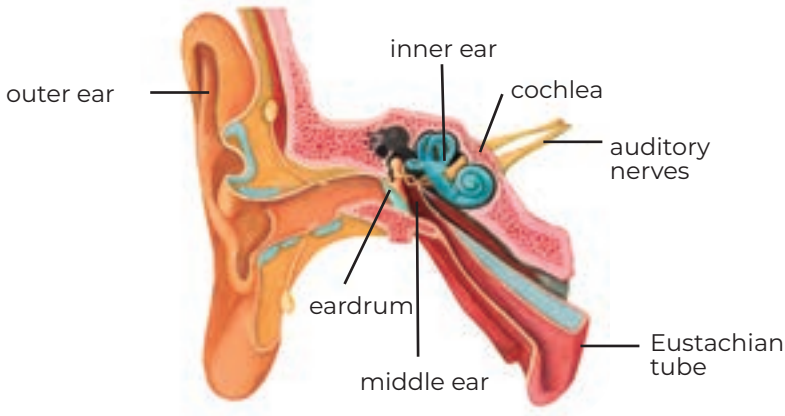
Do the exercises given in your WORKBOOK
page. 6 ✓✓

1.2. THE AUDITORY SYSTEM

Sound waves are perceived through the ears, which are the organs that receive and transform sound waves into nervous impulses sent to the brain.



To get a detailed view of the auditory system, look at the following drawing



From the moment a body vibrates until you become conscious of the sound, a complex process is initiated, as described below.

1. The outer ear receives the sound and channels it to the eardrum, or tympanic membrane.
2. The eardrum is set into vibration, and these vibrations are picked up by the ossicles, the smallest bones in the body (hammer, anvil and stirrup), which transmit them to cochlea in the inner ear, containing fluid.
3. These vibrations stimulate cells that transform them into electrical impulses or signals that are conveyed to the brain.

Projection 3

The brain stores all this information, so when you receive the same stimuli again, you can recognise it. You relate an auditory stimulus to another one that you have heard before thanks to what is called our **auditory memory**. Thus, you can recognise the voice of a friend, the sound of an instrument, or the flow of water in a stream, etc. without having to see it.

Do the exercises given in your WORKBOOK
page. 7-8 ✓✓

1.3. THE AUDITORY FUNCTION IN A FEW ANIMALS

- ✓ **Bats**: Bats have very sensitive hearing. They are capable of flying in the dark thanks to their high-pitched sounds that are inaudible to humans, which can reach 500,000 waves per second. These sounds are sent out at short intervals and bounce back from objects, and the echoes provide the bat with information on their surroundings, including the flying insects they want to catch!
- ✓ **Cockroaches**: Cockroaches capture sound through the hairs on their bodies. These hairs are sensitive enough to detect the slightest air movement in their immediate surroundings.
- ✓ **Worms**: Worms do not have ears as such, but they detect vibrations in the soil and can react in consequence.
- ✓ **Grasshoppers**: Grasshoppers have tympanic membranes, their «ears», in the central section of their bodies.
- ✓ **Dinosaurs**: The general theory is that dinosaurs were probably similar to certain large land mammals today, like the elephant, but with hearing abilities much poorer in relation to the higher frequencies. Generally, animals hear in the range in which they produce sounds. Dinosaurs could probably hear the footsteps of other dinosaurs quite well and so recognise friend or foe. It is said that elephants are capable of hearing very low frequency sounds over long distances – the kind produced by the footsteps of other elephants.

Larger animals usually hear lower frequencies better (***infrasound***), whereas smaller animals hear better in the higher ranges (***ultrasound***).

Projection 4

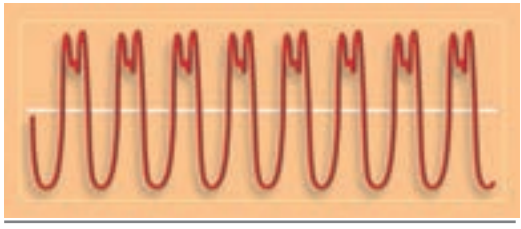
Do the exercises given in your WORKBOOK **page. 8** ✓✓

1.4. THE USE OF SOUND IN MUSICAL COMPOSITION

Sound is the «material» from which music is made. It is produced by a series of actions on instruments: striking, bowing, plucking, blowing, or simply by means of the voice in singing.

All these actions produce regular vibratory waves, with a regular frequency that can be numbered in waves per second. These wave types make up **musical sound**, which is ***sound of a definite pitch represented by musical notes.***

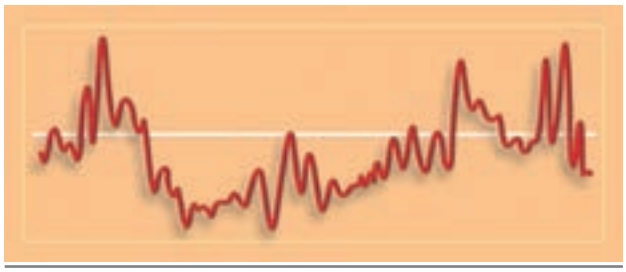
In the following projection you will learn about some important aspects of sound.



Graphic representation of musical sound

Projection 5

But when certain actions produce vibratory waves with irregular frequencies, we call it **noise**, which is ***sound without a definite pitch and which cannot therefore be represented on a musical score in a rhythmic way*** (if it is, it is placed on one single line).



Graphic representation of noise

Projection 6

The most important **difference** between **noise** and **sound** is that ***musical sound has a frequency that can be measured in waves per second (Hertz), whereas noise is so irregular that it cannot really be measured.***

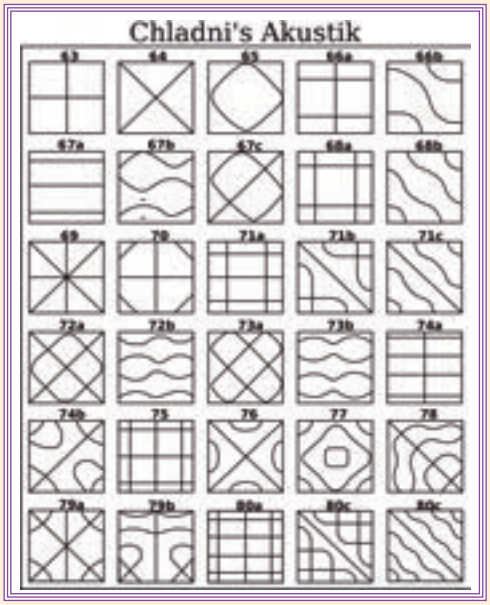
But we should remember that not all noise is disagreeable. There are noises that give us pleasure and a sense of well-being, such as the sound of waves on the shore, or the sound of the rain falling, and so on.

Musical sounds can also sometimes be sounds that are not initially related to music. But from the time a composer includes them in his or her work, these sounds can be classed as coming from «musical instruments». This means that almost any object can conceivably be included in a musical composition, in accordance with specific aesthetic criteria, as you will see below.

Do the exercises given in your WORKBOOK
page. 8-9

Projection 7

MUSIC AND SCIENCE



INTERESTING FACT

The Chladni plate experiment shows the effects that sound waves produce on a material. So if a granular substance (sand) is distributed on a metal plate, it will tend to accumulate forming various patterns on the plates, depending on the frequency of the sound produced.

Projection 8

CHECK YOUR LEARNING

Do the exercises given in your WORKBOOK
page. 10

BLOCK 2 MUSICAL CREATION AND PRACTICE

2.1. RHYTHM CREATION

We start off with the simplest music notes: the semibreve, minim and crotchet. Their values in the commonest times, such as $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$, are 4 beats (semibreve), 2 beats (minim) and 1 beat (crotchet).

	SEMIBREVE	MINIM	CROTCHET
	𝅝 = 4 beats	𝅗𝅥 = 2 beats	♩ = 1 beat
Rhythmic syllables:	**ta a a a**	**ta a**	**ta**
	SEMIBREVE REST	**MINIM REST**	**CROCHET REST**
Rhythmic syllables:	**chs s s s**	**chs s**	**chs**

Do the exercises given in your WORKBOOK
page. 11 ✓✓

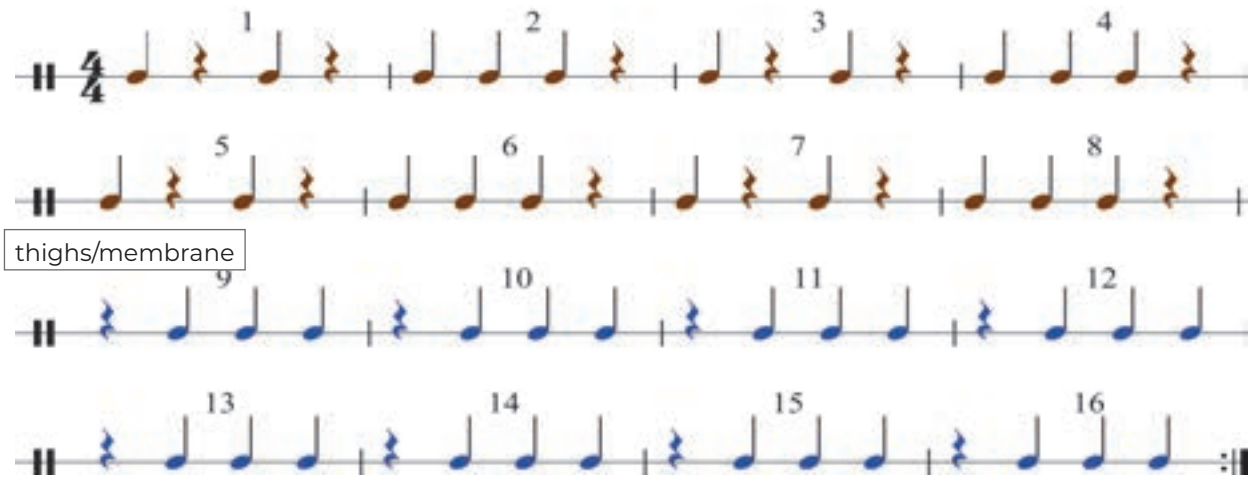
2.2. RHYTHM PRACTICE

Practise the notes you have learned. You can use rhythmic syllables, body sounds or small percussion instruments.

