Music Theory For Sound Editors

Why Learn About Music ?

- 1. Most audio projects include music:
  - Music albums
  - Voice auditions have background music
  - All marketing media except paper
  - All introductions for shows, presentations
  - And...

Why Learn About Music ?

- 2. The right music is a ***powerful communicator***.
  - 25% or more of a film's communication is through music
  - Happiness, sadness, fear, danger, tension, pace
  - Conflict is coming – Conflict is over
  - Themes communicate character and place

Why Learn About Music ?

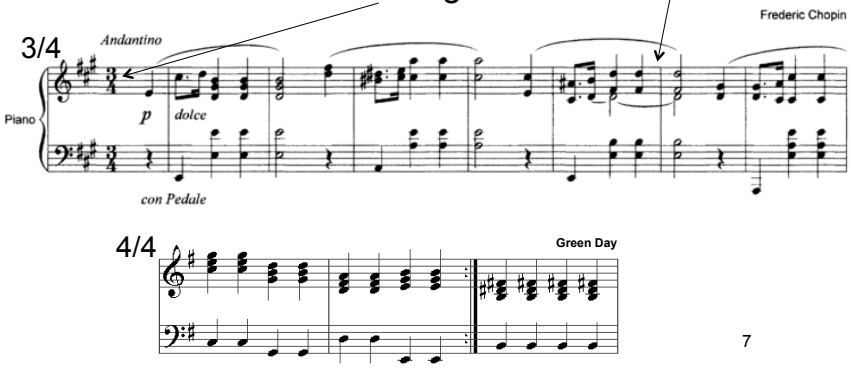
- Supporting music for drama, game design, ambiance, ***is not difficult*** to create if you understand a few basic musical relationships.
  - Fundamentals
    - Scale - Meter - Key
  - Cookbook strategies
    - Tension - Resolution - Simple Melodic Backgrounds
    - Simple repeatable building blocks
  - The right combination of notes
    - Happy note combinations - Sad ones- Tense ones

- 3. Software such as loop editors and sequencers use basic musical structure, notation, and terminology for the user interface.
  - You need to understand basic musical terminology to make the most of the tools
- 4. If more sophisticated music is required, as producer. you need to be able to communicate with musicians.

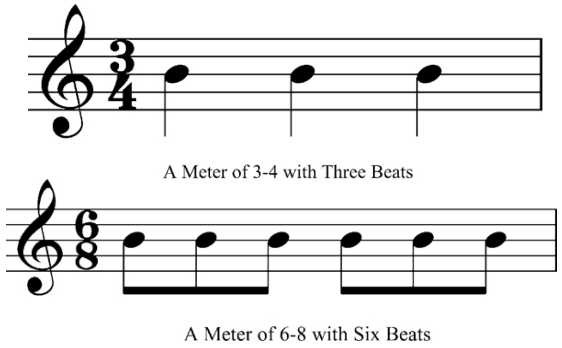
Beats and Meter

- Beats
  - Fundamental pulses at regular time interval
- Tempo
  - Beats per minute
- Measure
  - A handy building block - usually about 1 to 4 seconds long
  - A pulse-group. In pop music, some aspect of the music often repeats (with variations), like a basic drum or bass pattern
- Meter
  - How many beats/notes in a measure
  - Indicated by a *Time Signature, as 4/4 or 3/4*

- Measures are sometimes called ***bars***
  - Probably called that because of the vertical bars in music notation.
  - Notice the time signature



Meter Notation



A Meter of 3-4 with Three Beats

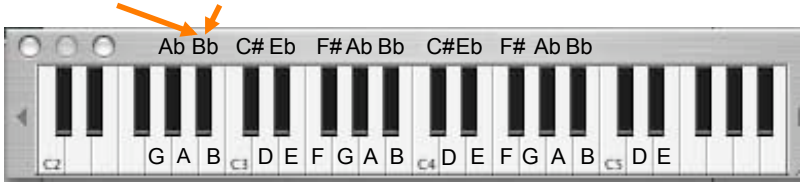
A Meter of 6-8 with Six Beats

We Get Much of Our Musical Scale from Pythagoras

- He reasoned music would be easiest to enjoy if it were based on straightforward mathematical ratios.
- We still use them today! Either he was right or we've simply gotten used to them.
- Our note pitches come from ratios:
  - Starting pitch x1.5 x1.33 x1.25 -etc

How Many Possible Notes Do We Have?

