

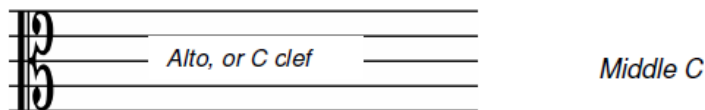
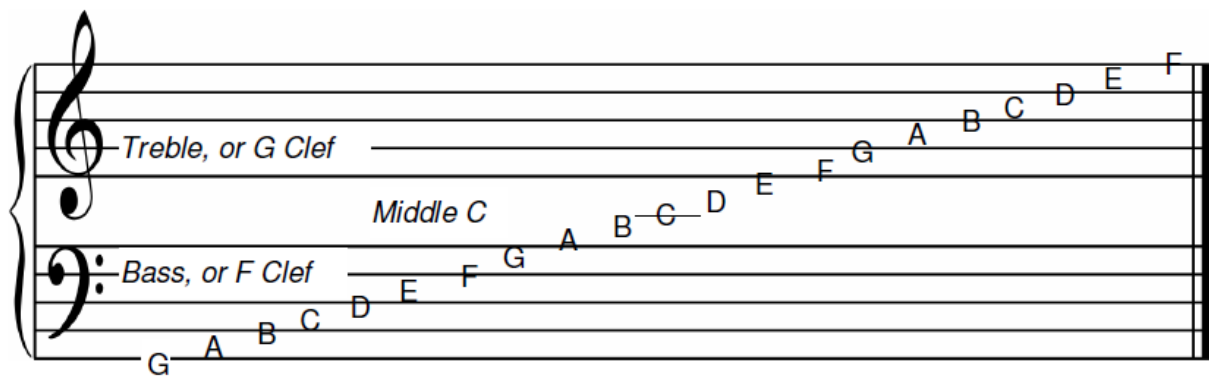
The Staff and its purpose

Staff Notation is the name given to the system of representing various sounds by using characters called notes and other symbols and placing them on a series of lines and spaces, thus visually indicating changes in **duration** and **pitch**. We can consider pitch to be “which note” and duration to be “how long”. Pitch can tell us how high or low a sound is – this of an adult or child’s voice.

The notes are named after the first seven letters of the alphabet from A to G, and repeated as required. The full range of notes are on the **Great Staff**.

As you can see below, the great staff has 11 lines and 10 spaces. The great staff uses both the **treble clef** and the **bass clef**. Notice though, there is a gap between the bottom line of the treble clef and the top line of the bass clef? This line we add in the middle is called “middle C”. This is the middle note on a piano. In between the treble and bass clef we find the **alto clef**. The word clef is French for **Key**.

THE GREAT STAFF



If we look at the Great Staff, we can see there are 3 of each note. As we go up, while called the same thing, each of these is a higher pitch. The difference between each of these notes is called an **octave (8 notes from G to G)**! The first note in the scale is called the **tonic**. Each step up the scale can be referred to as a **degree**, with the distance between each referred to as an **interval**.

For a bagpipe, the bass drone tunes to the A in the bass clef, the tenor drones to A in the alto clef and the chanter to A in the treble clef. Tenor and bass drums tune to the bass clef. The combination of the same note at different pitches with different instruments and timbres creates an interesting harmonic. In the case of bagpipes and drums, all instruments and notes are tuned in reference to low A of the chanter. This is possible due to each A being a full octave apart.

The image shows a musical score for bagpipes. At the top, a bracket labeled "Range of Chanter Scale" spans the notes G, A, B, C, D, E, F, G, A. Below this, a treble clef staff shows the chanter scale with notes G, A, B, C, D, E, F, G, A. A "Leger Line" is shown above the staff, with the note A written on it. Below the treble staff, a bass clef staff shows the drone parts: "Bass Drone" (G) and "Tenor Drone" (A). Below the bass staff, two more bass clef staves show "Bass Drum" and "Tenor Drum" parts, with notes G and A respectively. A "Middle C" is marked on the bass staff.