Rhythmic base 1

INTROITO

palms/metal



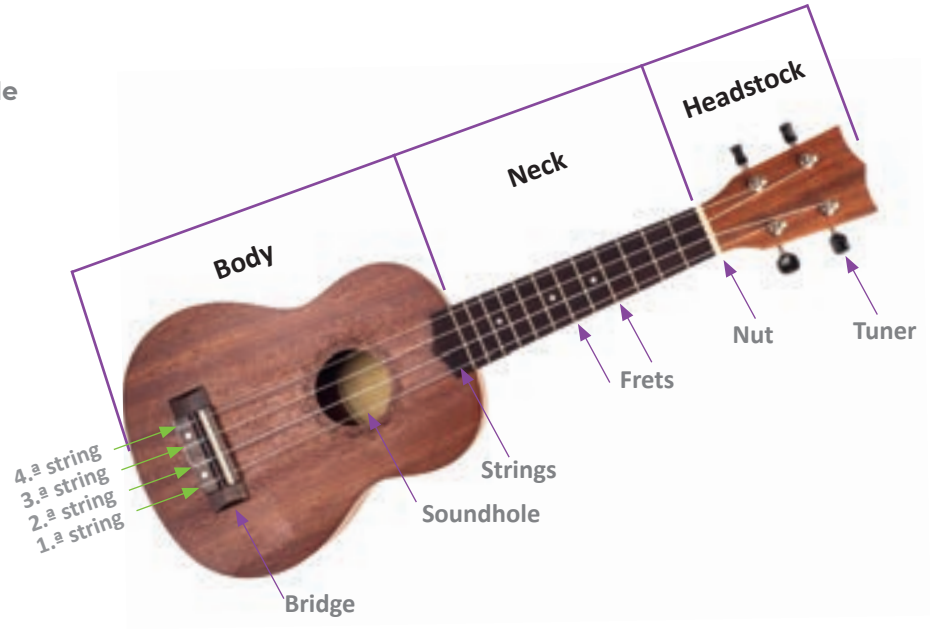
thighs/membrane

2.3. PRACTICE I (UKULELE)

The **Ukulele** is a plucked string instrument, just like the guitar, but instead of having six strings, it has four. This instrument can give great musical experiences, since it is both a **melodic** instrument, for playing songs just like the flute, as well as a **harmonic** instrument, used to accompany songs. In other words, chords can be played to accompany other instruments such as the flute or a reed instrument, or to accompany singing voices.

Ukuleles come in different sizes, each of which has a particular tessitura and timbre. Ordered from smallest to largest, they are: Soprano ukulele; concerto ukulele; tenor ukulele; baritone ukulele

Partes del Ukulele



The **headstock** is the part where the **tuners** are located, which are used to tune the strings. Turn them to tighten the string and therefore sound sharper and, conversely, turn them to the right to loosen the string and lower the pitch. The bottom two tuners are for the first and second strings and the top two are for the third and fourth strings. The **nut** is the support point where the length of the string begins that goes to the **bridge**, which is the other support point.

On the **neck** are the **frets**, which is where the notes are and can be compared with the piano keys. The frets follow a semitone tuning. In other words, the open string on the first fret is an A, pressing the first fret is a Bb, the second fret is a natural B, the next is a C and so on.

The **body** is the part that amplifies the sounds. That's why it is hollow and has a **soundhole** which collects the vibrations of the strings.

UKULELE position

If you're right-handed, your left hand will work the neck and your right hand will strum or pluck the strings. If you're left-handed, the other way around, although you have to take into account that the position of the strings must be changed. To strum, simply run the thumb of your right hand over strings 4 through 1.

For the correct position of the body, it is ideal to support it against your chest. If you find it too uncomfortable, try moving it slightly up or down, until you find your position. Wrap your right arm around the body of the ukulele, with the end of the ukulele pressed against your forearm. If it slips hold it a little tighter, but not too tight.

Hand position

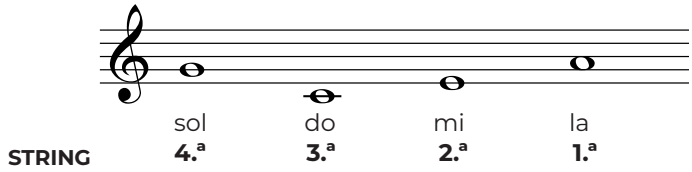
On the **neck**: Place the thumb of your left hand behind the neck and the rest of your fingers around the front, over the frets. In principle, pluck the strings with the fingertips. To know the finger to use at each moment to press the strings on the frets, they are numbered from 1 to 4. The thumb is only used as a support for the pressure of the other fingers and is therefore not numbered.

On the **body**: Stretch your right hand along the bottom of the ukulele and keep your wrist straight. Let your fingers curl and support the bottom of the instrument. You can use your thumb and index finger to strum. In addition to playing with your fingers, you can also use a plectrum.

Tuning

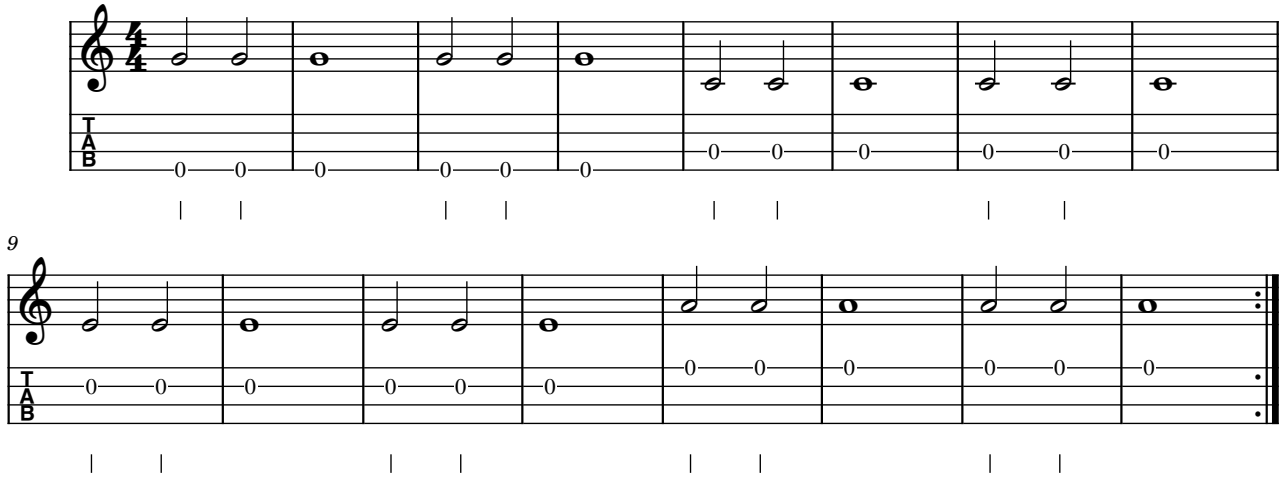
As with the guitar, the standard tuning of the ukulele is also C, although the strings are not tuned in the same order as the guitar.

The tuning of the ukulele is as follows:



ACTIVITY

First, learn how to hold the ukulele correctly. Then play each of the strings (without pressing any frets) with the thumb of the right hand, pressing the strings down. Start with the fourth string, then the third, then the second and finish with the first and so on, several times until you become confident in the movements. Once you have a certain mastery, play the next piece.



The tablature is the representation of the ukulele's strings. That's why it has four lines, since it represents the strings of the instrument, which are as follows:

1.ª string
2.ª string
3.ª string
4.ª string

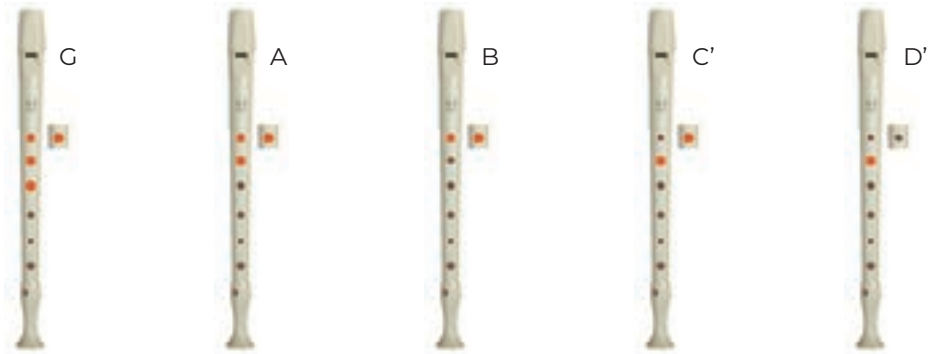
Base ukulele
1

Projection 9

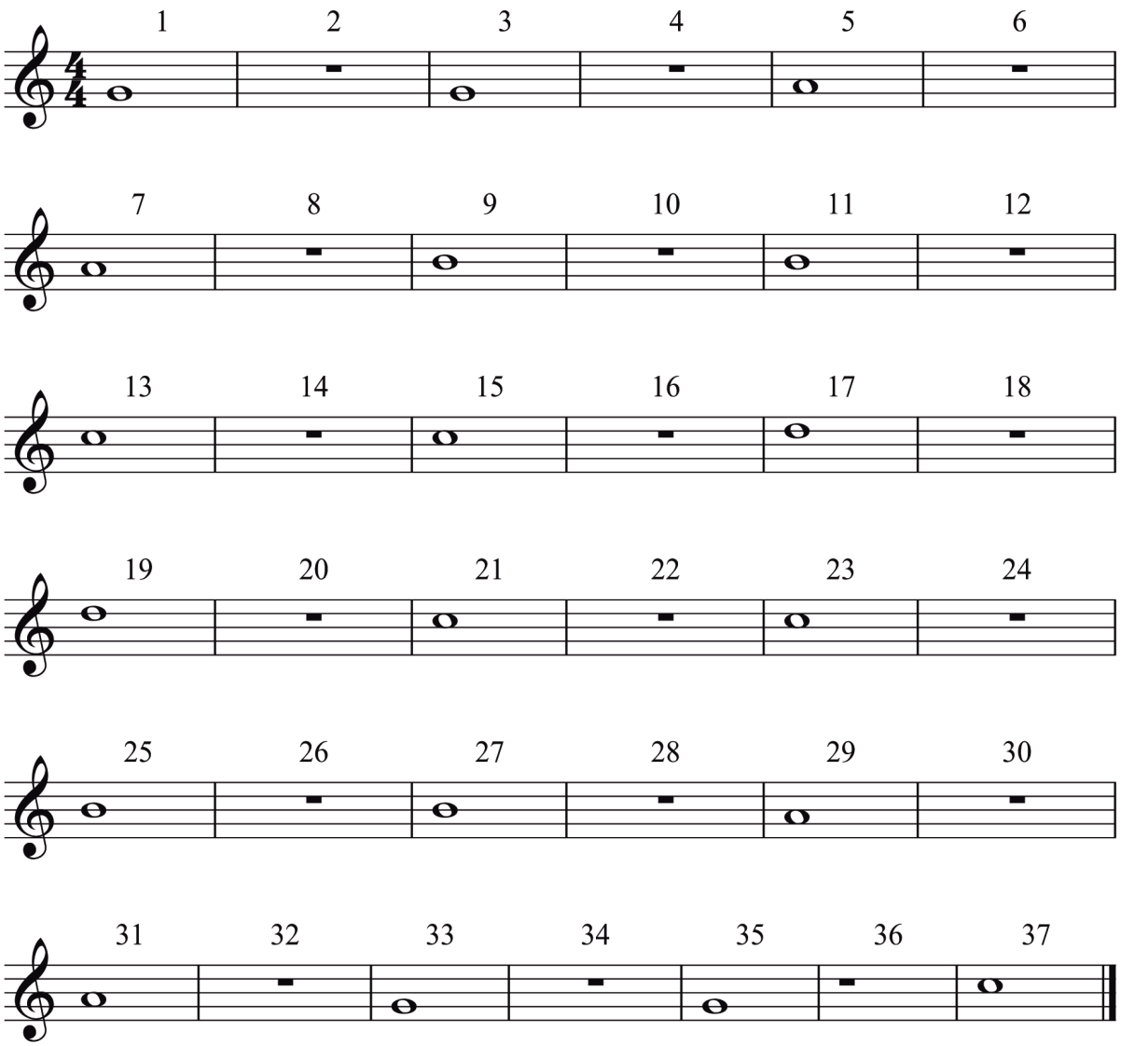
2.4. PRACTICE II (FLUTE)

Now practise sounds using your recorder and playing the notes given below. In this case you will use your left hand.