- **12** (That's it! Then we repeat at double Hz)
  - ***A Bb B C C# D Eb E F F# G Ab A***
- Looking at a piano keyboard
  - the sharps(#) and flats (b) are the black keys.
  - Bb and A# would be the same note.

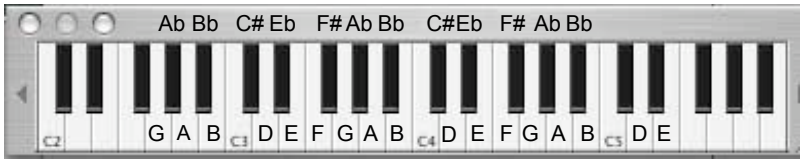


A Musical *Scale*

- For our purposes, think of a ***scale*** is a set of musical notes that ***sound good together***.
  - So if we stick to the notes of a particular scale, ***it will usually sound right***.
- Notes in C major scale: C D E F G A B C
  - The most common "**key**"
  - Includes only the white notes on a keyboard!
  - Easy to work with
  - Software can change it to other "keys"

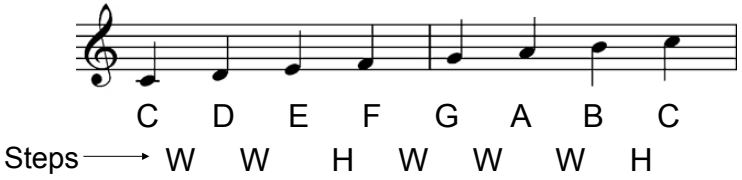
Defining a Scale in Steps

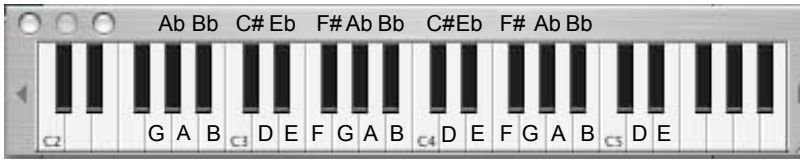
- **"half step"** is the next note on a piano
  - A to Bb or Bb to B etc
- **"whole step"** skips a note on a piano
  - A to B or B to C# etc



Sometimes a half-step is called a "semitone"

C major Scale Pattern





Transposing Keys

- Use the software tools to move from C to any other major key.
  - Typical Example
    - Select notes in the sequencer editor
    - Choose transpose from the options at bottom
      - A "semitone" is another term for a half-step
    - So 2 half-steps would move the key from C to D
    - 2 more half-steps would move the key from D to E
    - 5 half-steps would move the key from C to F
    - 7 half-steps would move the key from C to G

Music Structure

- Traditional music has an underlying shape, which constitutes its ***form***.
  - Think of form as the way musical building blocks are ***arranged***.
  - Building blocks might be ***measures*** (short) or ***movements*** (long sections) or just ***verses*** and ***choruses***.
  - Classical music forms
    - "Ternary" ABA
    - "Arch" ABCBA

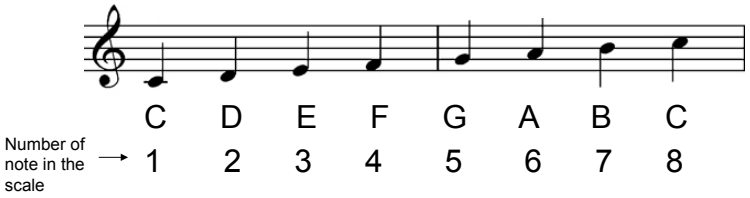
  - Example: ***blues*** has several basic forms that are used over and over, based on measures.
    - also called "bars"
      - Referring to the lines between measures in music notation
  - 8-bar blues A A B A C B A C
  - 12-bar blues A A A A B B A A D C A C
  - Most of *our* pop music is based on similar blues forms.