When we are writing bagpipe music we use a **short staff** as we can only play in the treble clef. Note that when we go outside of this (i.e. high a) we use an additional line called a **ledger line**. Drummers used to write their music on the great staff, but now use a single line called the mono-linear system to notate their music, to indicate the indefinite pitch of the drum. Above the line represents the right hand and below the line the left hand. While tenor drummers as a group can play multiple pitches, tenor music is written on a single line rather than on a staff. Although mid section drums are now pitched to set notes, this pitch cannot change during a tune, so each drum can only play one pitch at a time. Bass, tenor and snare drummers all write their music on the bass clef. While we don't often write all instruments together, when we do this is called a **full score** – with the bracket joining it called a **brace**.

The image shows a full score for bagpipes and drums. It consists of four staves. The top staff is a treble clef staff labeled "Bagpipe Score". The second staff is a bass clef staff labeled "Snare Drum Score". The third staff is a bass clef staff labeled "Tenor Drum Score". The bottom staff is a bass clef staff labeled "Bass Drum Score". A large bracket on the left side of the four staves indicates they are part of a full score.

Questions to think about:

1. What is the main purpose of notation in music?
2. Name the system of notation which is used in modern music.
3. How many (and which notes) can we play a full octave difference on the bagpipes?
4. Why are clefs important?
5. Which clef signs are used to indicate the pitch range of the (a) bagpipe, (b) bass and tenor drums
6. What is a degree and an interval?

Answers: 1. To notate pitch and duration, 2. Staff Notation, 3. G and A (hence the use of 'low' and 'high'), 4. To tell us which note we are referring to when there are multiple of the same note, 5. (a) Treble/G Clef, (b) Bass/F clef 6. Each step up the scale can be referred to as a degree, with the distance between each referred to as an interval.

Musical vs Unmusical Sound (Noise)

The difference between musical and unmusical sound (or noise) can be shown graphically by the wave pattern the sounds produce.

Regular Waves



Irregular Waves



A musical sound produces a regular, constant wave pattern, whereas the wave pattern for an unmusical sound is irregular and often broken.

Musical sound can be produced by a purpose built instrument which normally can be relied upon to constantly reproduce musical sounds in any random order, in exactly the same regular and constant wave pattern.

Unmusical sound (or noise) will seldom, if ever, reproduce the same pattern. If a metal tray is dropped on the floor from a particular height, the wave pattern is unlikely to be exactly reproduced regardless of the number of times it is dropped. The tray will always sound like a metal tray being dropped, and we may even distinguish differences in listening to each drop, but a measured wave pattern will show more accurately the differences between them.

Questions to think about:







1. What are the two main categories into which sound can be divided?
2. Show the wave pattern which you would expect from a sound produced by: (a) a musical instrument, (b) a non-musical instrument