Practise with your left hand

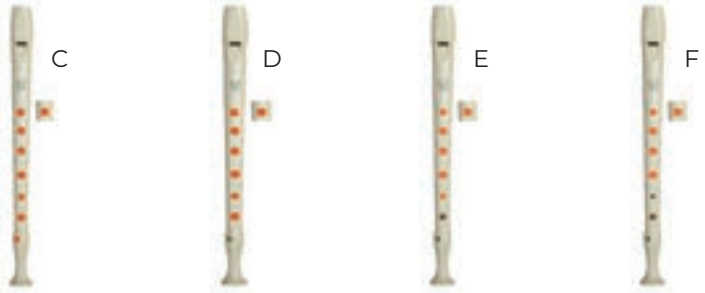


Melodic basis
1

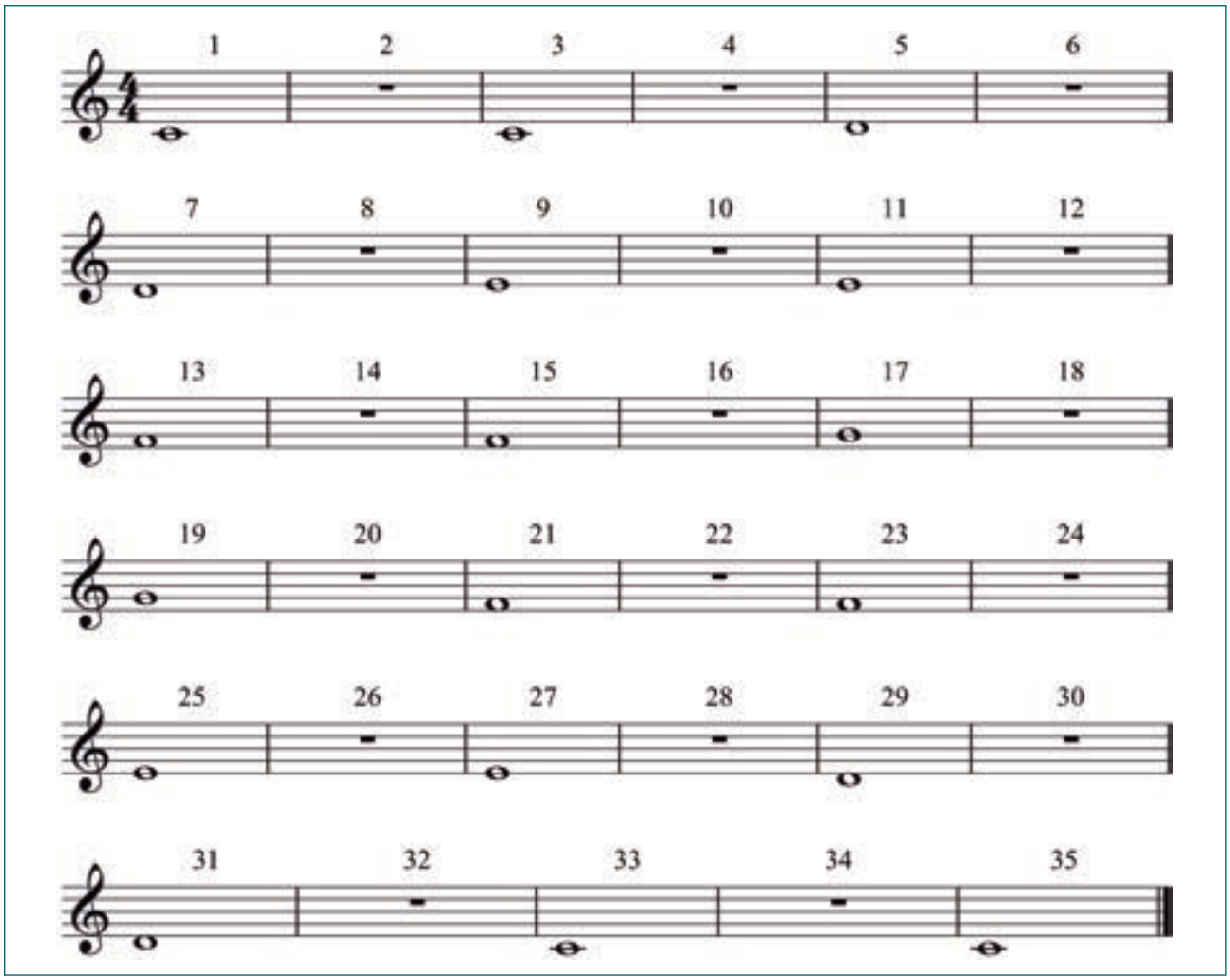


Now practise sounds using your recorder and playing the notes given below with your right hand.

Practise with your right hand



Melodic basis
2



2.5. CREATION AND IMPROVISATION

Show your ability as a composer and as an instrumentalist by composing a simple melody and improvising.

Do the exercises given in your WORKBOOK
page. 12-13 ✓✓

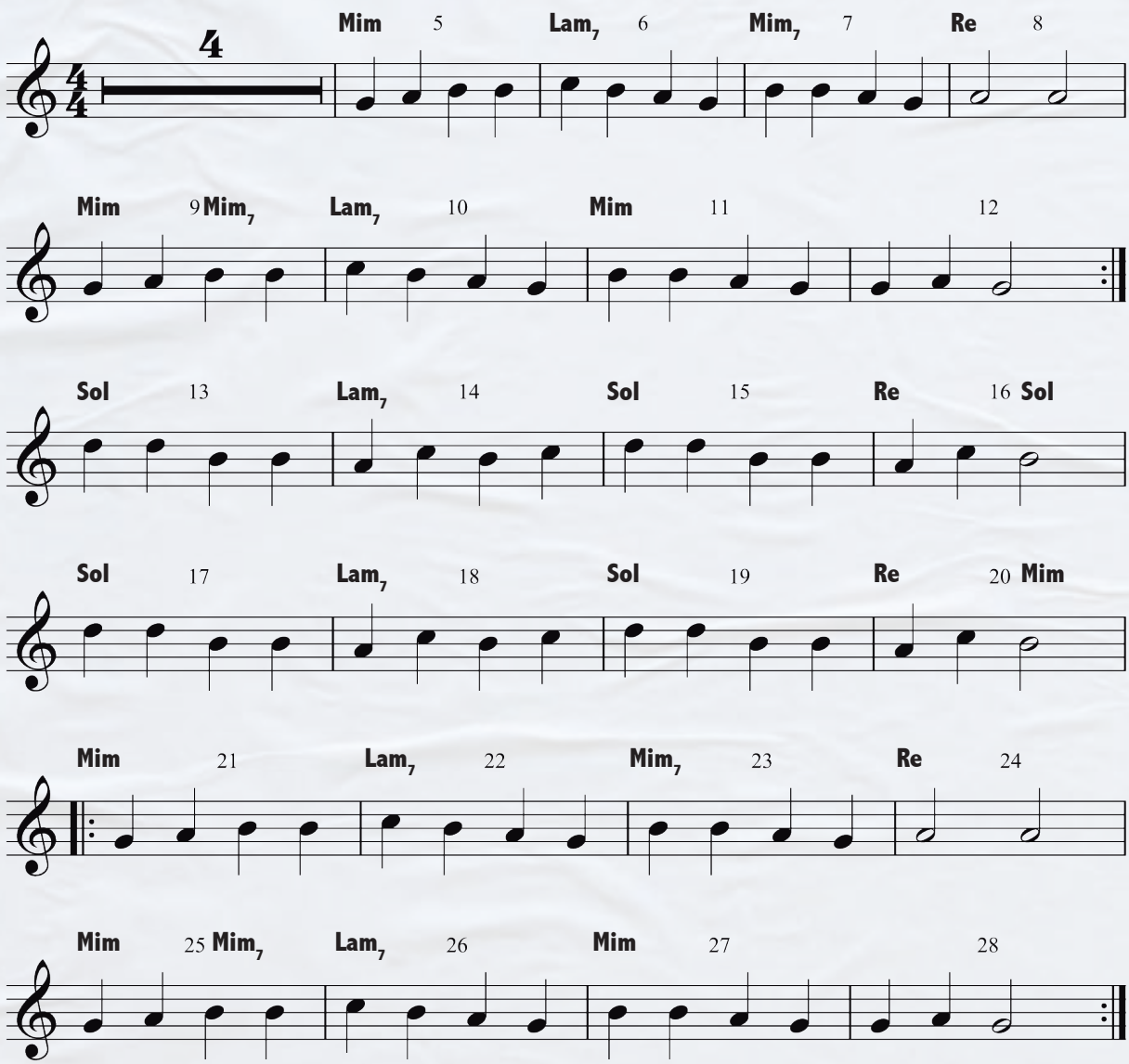
BLOCK 3 PLAYING MUSIC

Play with your left hand

Basis for interpretation 1

The **branle** (or *bransle*) is a type of old French dance from the early 16th century danced by couples or in groups, with the main movements going from side to side.