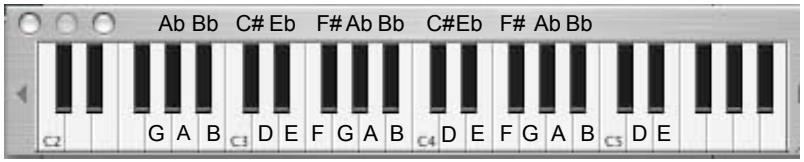
Break

Scales and Emotions

- **Major scale- *steady, strong, happy***
  - First note, whole step, whole step, half step, whole step, whole step, whole step, half step
    - W W H W W W H
- **Minor scale- *darker, sadder, complex***
  - First note, whole step, half step, whole step, whole step, half step, whole step, whole step
    - W H W W H W W
- Useful information for sound designers

C major Scale

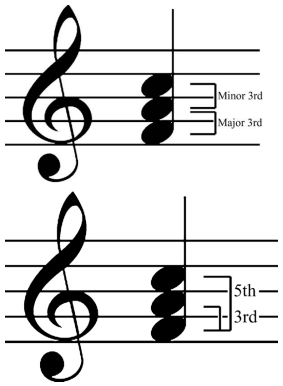




Scale Degrees

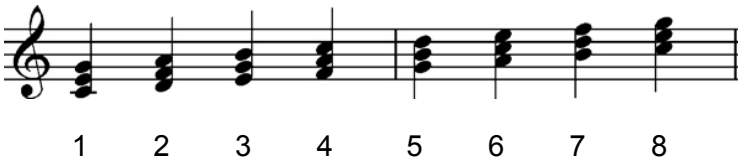
- Each note of a scale has a specific number applied to it.
- The first note is called ***one***, the second is called ***two*** or ***second***, and so on up to the ***octave***, which is number ***eight***.
  - (Sometimes 9th, 11th, 13th are specified too.)
- This is shortcut terminology when building harmonic and melodic formations. Sometimes we know the number of the note in the scale that we want, even if we don't know the key!

Chords and Their “Intervals*”



- Three or more notes sounding simultaneously is considered a chord.
- Major Chord
  - Root note
  - Note up four ½ steps*
  - Note up three more ½ steps*
- (F major shown)

Chord Scale (C major)



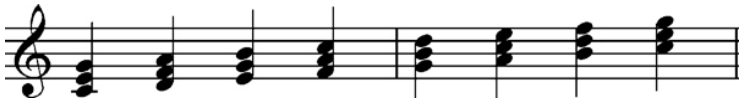
1 2 3 4 5 6 7 8

Each chord built of three notes:

Root note (one of the notes in the C major scale)
Second note four ½ steps up
Third note three ½ steps up from that

Assigning Numbers to a Chord Scale

(C major used for example)



1 2 3 4 5 6 7 8

We use these numbers as shorthand to:

- Refer to a particular chord in an arrangement
- To identify building blocks (the “form”) of a production

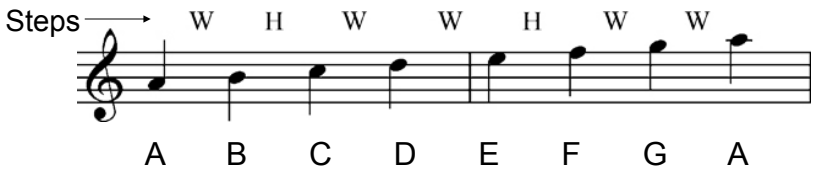
Example “12-bar Blues”: 1 1 1 1 4 4 1 1 5 4 1 5

Note using numbers instead of notes means we can use the form to play the piece in any key! The starting chord might change, but the numbers would be the same in any key.

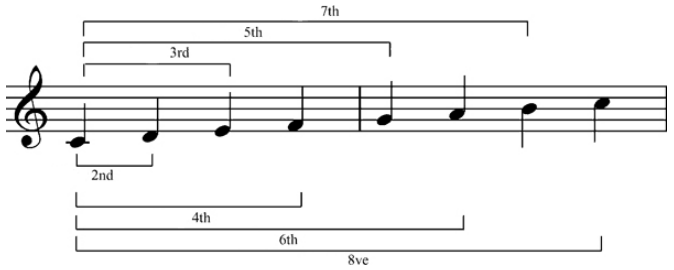
Break

Minor Scale Pattern

- Steps: W H W W H W W
- Example: *Key of A Minor*
  - Easiest one to remember because it only uses white keys!