Answers: 1. Musical and unmusical sound, 2. See diagram above

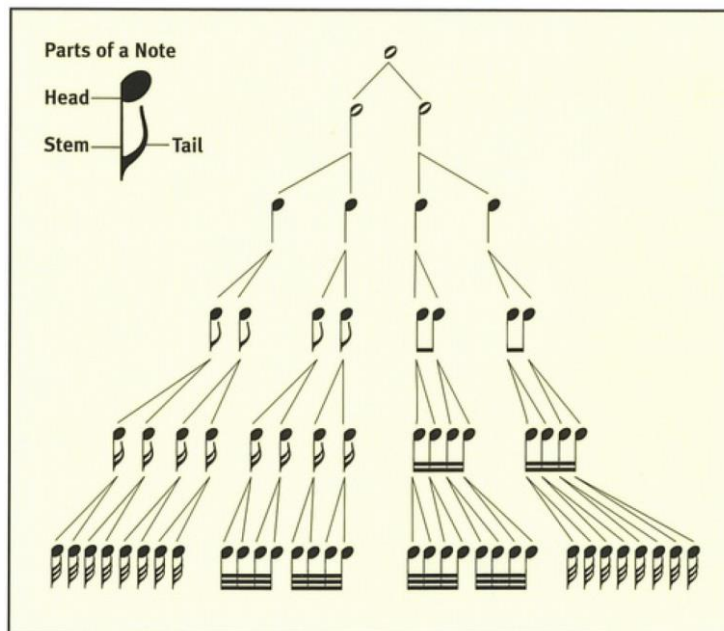
Note Duration

Duration is the length of a musical sound, or in other words the period of time during which a musical sound is sustained or held. Notes are characters or symbols used to show the relative length or duration of a musical sound.

In Staff Notation, six different note shapes are generally used to give the duration of a musical sound meaning to the eye. These signs or symbols are as follows:

Relative Note Value Scale		Absolute Note Value Scale
The Semi-breve The Whole Note (1)		The Semi-breve 4 crotchet beats
The Minim The Half Note (1/2)		The Minim 2 crotchet beats
The Crotchet The Quarter Note (1/4)		The Crotchet 1 crotchet beat
The Quaver The Eighth Note (1/8)		The Quaver 1/2 a crotchet beat
The Semi-Quaver The Sixteenth Note (1/16)		The Semi-Quaver 1/4 of a crotchet beat
The Demi-Semi-Quaver The Thirty Second Note (1/32)		The Demi-Semi-Quaver 1/8 of a crotchet beat













It should be noted that we need to learn both names of each of the note values (e.g. crotchet and $\frac{1}{4}$ note). A great way to visualise how these note values interact is the note value tree below:



Duration - Rests

Six note shapes are used to show the length of music sounds. Another 6 shapes, called a **rest**, are used in music to show a period of no sound (silence).

Each note has its equivalent rest and both share the same note name.



THE SEMIBREVE REST		Equal in value to	
THE MINIM REST		Equal in value to	
THE CROTCHET REST		Equal in value to	
THE QUAVER REST		Equal in value to	
THE SEMI-QUAVER REST		Equal in value to	
THE DEMI-SEMI QUAVER REST		Equal in value to	

Rests are common in drumming, as it is a staccato instrument. Bagpipes, however, are a legato instrument and therefore, it is very uncommon to use a rest in bagpipe music, except in some cases to show the end of a tune finishing without a full bar of music.

Rests follow the same principles of a normal note, with dots and cuts, and note groupings.

Questions to think about:

1. Explain the musical term 'duration'.
2. Name the note referred to as a Quarter Note. How many semi-quavers does it contain?
3. Which note represents two crotchets?
4. Complete the table below:

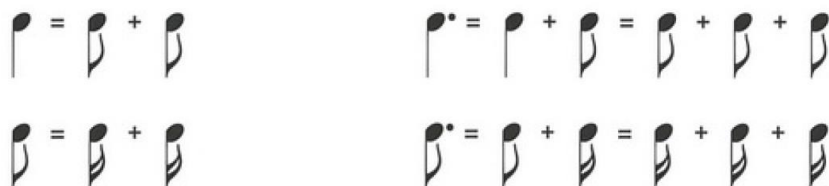
Note	Pitch Name	Duration Name	Duration Value
	D	Quaver	Eighth note (or 1/8)
			
			
			
			

5. What do rests show or represent?

Answers: 1. the length of a musical sound, or in other words the period of time during which a musical sound is sustained or held, 2. Crotchet = 4 semi-quavers, 3. Minim, 4. (a) e, quaver, eighth note (b) a, crotchet, quarter note (c) d, semi-quaver, sixteenth note (d) high a, minim, half note. 5. The duration of a period of silence

Duration and Note Groupings

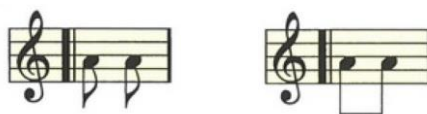
Remember from the previous lesson where each time a tail is added to the stem of a note its duration is halved. Similarly, we can increase the duration of a note by half by putting a **'dot'** after the note head.