BRANLE DE CHAMPAGNE



Play with your left hand

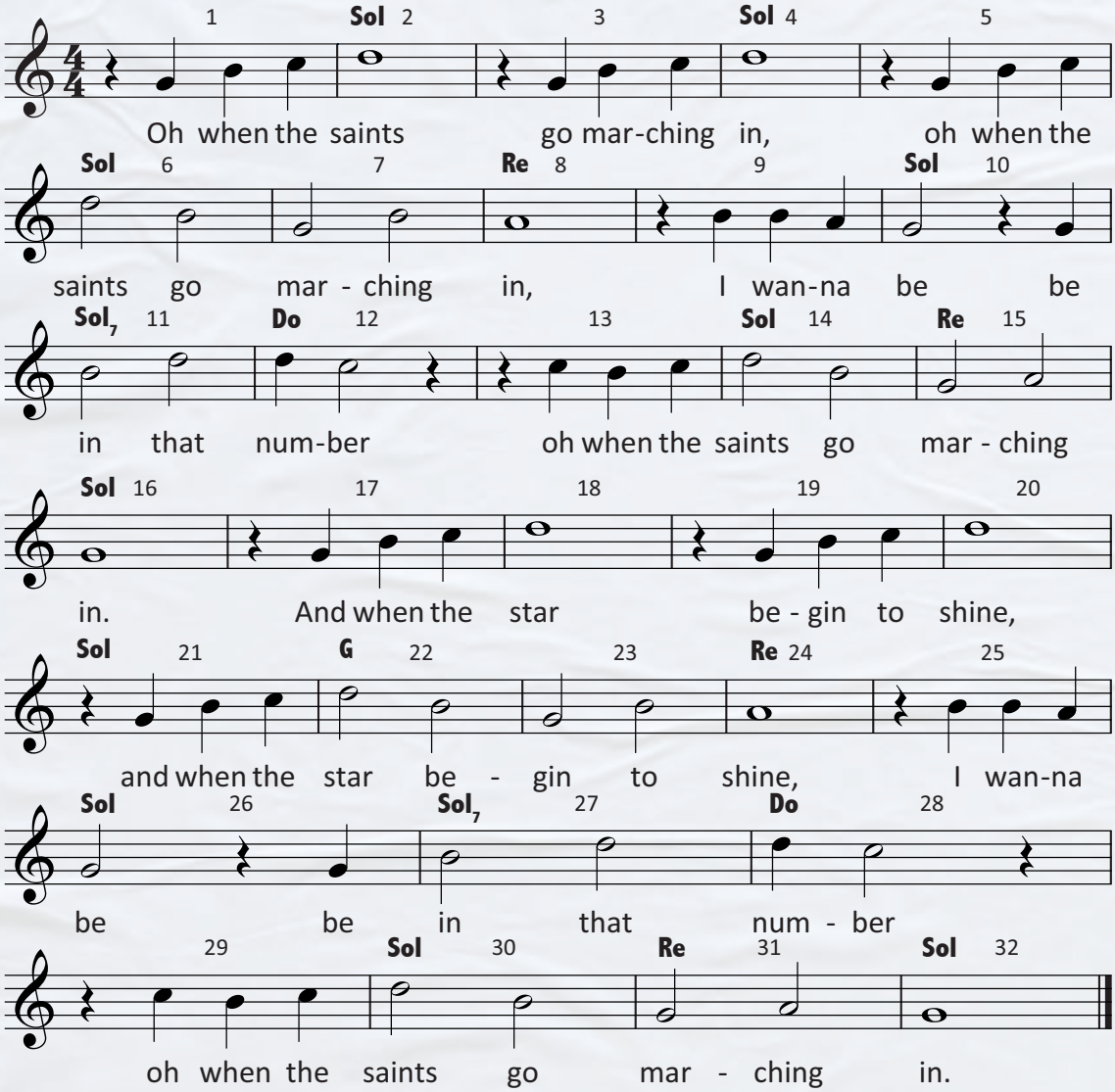
Basis for interpretation 2

Projection 10

When the Saints Go Marching In is an American gospel hymn composed in 1896 in New Orleans (Louisiana) and first recorded in a jazz version 1938 by Louis Armstrong and his Orchestra. It is often played during funeral processions.

WHEN THE SAINTS GO MARCHING IN

K. Purvis (letra) – M. Black (música)



Basis for interpretation 3

Play with both hands

Johann Sebastian Bach

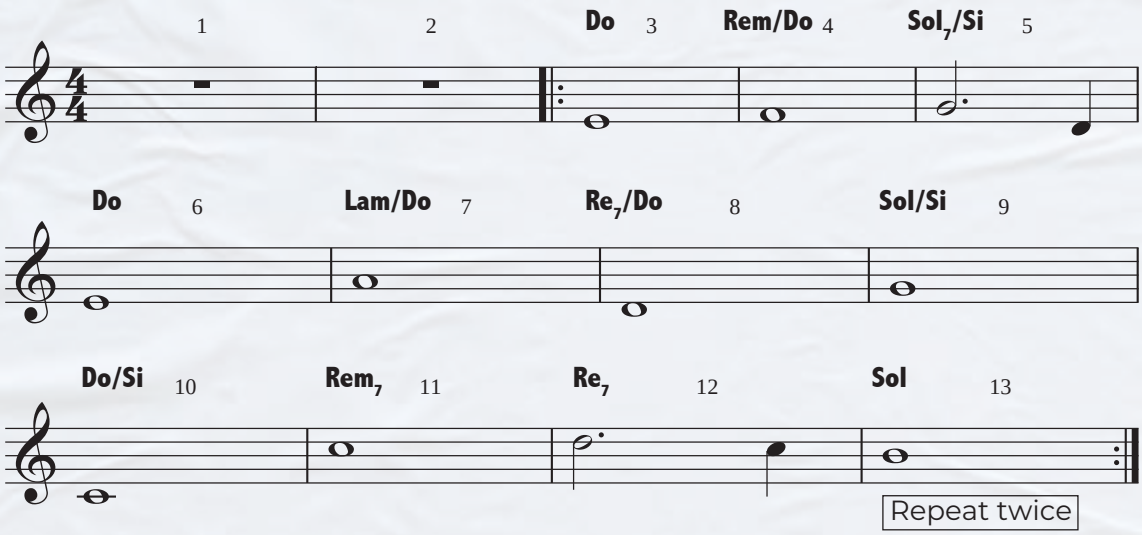
This piece you are going to play here is the work of Johann Sebastian Bach, the outstanding German organist and clavichordist born in Eisenach in 1685 and dying in Leipzig in 1750.

It is part of the first volume of his ***Well-Tempered Clavier***, composed around 1721 and containing 24 Preludes and Fugues in each of the 24 major and minor keys for the clavier. These musical pieces were intended, in the composer's words: «for the profit and use of musical youth desirous of learning, and especially for the pastime of those already skilled in this study...».

You should know, however, that it is essential to have a good level of piano playing to interpret these pieces, as most are quite difficult and require a good command of piano technique.

PRELUDE

J. S. Bach



Play with two voices

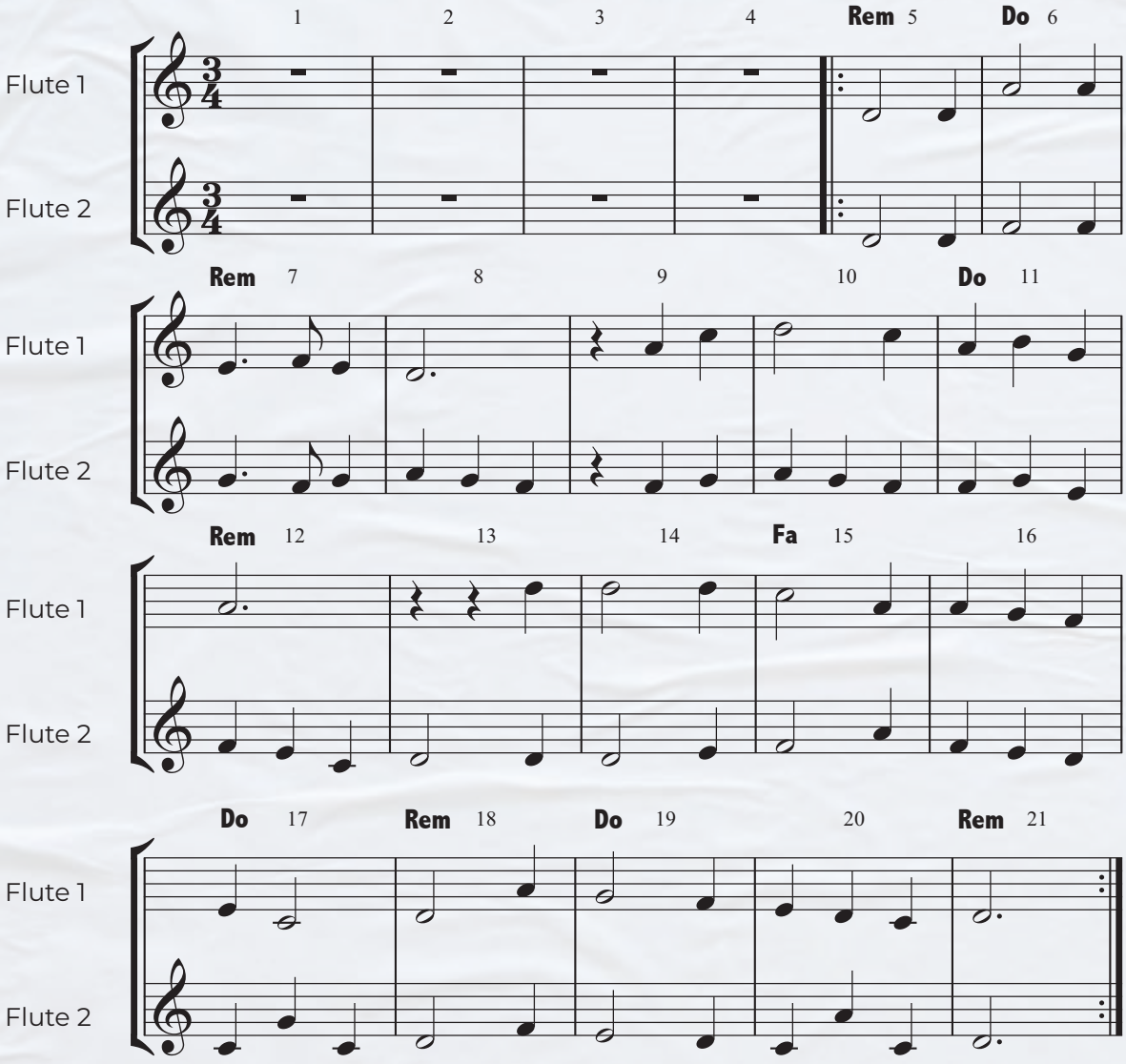
Basis for interpretation 4

Projection 11

This is a traditional English folk song, although it is now well-known after appearing in the film *The Graduate*, sung by the duo Simon and Garfunkel. In Spain, it was covered by groups such as Luar na Lubre and Mago de Oz, appearing in the TVE series *Águila Roja* in the second season, interpreted by one of the characters in Spanish.

SCARBOROUGH FAIR

English traditional



BLOCK 4 STAGE CREATION

Hip hop is an artistic and cultural movement that emerged in the United States in the late 1970s in the African-American and Latin-American communities of marginal New York neighbourhoods such as the Bronx, Queens and Brooklyn, creating an urban subculture based on four elements:

– **Graffiti** (visual manifestation, painting);
– The **DJ** (auditory or musical manifestation);
– **Break dance** (physical manifestation, dance) and
– The **MC** (oral expression, reciting or singing).

