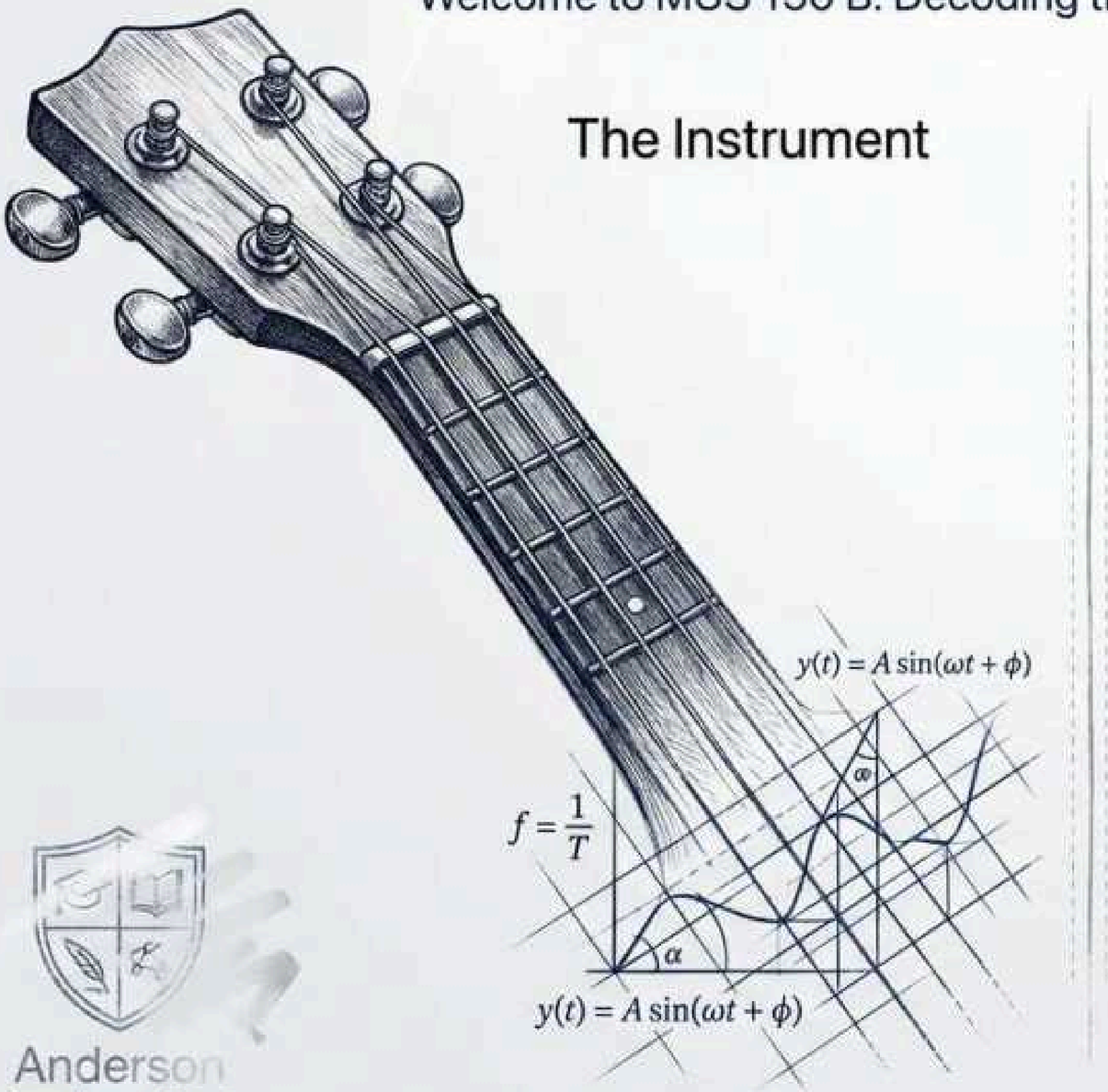
Welcome to MUS 150 B: Decoding the Ukulele's Mathematical Canvas

¶ 0.1

The Instrument



The Commitment & Audience

Time = 6 Lectures × 10 min
= ~1 Hour Total

Who is this for?