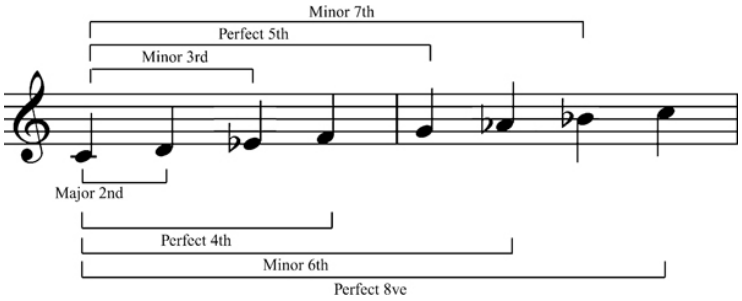
Scale Intervals (C major scale shown)



C D E F G A B C

W W H W W W H

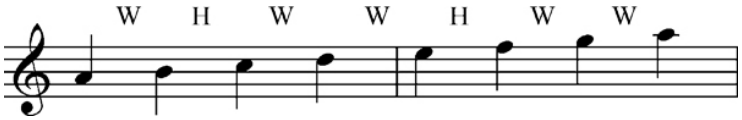
Scale Intervals (C minor scale shown)



C D Eb F G Ab Bb C

W H W W H W W

A minor

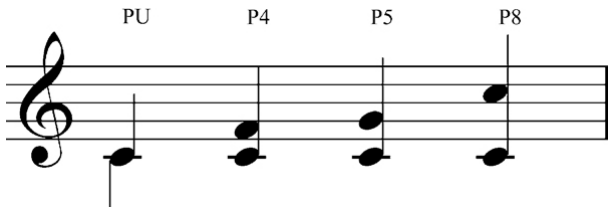


A B C D E F G A

W H W W H W W

Intervals

- Perfect intervals with C



Intervals

- All Intervals

Table 5-5. Interval names and equivalents

Interval Name	Half Steps Required to Create the Interval
Perfect unison	0
Minor second	1
Major second	2
Minor third	3
Major third	4
Perfect fourth	5
Tritone/diminished fifth/augmented fourth	6
Perfect fifth	7
Minor sixth	8
Major sixth	9
Minor seventh	10
Major seventh	11
Perfect octave	12

Consonant and Dissonant Intervals

- Associated with western (European) music. *(and therefore, our usual audience)*
- Consonant intervals are ***comfortable.***
- Dissonant intervals cause ***tension*** and desire to be resolved to consonant intervals.

Typical Sound Track **Interval** Strategies

Start with **two notes**

Octave	Purity, peace, unity
Fifth	Harmony, obvious change
Fourth	Harmony, gentle change
Third	Harmony, interest
Flatted Third	Darker, sad
Second	Tension
Flatted Second	Discord, real problems
	Uncomfortable

- *Useful information for sound designers!*

Using frequency equivalents and Multiplier Ratios for Non-Musical Sounds

- When combining sounds in a sound track, the frequencies associated with the rest of the sound track need to be considered.
  - Example: We can find the average frequency of a kitchen blender in a restaurant and match a second machine to it in a perfect 5th, to give the impression everything is “running harmoniously.”
  - Also, we generally avoid placing multiple sounds, with the same average frequencies, in the same location in the sound field. They tend to mask each other.

Frequency Multipliers

Table 5-6. Intervallic multipliers

Interval Name	Frequency Multiplier
Unison	1.0000
Minor second	1.0595
Major second	1.1225
Minor third	1.1892
Major third	1.2599
Perfect fourth	1.3348
Tritone	1.4142
Perfect fifth	1.4983
Minor sixth	1.5874
Major sixth	1.6818
Minor seventh	1.7818
Major seventh	1.8897
Perfect octave	2.0000

Other Ways Musical Notes Can Support Communication

- Low Tones - heavier, more important
- Rising Tones - about to happen
- 3/4 Time - graceful
- Resolving - tension is over
  - Resolving - ending on the home chord
  - Resolving - from a suspended chord
    - From CFG to CEG
  - Resolving - from an augmented chord
    - From CEG# to CEG

End

(General music information is included on the following slides.)

Rhythm

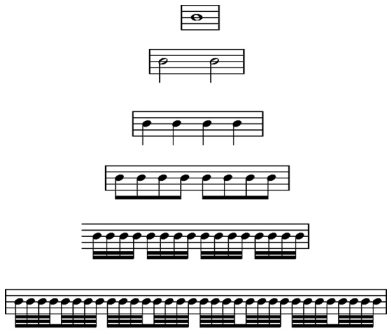
- Common Meaning
  - Reoccurring beat pattern (may include contrasts)
- Formal Meaning
  - How whole notes are divided up in a measure

- The rhythm is usually clear to the listener with a little practice.