Projection 12

MUSIC AND EQUALITY

This movement (its origin based on the fight for social rights), has shown that it serves to vindicate, among others, **gender equality**. An example of this can be found in the music of Spanish performers **Arianna Puello** and **Mala Rodríguez**, although there is a very long list of women who fight to break with the macho vision of this style: **Anita Tijoux** (Chile), **Mamba Negra** (Mexico), **Actitud María Marta** (Argentina), **Karol Conka** (Brazil), **Spektra de la Rima** (Colombia), **Danay Suárez** (Cuba), **Caye Cayejera** (Ecuador), **Rebeca Lane** (Guatemala), **Anarkía Ruíz** (Venezuela), **Little Simz** (United Kingdom), **Sampa the Great** (Botswana/Australia), **Ruby Ibarra** (Philippines), **IAMDDB** (Manchester/Angola). The following quote shows women's constant struggle to obtain equality: «Sometimes we don't get the recognition that men get even though we sell more records. We don't get the same push as male artists» (Lil' Kim, 2003).

Arianna Puello

Unit 2. Pitch and melody

A name for each sound

BLOCK 1 MUSICAL AND CULTURAL CONTEXTS. LISTENING

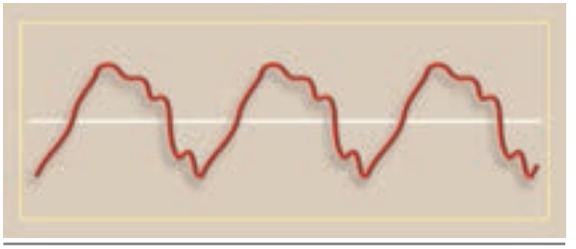
1.1. Pitch

When you hear various sounds, you can usually clearly recognise if they are the same when repeated or different.

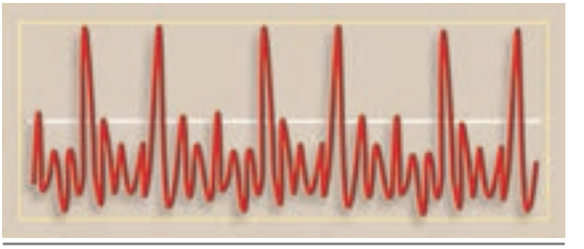
Pitch is one of qualities of sound that enable you to distinguish whether it is high or low.

In the last unit we saw that sound is actually a vibrating wave from a sound-producing body that is transmitted through various media. Therefore, the variation in the sounds come from the frequency of vibration of the sound-producing body, meaning, the number of vibrations per second.

A sound is *lower when the frequency is less* (fewer vibrations per second) and *higher when the frequency is greater* (more vibrations per second).



low sound



high sound

Projection 1

Similarly, the pitch of a sound is directly related to the size of the sound-producing body, meaning that *larger bodies or instruments normally produce lower sounds*, and *smaller bodies or instruments produce higher sounds*. Thus, men's voices are generally lower than women's voices due to the size of the larynx. In children, with smaller larynxes, voices are higher, but as they grow and change with the onset of puberty, their voices change and get lower.

Do the exercises given in your WORKBOOK
page. 14-16 ✓✓

1.2. NOTE NAMES AND STAFF PLACEMENT

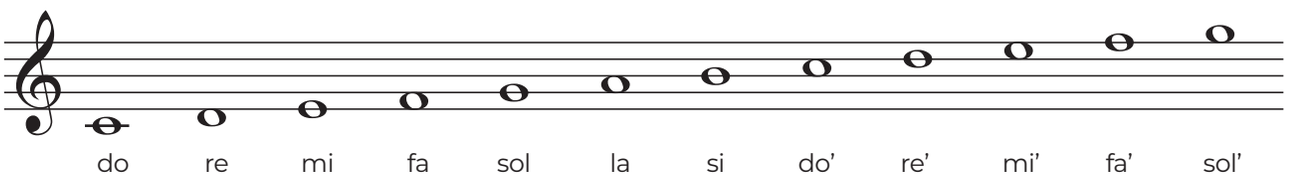
Now you know why a sound is higher or lower. But is there a way to indicate its exact pitch?

Yes! Musicians saw that to interpret sounds with voices or instruments, it was necessary to «invent» a system that would clearly specify the pitch or height of the sounds they wanted to use. This is why we have a system of musical notation, which, over time, was placed in a certain way on the staff or pentagram.

The **pentagram** (penta = five, gram = line), called the **staff**, *is the set of lines and spaces where the notes are placed when writing music*. The staff is formed of 5 horizontal parallel lines, where the different musical notes and signs are placed.

Note how the lines (5) are numbered from the bottom up to create the spaces (4).

This is where the notes are placed, and each note represents a definite musical sound. Depending on where the note is placed, on a line or in a space, it is given a certain name, in English with letters, and in Spanish in sol-fa syllables:



The origin of the sol-fa syllables is from an 11th-century monk called Guido d'Arezzo, who created a system so that singers would have a clear reference to the pitch of the sounds they had to produce. The English system uses the letters A to G.

Do the exercises given in your WORKBOOK
page. 16-17 ✓✓

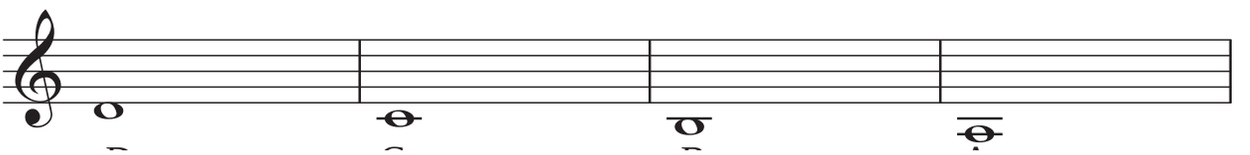
Projection 2

1.3. THE PLACEMENT OF NOTES

Some notes are so high or so low that they do not fit on the lines or in the spaces of the staff. To write these notes on the staff, we use additional lines called **ledger-lines** *to place them above or below the staff.*

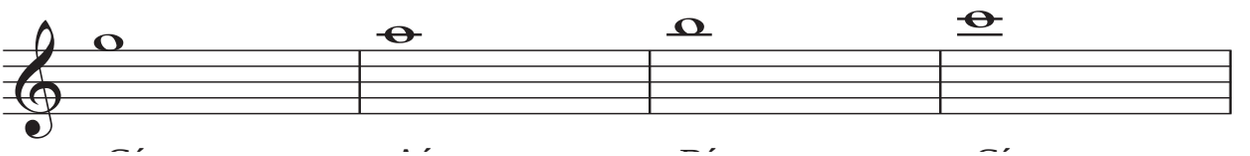
Here are some notes that are written above or below the staff using ledger-lines.

Low sounds



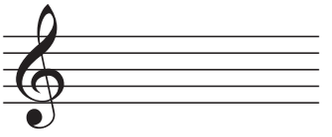
D	C	B	A
1st space	1st line	2nd space	2nd line

Sonidos agudos



G'	A'	B'	C'
1st space	1st line	2nd space	2nd line

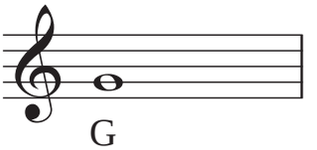
In the above examples you can see that each line of the staff starts with this symbol:



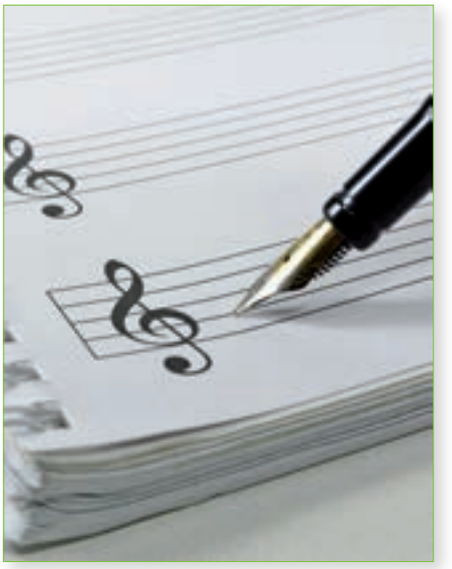
This is the **G-clef** and is written at the beginning of each line. The G-clef or treble clef *indicates which note is which on the staff.*

There are various kinds of clefs, but in this course you will only be studying the commonest kind of clef, shown above: the G-clef or treble clef.

This clef means that the note G (sol) is placed on the second line..



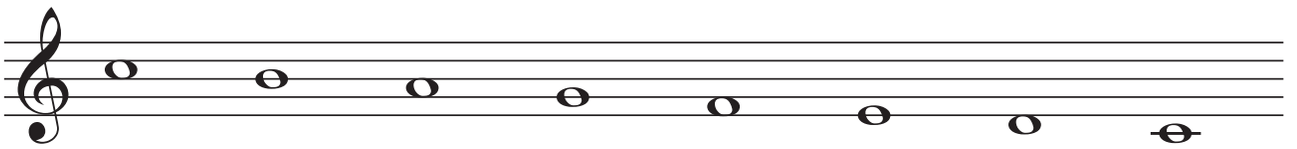
G



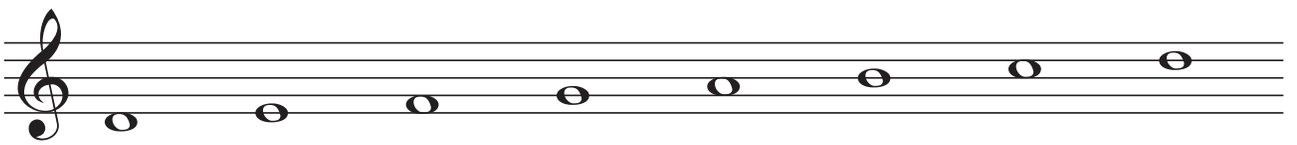
Do the exercises given in your WORKBOOK
page. 18 ✓✓

1.4. ORDERING SOUNDS (SCALES)

When you place the notes in an orderly manner on the staff, you get a series of sounds that go from one pitch to another, either from higher to lower (descending):

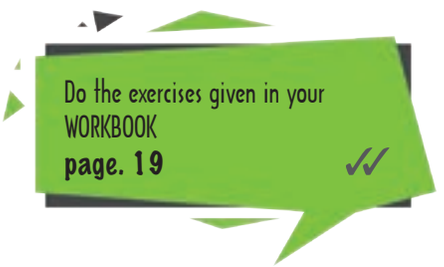


Or from lower to higher (ascending).



This series of notes placed in an orderly manner on the staff is like a ladder that goes up or down and is called a **scale**. It includes all the notes needed to create a melody.

Here you can see how a scale is created in either an ascending or descending direction.