- Owns a ukulele [✓]
- Can strum basic chords [✓]
- Wants to know why [✓]

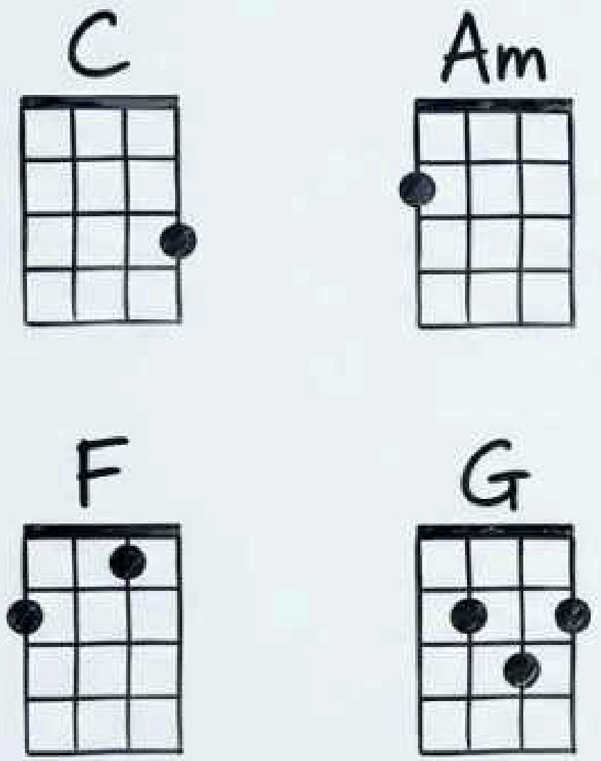
Anderson
Academy Brief

Gemini Notebook

Theory transforms isolated chord shapes into an interconnected system.

