

## 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...

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## 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

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## 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

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- 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.

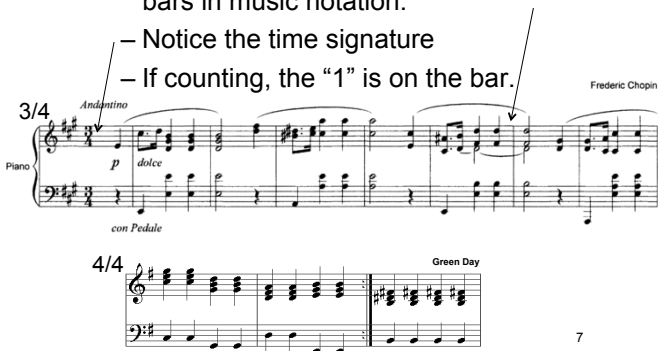
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## Beats and Meter

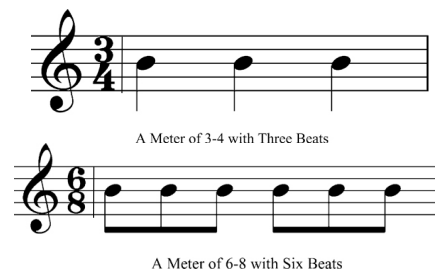
- Beats
  - Fundamental pulses at regular time interval
- Tempo
  - Beats per minute
- Measure
  - A handy building block - usually about 1 to 4 seconds long
  - A pulse-group. In pop music, some aspect of the music often repeats (with variations), like a basic drum or bass pattern
- Meter
  - How many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

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- Measures are sometimes called **bars**
  - Probably called that because of the vertical bars in music notation.
  - Notice the time signature
  - If counting, the “1” is on the bar.



## Meter Notation



## We Get Much of Our Musical Scale from Pythagoras

- He reasoned since math is joyful, 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
- Over the centuries, these have been adjusted a bit to make pianos work right.

## 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!
    - So it is easy to work with
  - Software can change notes to other “keys”

## Defining a Scale in Steps

- A **half step** or **semitone** is to the next note possible (out of 12 possible)
  - A to Bb or Bb to B or E to F, etc
- A **whole step** skips a note (= 2 half steps)
  - A to B or B to C# or C# to D#, etc



## C major Scale Pattern

Steps → Whole Whole Half Whole Whole Whole Half

Notice that no black keys are in C major.  
And every white key is in C major.  
Stay on the white keys and you are safe.

## Transposing From One Key to Another

- All major keys (12) have the same arrangement of steps between their notes.
- The *transpose* tool moves notes from any key to any other key
  - Typical Example
    - Select notes in the MIDI editor, or choose a recorded event
    - Choose transpose from the options (For instance: Inspector)
      - Remember, 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

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## 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!

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## C major Scale has 8 Notes

Number of note in the scale, or scale degrees → 1 2 3 4 5 6 7 8

## Music Structure

- Traditional music has an underlying shape, which constitutes its **form**.
  - Think of form as the way musical building blocks are **arranged**.
  - Musical building blocks can be **measures** (short) or **movements** (long sections) or just **verses** and **choruses**.
  - Classical music forms
    - “Ternary” type **A**, then type **B**, then type **A** again (or 1-2-1)
    - “Arch” **ABCBA** or 1-2-3-2-1

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## The Blues Form

- 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
- In blues specific chords used are based on the scale
  - A is 1<sup>st</sup> note in scale. B is 4<sup>th</sup> note in scale. C is 5<sup>th</sup> note in scale
- 8-bar blues Form: 1 1 4 1 5 4 1 5
- 12-bar blues Form: 1 1 1 1 4 4 1 1 5 4 1 5
- Most of *our* popular music is based on similar blues forms.

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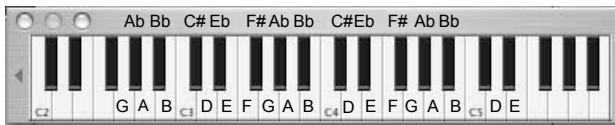
# Break

# 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 has 8 Notes

Number of note in the scale → 1 2 3 4 5 6 7 8

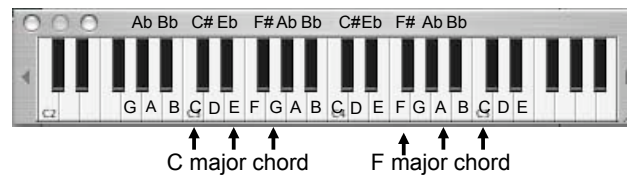


## A Chord



(F major shown)

- Three or more notes sounding simultaneously.
  - A Major Chord
    - Root note of the chord
      - could be the first scale note
    - Skip the next note in scale
    - Skip the next note in scale
- Example in key of C: C + E + G



## Chords in 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 is always four 1/2 steps up from root  
 Third note is three 1/2 steps up from second note

## 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.

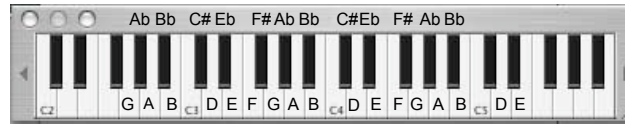
# Break

# 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!

Steps → W H W W H W W

A B C D E F G A



# Scale Intervals (C major scale shown)

C D E F G A B C

Steps: Whole Whole Half Whole Whole Whole Half

# 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

PU P4 P5 P8

# Intervals

- All Intervals

**Table 5-5. Interval names and equivalents**

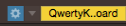
Interval Name	Half Steps Required to Create the Interval
Perfect unison	0
Minor second	1
Major second	2
Minor third	3
Major third	4
Perfect fourth	5
Tritone/diminished fifth/augmented fourth	6
Perfect fifth	7
Minor sixth	8
Major sixth	9
Minor seventh	10
Major seventh	11
Perfect octave	12

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# Time Out

- Let's get this to work in Studio One
- Set up a computer keyboard as an input device, so that you can select more than one note at a time.
- First tell S1 that you want to set up a QWERTY keyboard musical device input
  - Song > Song Setup > Preferences
  - > External Devices > Add > Presonus
  - > QWERTY Keyboard – OK - OK

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- Let's add an instrument from the *Browser Panel*:
  - Presence* is the only one available in Prime.
  - Drag it into a track.
  - Change the instrument from default to Cello, or?
    - Notice the keyboard works only one note at a time.
  - Notice  in the *Presence* upper right.
  - Click the down arrow and choose QwertyKeyboard.
  - Click the gear icon to open the control line.
  - Click the Control down arrow to QwertyKeyboard.
  - Then to the left of track, change All inputs to Qwerty Keyboard. Now record as you play it!

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Back to Design

## Consonant and Dissonant Intervals

- Associated with western (European) music. (*and therefore, our usual audience*)
- Consonant intervals are **comfortable**.
- Dissonant intervals communicate or cause **tension** and desire to be resolved to consonant intervals.
  - Flatted 3<sup>rd</sup>, 2<sup>nd</sup>, and Flatted 2<sup>nd</sup>, are common

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## Typical Sound Track Interval Strategies

Useful information for sound designers...

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

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## 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

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## 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.

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## Frequency Multipliers Pythagoras with adjustments The Math behind the Notes

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

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End

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

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