Another way to increase the length of a note is to combine two notes of the same pitch with a **'tie'**. We use a tie rather than joining the notes together when the two notes are across multiple beats or bars. The tie is used to indicate that the pipes do not stop its' sound across the bar – whereas if we write the note twice without the tie, this would indicate that we need to play the note twice. While this can be done with instruments like a piano, we can't do that with bagpipes.



When we write out music, where possible we join together notes using a **'beam'**, which means that those notes are part of the same beat. The below illustration show two separate quavers (with two tails) which are then joined together with a beam using those two tails. We call this a **note grouping**. The beat always falls at the start of a note grouping.



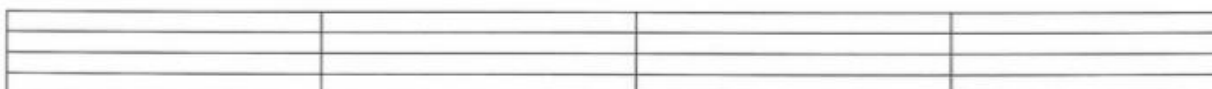
Where a note has 2 tails we can add a second beam. In the case of a dot and cut note grouping as below, we have a dotted quaver followed by a semi-quaver. The second beam in the semi-quaver represents the **'cut'**, to form a **'dot and cut'**.



Vary rarely we use a **double dot**. This adds the value of a single dot, plus an extra half a dot.



When music is written, it is divided into sections which contain the same number of beats. One of these sections is called a **'bar'**. A beat is a regularly occurring pulse. The interval between beats may contain one note or a group of notes which add up to 1 beat. **Bar lines** are vertical lines which appear at intervals along the stave and divide the music into the required number of beats.



At the beginning of a part of a tune, a double bar line is used. When the part is repeated, two dots are used.



Time Signatures

PRELIMINARY

In order to understand the rhythm of a piece of music, it is necessary to be able to interpret its' **time signature**. The time signature appears after the clef, and is represented by two numbers, one above the other.

The time signature identifies the number of what type of note is in each bar. For example, 2_4 time indicates that there are 2 crotchets ($\frac{1}{4}$ notes) in each bar. In pipe band music, bars normally contain 2, 3 or 4 beats.

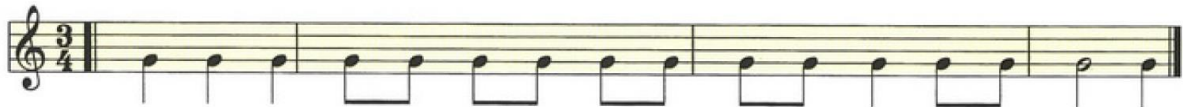
There are two types of time which are commonly used in pipe band music. These are called **Simple Time** and **Compound Time**.

In simple time, the 3 most common time signatures are 2_4 , 3_4 , and 4_4 . In simple time, each beat can be divided into **two equal parts**.

2_4 tells us that there are 2 notes in each bar, and that each of those notes (or note groupings) are crotchet ($\frac{1}{4}$ note) beats.



3_4 tells us that there are 3 notes in each bar, and that each of those notes (or note groupings) are crotchet ($\frac{1}{4}$ note) beats.



4_4 tells us that there are 4 notes in each bar, and that each of those notes (or note groupings) are crotchet ($\frac{1}{4}$ note) beats. 4_4 time is sometimes referred to as common time and is written as an incomplete circle which looks like a capital C.



The staves above contain examples of different note duration combinations which add up to the required number of beats in the bar, determined by the time signature. Try tapping out the rhythm to a steady beat. The beat will always be at the start of a note grouping.

Questions to think about:

1. What note value would be represented by a dotted crotchet?
2. What is the purpose of a tie?
3. What does the time signature $\frac{3}{4}$ represent?
4. What is a bar line?
5. What is the purpose of a double bar line?
6. What does a double dot do?