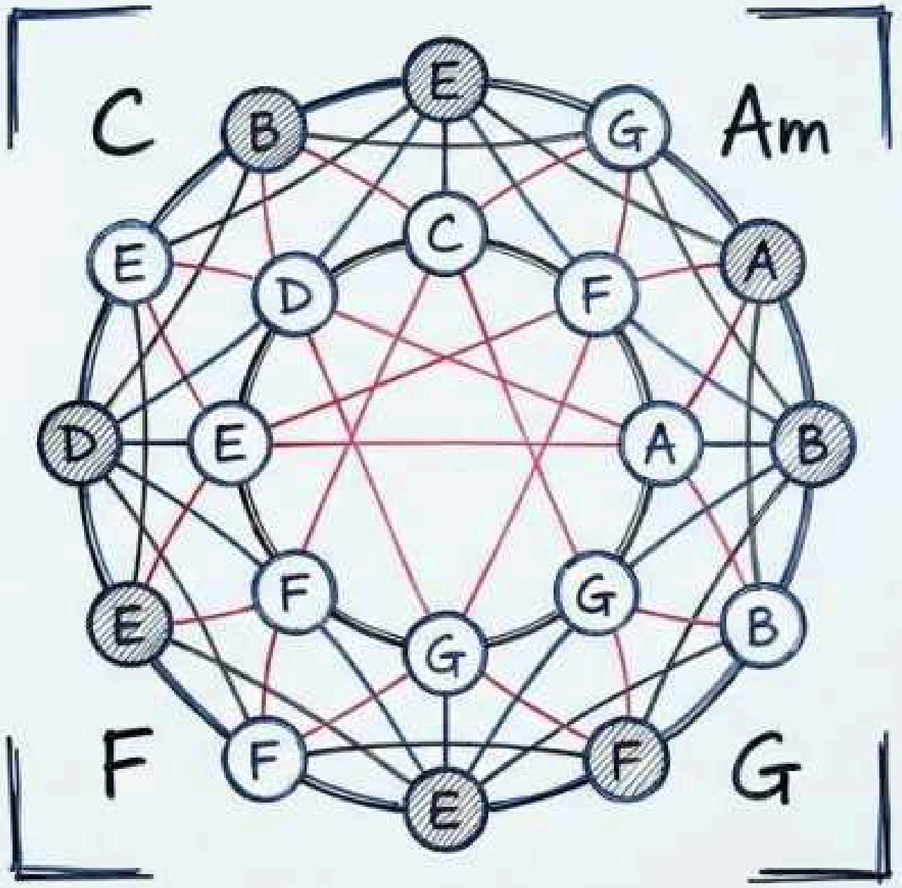
¶ 0.2

Before: Memorized Shapes



Music Theory

After: The Unified Map



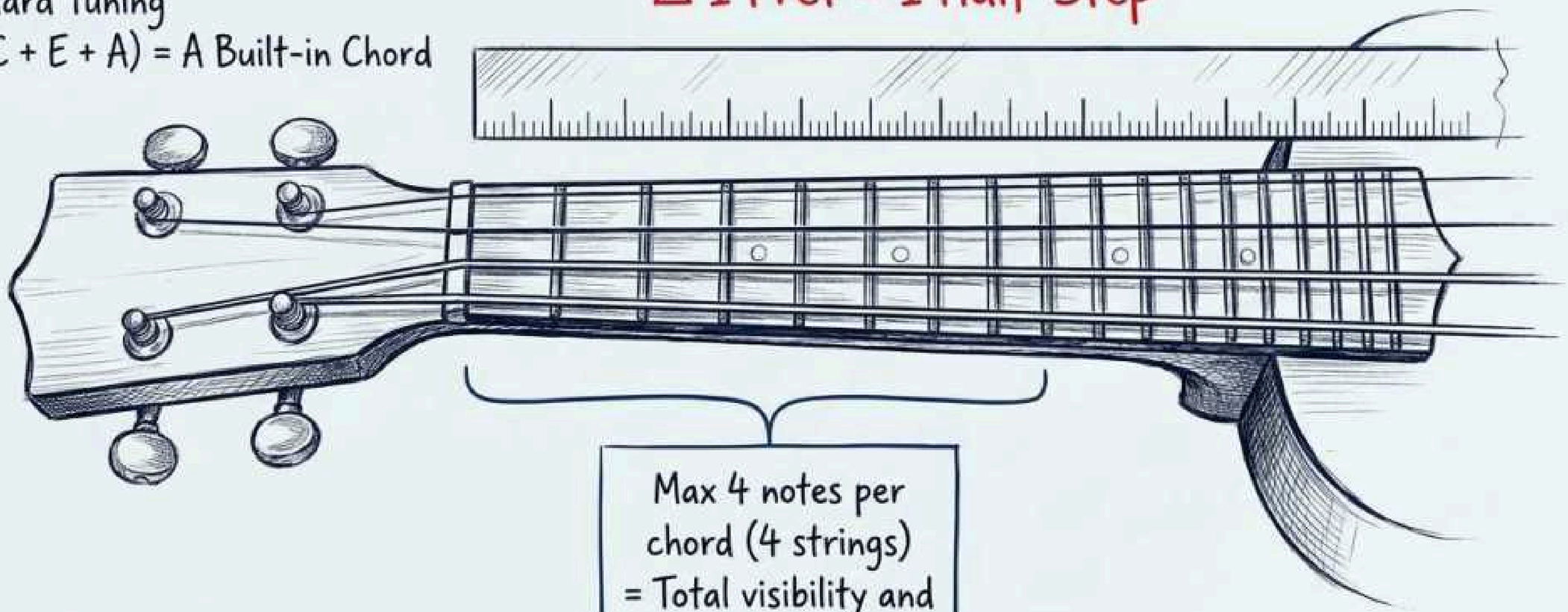
Theory turns memorized shapes into a system you can reason about—making every key accessible.