Projection 3

1.5. MELODY (THE SUCCESSION OF SOUNDS)

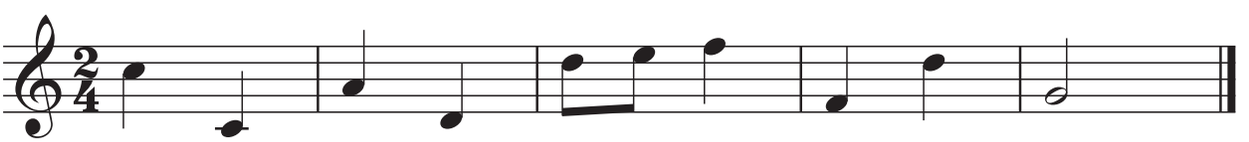
Melody is one of the most important elements in music and generally, it is what attracts our attention when we listen to a song. Normally, the sound we follow most easily is the melody line, like the voice of a singer, with the other instruments being of lesser importance.

A **melody** is a succession of sounds that advance over time using combinations of different pitches (melodic intervals).

If you combine notes on a staff in a certain way at different heights, and going up or down or remaining the same, you may be able to create a «melody». Depending on the combination of notes, representing sounds, you can obtain different types of melody lines.

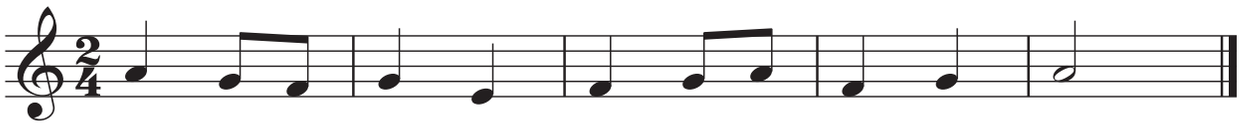
Here are two examples:

Melody with big intervals

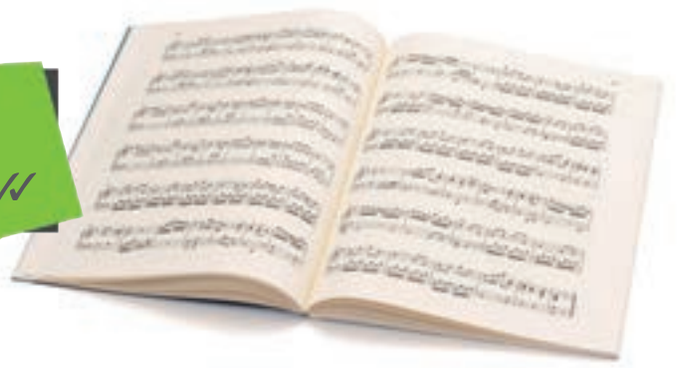


Projection 4

Melody with small intervals



Do the exercises given in your WORKBOOK **page. 20** ✓✓

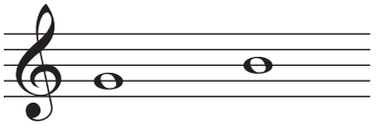


Projection 5

1.6. INTERVALS (DISTANCES BETWEEN SOUNDS)

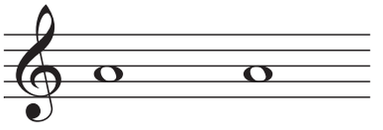
All melodies are formed of a number of notes of different pitches, varying in how far apart they are. *This distance in tone between two different notes sounded one after another* is called a **melodic interval**.

To calculate an interval all you have to do is count the number of notes starting from the lowest to the highest or vice versa. Here's an example



interval of a 3rd

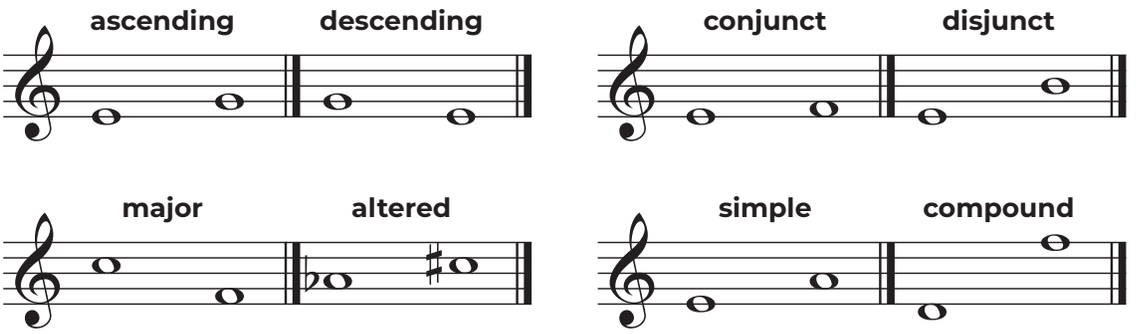
Bear in mind that *two notes with the same name and pitch* are **not** an interval (or can be called a **0** interval), as there is no difference in pitch between them. This is called **unison**.



Depending on the relative positions of the two notes forming the melodic interval, this is called:

- ***ascending***: when the second note forming the interval is higher than the first.
- ***descending***: when the second note forming the interval is lower than the first.
- ***conjunct***: when the two notes forming the interval are consecutive steps in a scale.
- ***disjunct***: when the two notes forming the interval are not consecutive steps in a scale.
- ***simple***: when the distance between the two notes forming the interval does not exceed an 8th (octave).
- ***compound***: when the distance between the two notes forming the interval exceeds an 8th (octave).
- ***major***: when the two notes forming the interval both form part of the same major scale.
- ***altered***: when one of the two notes is moved slightly up or down with respect to a note from the major scale.

Here are some examples of these:



In the examples above you can see the **sharp** ♯ and **flat** ♭ signs.

These are called **accidentals**, *which are musical signs that modify the pitch of ascending or descending* notes, and therefore strongly influence the melody in a musical composition.

We will look at these in detail in unit 3.

Do the exercises given in your WORKBOOK **page. 21-22** ✓✓

MUSIC AND SCIENCE

INTERESTING FACT

Ultrasounds are sound waves with a frequency greater than 20,000 Hz that cannot be perceived by the human ear. However, they have been key in different inventions such as:

- The **sonar**, used for navigation, drawing marine maps and locating objects or living beings in the sea. It projects ultrasonic waves that bounce off obstacles, subsequently transforming them into an electrical signal visible on a screen..
- In the medical field, the **ultrasound** machine uses a low-intensity ultrasound that is projected on the different internal organs that returns in the form of an echo when it collides, transforming the signal into images on the screen.

Projection 6

CHECK YOUR LEARNING

Do the exercises given in your WORKBOOK **page. 22-23** ✓✓

BLOCK 2 MUSICAL CREATION AND PRACTICE

2.1. RHYTHM CREATION

This activity gives you a chance to practise with **quaver notes**. This is a note that is one half of a crotchet, and may appear on the staff in various formats. However it is written, its duration is always the same.

Quavers can be either separate or connected into various groupings using a **beam**. They are played in exactly the same way.

They have a duration of half a crotchet note. In most time signatures, such as $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$, they are half notes, representing half a beat.

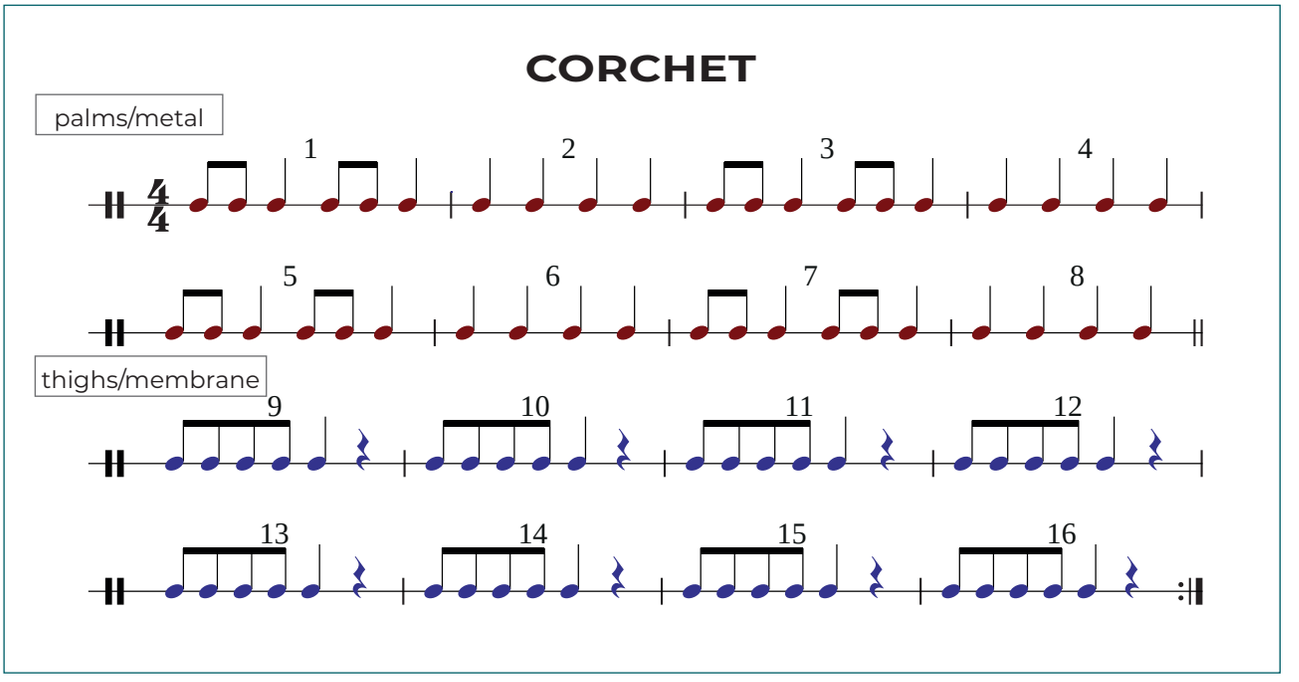
	QUAVER	**REST QUAVER**	**2 BEAMED QUAVERS**	**4 BEAMED QUAVERS**
	= 1/2 beat	= 1/2 beat	= 1 beat	= 2 beats
Rhythmic syllables	**ti**	**un**	**ti ti**	**ti ti ti ti**

Do the exercises given in your WORKBOOK **page. 24** ✓✓

2.2. RHYTHM PRACTICE

Practise with the notes you've learned. You can use rhythmic syllables, body sounds or small percussion instruments.

Rhythmic base 1



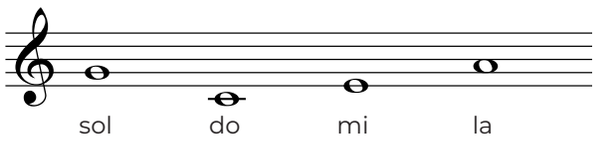
2.3. PRACTICE 1 (UKULELE)

As you know, the ukulele is a string instrument and this type of instrument must have a specific tension for the tuned note to sound correct. So before starting to play, it needs to be tuned, since the strings often go out of tune. There are tools available that help to tune, applications for mobile phones, tablets and computers and even tuners that can be placed on the instrument. However, and although there are tools that can help you to tune an instrument, it is also good to put them aside little by little, because if you train your ears daily, you can perfect your hearing and auditory education.