Rhythm Patterns in Pop Music

- Usually last for some multiple of **four** measures
- For example, the ***verse*** and ***chorus*** parts of a popular song often last for 16 or 32 measures each.

Rhythm Notation



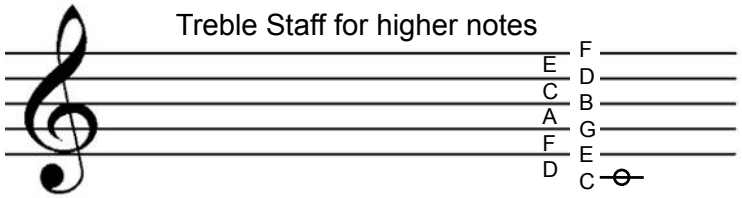
Rhythmic Breakdown of a Whole Note

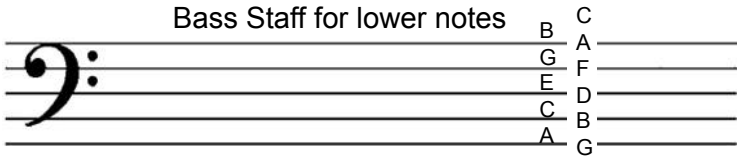
- The variation of duration of sounds or other events over time.

Dynamics Notation

Table 5-2. Italian and English dynamic conversion chart.

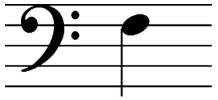
Dynamic Marking	Italian Word	English Translation
ppp	Pianississimo	Very, very soft
pp	Pianissimo	Very soft
p	Piano	Soft
mp	Mezzo piano	Medium soft
mf	Mezzo forte	Medium loud
f	Forte	Loud
ff	Fortissimo	Very loud
fff	Fortississimo	Very, very loud





Clefs

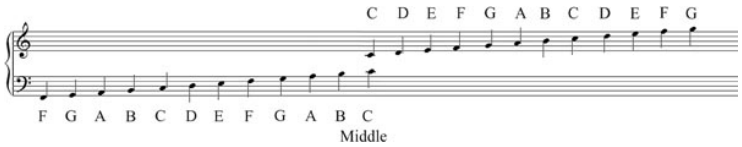
G line is marked by the ***treble clef*** icon



F line is marked by the ***bass clef*** icon

Grand Stave or Staff

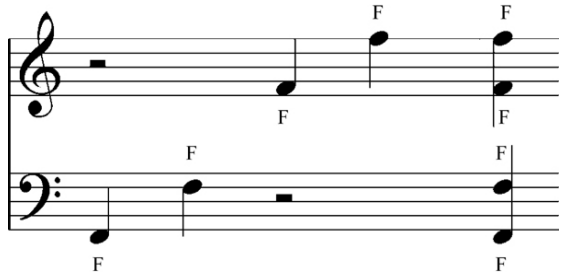
- Contains the treble and bass clefs
- Also called the “keyboard” stave



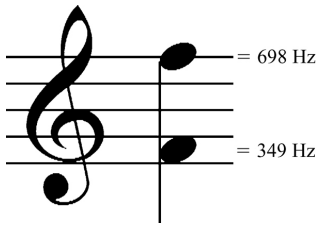
Notes are named ABCDEFG and then repeat

The Octave

- A musical interval that is produced by doubling the frequency of the lower pitch.

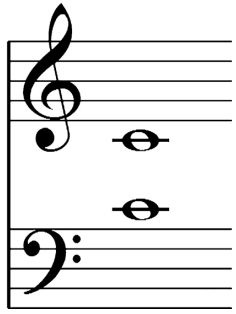


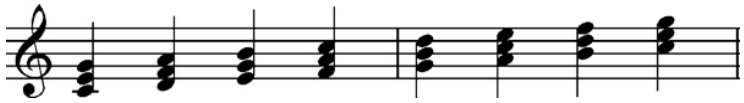
Frequency Equivalents



- Every pitch can be equated to a specific frequency.
- This frequency is considered an equivalent to the pitch.
- Very important when designing a sound track around music or dialogue.
- (**F**s an octave apart)

Between the treble and bass clef: Middle C



- Middle C can be indicated by one ledger line (—) below the treble stave or one ledger line above the bass clef stave. (The same note!)
- Ledger lines are used for notes that are above or below either stave.

Chord Scale (C major)