Answers: 1. $1 + \frac{1}{2}$ crotchets, or 3 quavers, 2. To join the notes together when two notes of the same pitch are across multiple beats or bars, where there is no embellishment to stop the constant sound 3. There are 3 quarter notes per bar 4. Vertical lines that divide the music into the correct number of beats 5. Signify the start and end of a part of music 6. Adds a single dot, plus an extra half dot

Compound Time

In pipe band music we often play tunes in **compound time**. The compound time signatures most often used are $\frac{6}{8}$, $\frac{9}{8}$, and $\frac{12}{8}$.

The main difference between simple time and compound time is that in simple time each beat can be divided into two equal parts, whereas in compound time it can be divided into **three equal parts**.

The time signature still tells us how many and what type of beat per bar. Because we are now counting in threes, each beat is worth three quavers ($\frac{1}{8}$ notes), which is equivalent to one dotted crotchet (dotted $\frac{1}{4}$ note).

$\frac{6}{8}$ tells us that there are 6 notes in each bar, and that each of those notes (or note groupings) are quaver ($\frac{1}{8}$ note) beats. Alternatively, there can be 2 dotted crotchets in each bar.



$\frac{9}{8}$ tells us that there are 9 notes in each bar, and that each of those notes (or note groupings) are quaver ($\frac{1}{8}$ note) beats. Alternatively, there can be 3 dotted crotchets in each bar.



$\frac{12}{8}$ tells us that there are 12 notes in each bar, and that each of those notes (or note groupings) are quaver ($\frac{1}{8}$ note) beats. Alternatively, there can be 4 dotted crotchets in each bar.

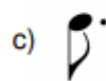


Be careful not to confuse simple time and compound time. In simple time a dotted crotchet would be a beat and a half, whereas in compound time a dotted crotchet is one beat.

Where a note or rest can be divided into two notes of equal value, we call this a **simple note**. Where a note or rest can be divided into three notes of equal value we call this a **compound note**.

Questions to think about:

1. What is a simple note?
2. What is a compound note?
3. Are the following notes simple or compound? →
4. What does the time signature $\frac{12}{8}$ represent?



Answers: 1. A note divisible by two, 2. A note divisible by three, 3. Simple, Compound, Compound, Simple 4. There are 12 eighth notes in each bar.

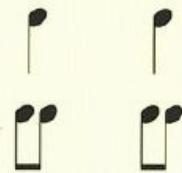
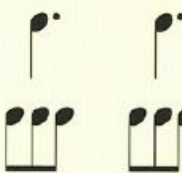

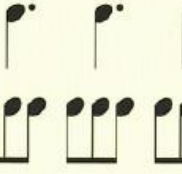
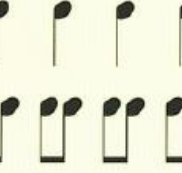
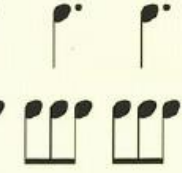
Simple Time vs Compound Time

Most music played has a natural and definite pattern of beats or pulses running through it forming a basic rhythm. Rhythm is the regular recurrence of the strong and weak accents arising from the division of the music into regular metrical portions.

These rhythmical patterns generally fall into three groups, collectively known as the “**kinds of time**”:

1. The 2 pulse pattern is call **Duple Time**
2. The 3 pulse pattern is called **Triple Time**
3. The 4 pulse pattern is called **Quadruple Time**

The relationship between simple and compound time can be seen in the table below.

No. Beats/Bar	Simple Time	Compound Time
2 (Duple)	2_4 	6_8 
3 (Triple)	3_4 	9_8 
4 (Quadruple)	4_4 	12_8 

The use of these names is interchangeable. For example we could call 2_4 time **simple duple** time, or 12_8 time **compound quadruple** time.