ACTIVITY

Tune the ukulele using a tuner or by simply listening to the notes on the piano or any other instrument. Remember that if the note is out of tune too low, tighten the string by turning the corresponding peg to the left and vice versa, if the note is out of tune too high, loosen the string by turning it to the right.

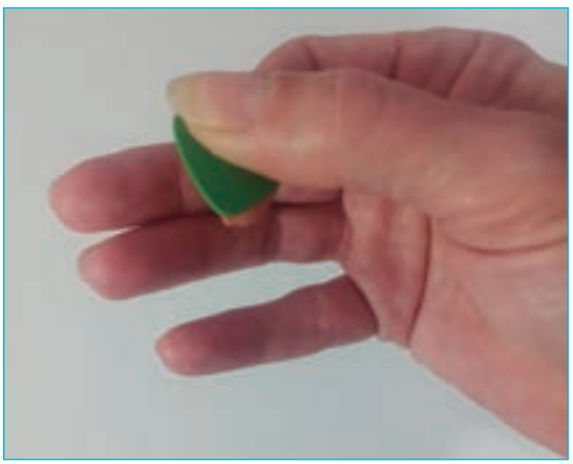
1.ª string (la)
2.ª string (mi)
3.ª string (do)
4.ª string (sol)



The plectrum

Up until now, the strings have been plucked with the thumb. However, there is a widely used object called a **pick** or **plectrum**. It is a triangle-shaped item made of different materials such as plastic, wood, bone, metal, etc., although the most-common are plastic. They are also used to pluck the strings, replacing the fingers. There are different thicknesses depending on the sound you want to make. The soft ones emit a softer sound and the hard ones a more forceful sound, although to begin with it is advisable to play with medium or soft plectrums.

The usual way to hold the plectrum is to leave half of it free and the other half covered by the index finger and thumb. Contact is usually with the tip of the thumb and with the edge of the third phalanx of the index finger. This way the plectrum is well gripped and stabilised without keeping the hand tense.



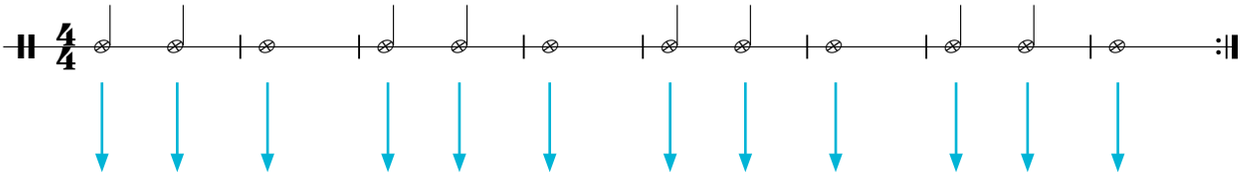
PRACTICE

1. **Practice using the plectrum. To begin, hold the plectrum as explained above. Hold it securely with your fingers but allow your hand to relax so that you can move it easily. To begin with, practice this technique of gripping with the fingers and relaxing the hand, passing the plectrum over the leg or thigh as if you were scratching yourself. This can help to grasp the concept of gripping the fingers and relaxing the hand at the same time.**

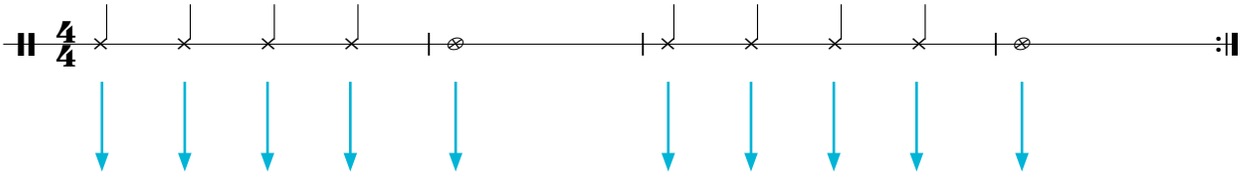
2. **Repeat the same activity on the ukulele strings. Now strum the strings with the right hand while «muting» them with the left so that they there is no sound. «Muting» the strings means gently holding the fingers of the left hand on the strings so that they don't vibrate and therefore there is no sound.**

3. **Once you've become familiar with the plectrum, let's perform the following rhythms. For now, keep the strings muted, only use the left hand with the plectrum.**

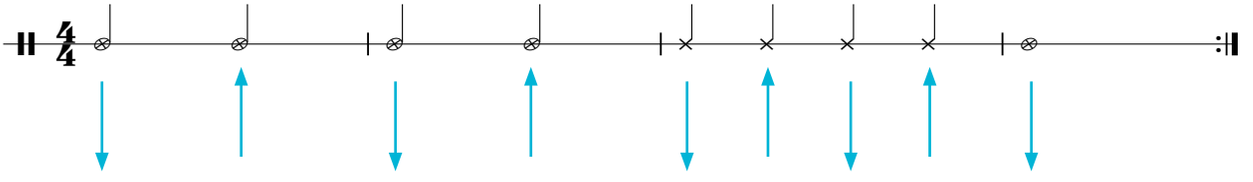
   a. Rhythm of minim and semibreve notes playing all the strings from top to bottom. In other words, from the fourth to the first. It is indicated with a down arrow.



   b. Rhythm of crotchet and semibreve notes playing all the strings from top to bottom, the same as in the previous activity.



   c. Rhythm of crotchet, minim and semibreve notes playing all the strings down and up. The arrows indicate the direction of the hand.



Base ukulele
1

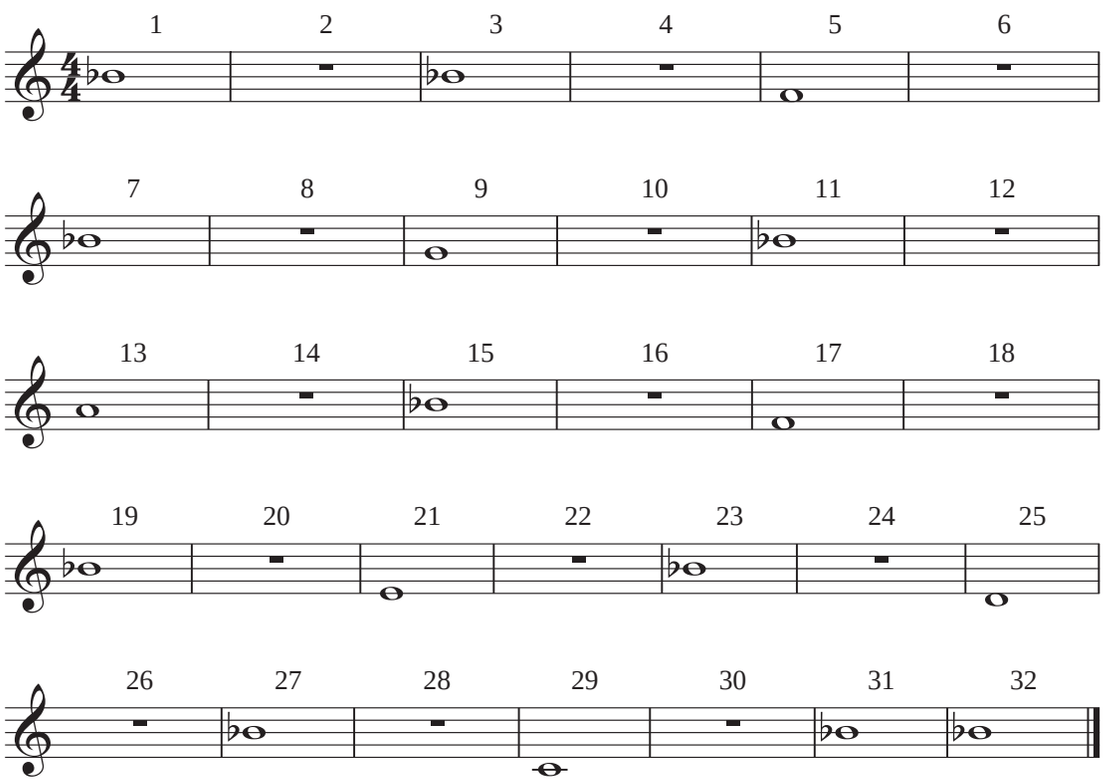
Projection 7

2.4. PRACTICE II (FLUTE)

Through these activities you can practise the fl auta sounds in a progressive way. In this case we will practise the B♭

Practise B♭

Melodic basis 1



2.5. CREATION AND IMPROVISATION

Show off your skills as a composer and player by composing a simple melody and improvising.