Each of these kinds of time have different pulse patterns:

- Duple time has a pattern of Strong – Weak
- Triple time has a pattern of Strong – Weak – Weak
- Quadruple time has a pattern of Strong – Weak – Medium - Weak

Questions to think about:

1. How many kinds of time are there?
2. If a pulse pattern was STRONG-WEAK-MEDIUM-WEAK, what kind of time would it be?
3. Give the pulse pattern for simple duple time.

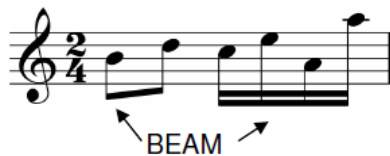
Answers: 1. 3 – duple, triple, quadruple 2. Quadruple time, 3. Strong, Weak

Writing Music

Music is as much a way of communication as speech, therefore each musician must know how to play, read, and write music so that it can be understood by anyone who is tasked with playing the piece.

The basic rules in writing staff notation in both piping and drumming are:

1. The head of the note must be clearly written either on a line or space. If a note is in a space it should just touch both the top and bottom lines. All note heads should be the same size.
2. Stems always go downwards with tails either going up to the right of the stem or joined together as part of a note grouping. These tails should be easily distinguishable.
3. Where possible, all notes should be grouped into a beat note by beams to show that they are obviously part of that beat note.



4. All tails or beams must be written below the lowest line of the staff (first line).
5. Embellishments must clearly indicate what is being played by their relative position. For piping this will indicate which note is being played and for drummers this will indicate which hand is being used.



6. Notes and embellishments should be evenly spaced to ensure it is as easy as possible for the reader to understand the music.
7. Where dots and cuts are used, the direction of the cut should be directed at the relevant dot.



The above principles apply equally when using rests



Try writing out a whole part of a simple time march with your tutor.

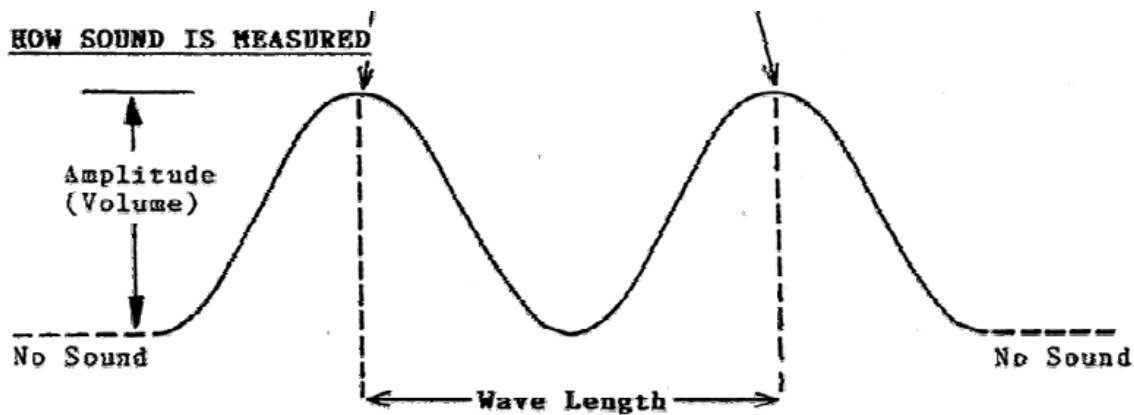
The Mechanics of Sound

Sound is caused by vibrations which our ears can sometimes hear. Sound can only be produced and registered if all four of the essential elements are present:

- (1) **Originator** - Piper / Drummer
- (2) **Vibrating Body** - Reeds / Drumskins
- (3) **Medium** - Air / Water
- (4) **Receptor** - Ear

Should any one of these elements be missing, then sound cannot be produced.

How do sound waves work? Well, the key components to these waves are **amplitude (volume)** and **wave length (pitch)**. Once an originator produces sound through a vibrating body, in a very short space of time the sound goes up and then back down. The higher up the wave goes, the louder it will be. The shorter the wave length, the higher pitch it will be.



How do we measure sound? Look on a tuner and notice 'Hz' (this means Hertz). This indicates how many cycles of vibrations there are per second. Think of a bagpipe tuning to 480Hz. That's 480 vibration cycles per second!