Do the exercises given in your WORKBOOK **page. 25** ✓✓

Play with 2 voices

Basis for interpretation 1

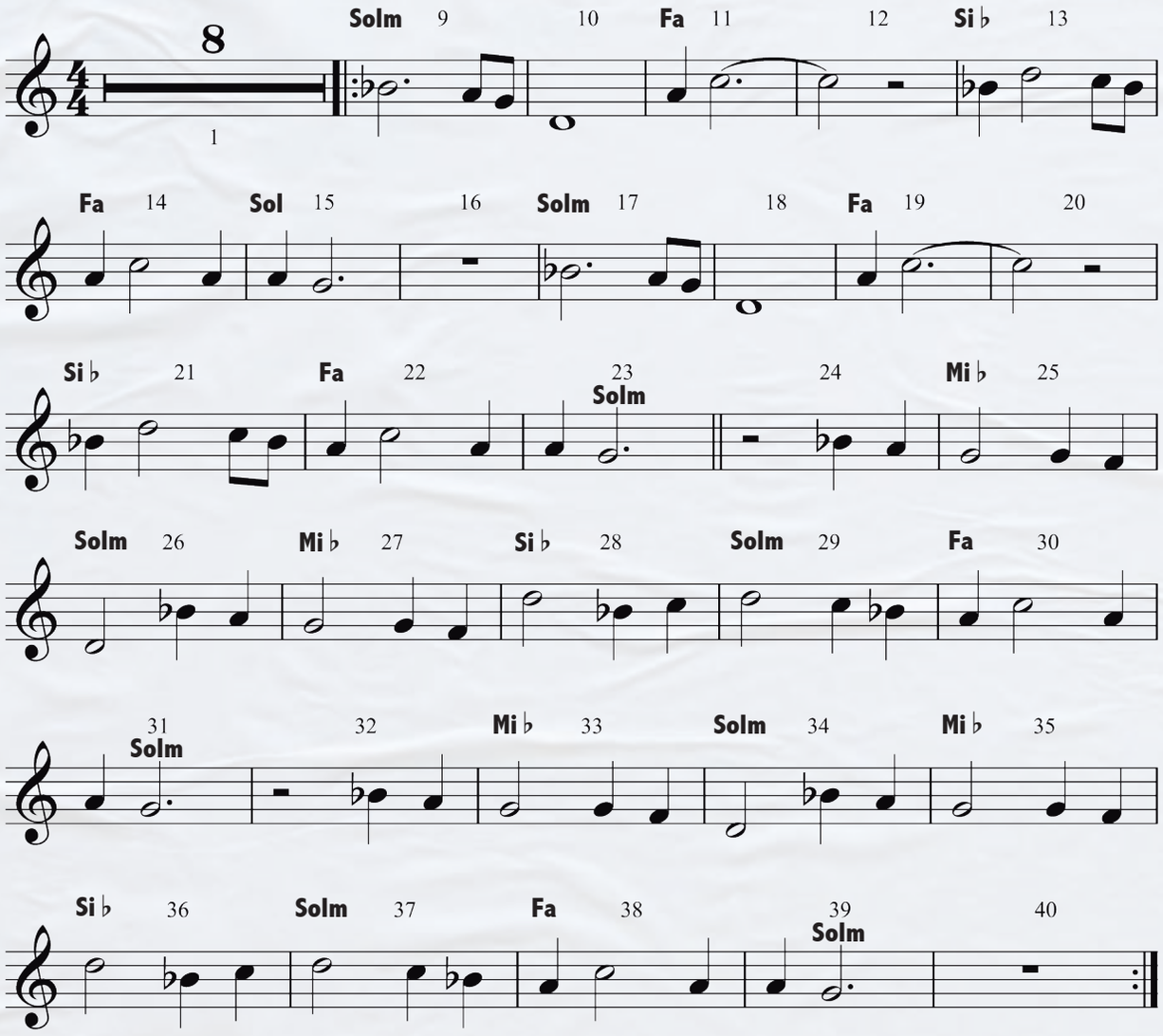
Projection 8

This film is set in 1757 along the Hudson River in America, where the French and the English are fighting to control the country. This is the adventure of Hawkeye, a white man adopted by the Mohican Indians who saves two English girls from an attack, Cora Munro and her little sister Alice, the daughters of a British official. He tries to take them back to the English Fort William Henry, which is under siege from both the French and the Huron Indians.

THE LAST OF THE MOHICANS

Flute 1

Trevor Jones & Randy Edelman



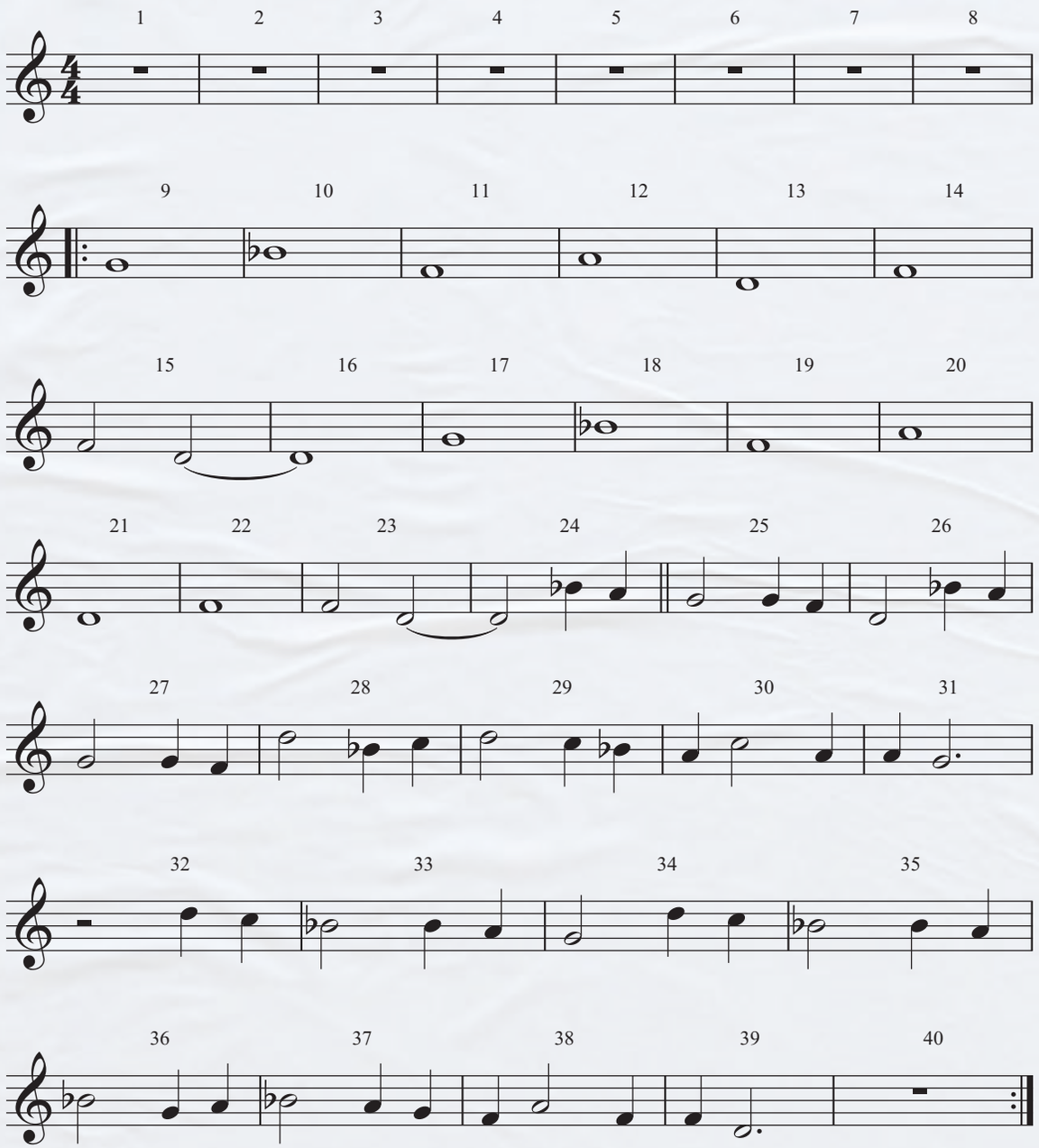
INTERPRETATIONS FOR ORFF INSTRUMENTS

In this section you can interpret musical pieces with Orff instruments by downloading the music from the website **www.tabarcallibres.com**

THE LAST OF THE MOHICANS

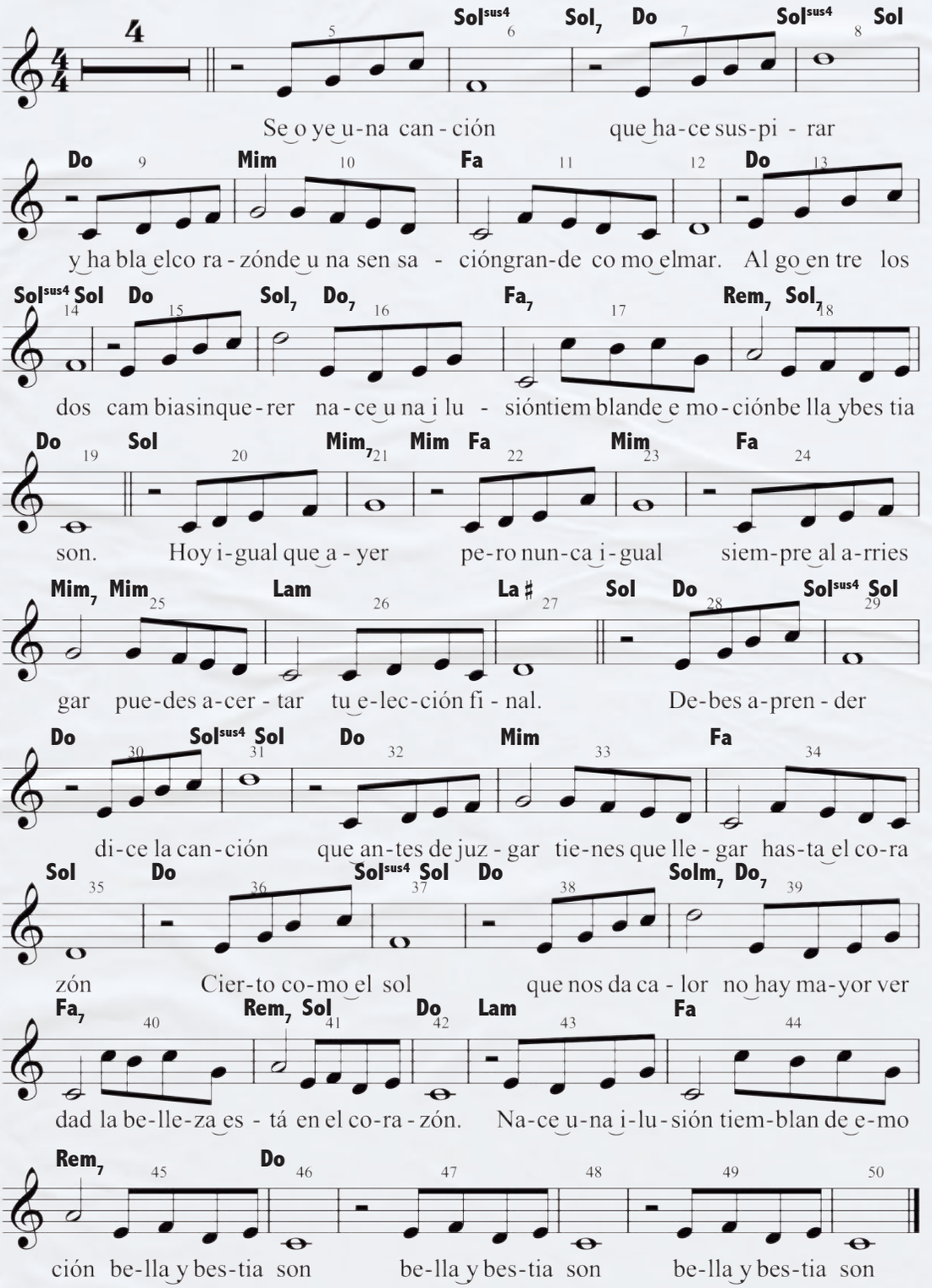
Flute 2

Trevor Jones & Randy Edelman



BEAUTY AND THE BEAST

Alan Merken



Play with both hands

Basis for interpretation 3

Projection 10

Pandora, the moon of the planet Polyphemus, is where the Na'vi live in the year 2154, a humanoid race that has settled around a giant tree that sits on a vast store of a mineral called unobtanium, which humans want as an energy supply. This mineral is supposed to solve all the energy problems of the Earth. The natives, however, oppose the human plan and unleash an armed conflict of fantastical proportions.