Questions to think about:

1. What would happen if we tried to play bagpipes or drums in a vacuum (no air or water?)
2. What else could be a receptor?
3. What would happen to the sound wave if we had a very loud and sharp noise?
4. What happens as the pitch increases?

Answers: 1. No sound would be transmitted, 2. A microphone, the body of an animal (i.e. shark), 3. Big amplitude, short wave length, 4. We eventually end up at a new note.

Types of musical sound

There are TWO kinds of musical sound:

1. **Legato** - *Smooth and connected*

Legato sounds are played so that each note connects smoothly with each successive Note.

2. **Staccato** - *Short and detached*

Staccato sounds are the opposite of LEGATO sounds and these are played so that there is a definite period of silence between each note.

The Characteristics of Sound

- (1) **Pitch** – the height or depth of sound
- (2) **Volume** – Loudness or softness, the intensity of the sound
- (3) **Quality** – Timbre, tone quality

Quality of musical sound, also called **timbre** or colour, is what distinguishes between sounds of the same pitch e.g. a trumpet from bagpipe; whether one piper has a better sound than another.

When a musical sound, or note, is produced, the quality of the sound is affected by other less easily heard/distinguished sounds which are produced at the same time as the main pitch note.

This central or main pitch note is called the 'Fundamental' and the other sounds which occur at the same time are called 'Harmonics', 'Overtones', or 'Partials'.

When two different instruments sound alike, this is due to the similarity of the harmonics.

Questions to think about:

1. Do bagpipes produce Legato or Staccato sound?
2. Do drums produce Legato or Staccato sound?
3. If you were comparing the sound produced by 2 bagpipes and one sounded nicer than the other, how could you describe the difference in sound quality?
4. What are the characteristics of musical sound?
5. What are the two kinds of musical sound?

Answers: 1. Legato, 2. Staccato (Note: A roll on the snare drum consists of a rapid succession of sounds, which, when played correctly, will give the impression of a Legato sound), 3. Good timbre. 4. Pitch, volume, quality 5. Legato and staccato

Tempo, Volume and Expression

Tempo is the speed at which a piece of music is played and can be shown in various ways on the staff. Sometimes broad statements will be used such as **allegro** which means **fast**, or **lento** which means **slow**. Sometimes the tempo may be written on the music. However, in pipe band music this is often not written and will be determined and commanded by the leading piper or drummer. In sets like a medley, these tempos may change between tunes in the same set.

Volume is the loudness or softness of the music being played. Thinking back to the lesson on the mechanics of sound: volume is the amplitude of the sound wave.

Bagpipes cannot change volume during a piece of music. Instead we use embellishments to provide a similar effect. Drummers, however, can use varying levels of volume, known as **dynamics** or **expression**. Where a number of notes or beats change volume we use the below symbols. These are called **crescendo** (gradually louder) and **diminuendo** (gradually softer).



Crescendo



Diminuendo

Where individual notes are being stressed or emphasised through increasing the volume we use the below symbols called accents, with the first meaning loud and the second being even louder.



Loud Louder

In pipe bands, the first and second time respectively of a part are called the **Piano (P)** and **Double Forte (FF)**. These terms are predominantly used in drumming, although equally apply to piping.

Some different things to consider

Sometimes when writing music, most commonly at the start of a part, we write notes that do not form a full bar (an incomplete bar). For example a note grouping may add up to 1 crotchet beat rather than 2 in 2_4 time. These are used to introduce the music. These are called the **anacrusis**.



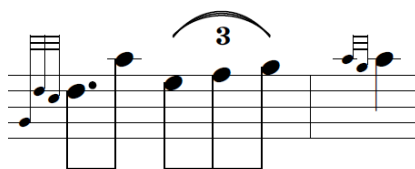
If the part is repeated, or there is an anacrusis at the start of the next part, the last bar in the part will also be an incomplete bar, which when added to the anacrusis will have value equal to a complete bar.

Sometimes when we repeat parts we don't play the same full passage both times. In this case, we use the below bracket type symbols with 1 and 2 to indicate which time through (1st or 2nd) that section of music is to be played. Where this happens multiple times during a piece of music this may be written as **1 of 2** and **2 of 2**, etc. which means first time through the second part and second time through the second part respectively.



While we have discussed the division of simple and compound time, occasionally we want to divide a beat note into a greater or lesser number of parts than normal. These are called **irregular groupings**. For example, it is common in a strathspey to play a run of three notes over the space of 1 beat.

While a strathspey is 4_4 time, we represent this as 3 quavers with a tie over it and the number 3 – representing that we are playing 3 notes over the 1 beat (3 notes in the time of 2).



How do bagpipes and drums make sound?

Bagpipes

In the bagpipe, the vibrating bodies, that is, the reeds, set columns of air vibrating along tubes – the chanter and the drones.

The length of the column of air has a direct influence on pitch. The longest drone, the Bass, is lower in the pitch than the shorter drones, the Tenor.

The chanter uses the same principle. The lowest note, Low G, is the furthest from the reed, therefore the air column is long, and, as the player raises fingers one after the other to sound Low A, B etc., the column is shortened and the sound or notes are successively higher in pitch.

When we tune the chanter and drones we are trying to match up the vibrations from all of the vibrating bodies (drone reeds, chanter reeds) to the same Hz.

Drums

The different sizes of bass and tenor drums also indicate the principle of larger vibrating bodies giving lower sounds. Think about how much bigger the bass drum is compared to a small tenor drum. Did you know that the tenor and bass drums are typically tuned to notes on the bagpipe chanter? While the size of the drum has an impact on which note it tunes to, the heads (top and bottom) are stretched tight to cause shorter wave lengths and a higher pitch.

While instruments such as the bagpipes and tenor/bass drums can play a melody and serve harmonic functions, other instruments such as the snare drum produces sounds with complex overtones and a wide range of frequencies such that no single, definite pitch is discernible – called **indefinite pitch**. As a result, snare drums are given the roles of rhythm-making. It is however possible for sounds of indefinite pitch to clearly be higher or lower than one another. For instance, a snare drum sounds higher in pitch than a bass drum. This is called **relative pitch**. As such, the drums will work with any harmony or key that a band may play. This is why we write drum scores on a single line.

Questions to think about:

1. What happens when all of the bagpipes or drums are in tune together?
2. What can influence the sound created from a bagpipe or drum?
3. What happens to the sound when a drummer uses an “accent”?

Answers: 1. The amplitude (volume) increases, 2. Tuning, the pressure/blowing from the player, moisture, dampening to the drum, sticks, how hard the drum head is hit, mould, etc. 3. The amplitude/volume increases.

Embellishments

Embellishments are short notes which are played in addition to the melody or theme notes and are used to create dynamics to the music. In piping, this is the only way we can create dynamics. These embellishments are used to emphasise certain notes or rhythms (i.e. to stress the strong pulse or highlight a particular rhythm). Pipers have a number of movements which are embellishments such as gracenotes, doublings, taorluaths, grips, etc. Embellishments for drummers include movements such as flams, drags, ruffs, etc.

Embellishments are shown with their stems upwards and are written physically smaller than the notes that form the melody. With both piping and drumming, embellishments are not considered to have value when putting the notes into bars for timing purposes. Instead, they form part of the value of the note that follows the embellishment.

The image displays two musical staves illustrating various embellishments. The top staff, in treble clef, shows a sequence of notes with smaller stems above them representing embellishments. Labels above the staff include 'Single Gracenotes' and 'Birl'. Labels below the staff include 'D Throw' and 'Doubling'. The bottom staff, in bass clef, shows a sequence of notes with smaller stems above them representing embellishments. Labels below the staff include 'Flam', 'Drag', and '4 Stroke Rough/Ruff'.