Gemini Notebook

The ukulele fretboard is a geometric ruler for musical distance.

Standard Tuning
(G + C + E + A) = A Built-in Chord

Δ 1 Fret = 1 Half-Step



Max 4 notes per chord (4 strings) = Total visibility and no hidden theory.

Gemini Notebook

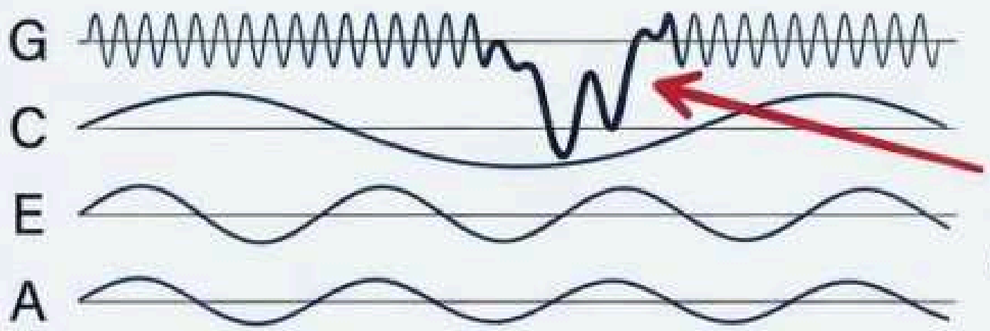
Module I: Mapping the Instrument's Physical and Sonic Boundaries

Foundations

Lecture 1

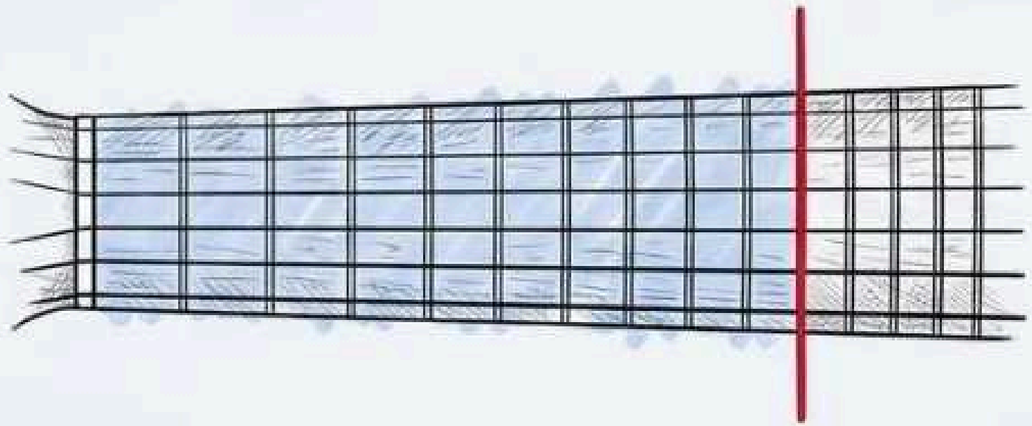


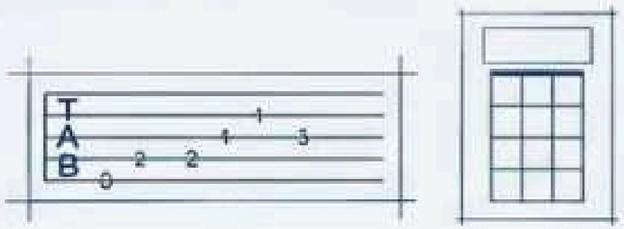
Soprano → Concert → Tenor → Baritone



The secret to the bright ukulele sound.

Lecture 2





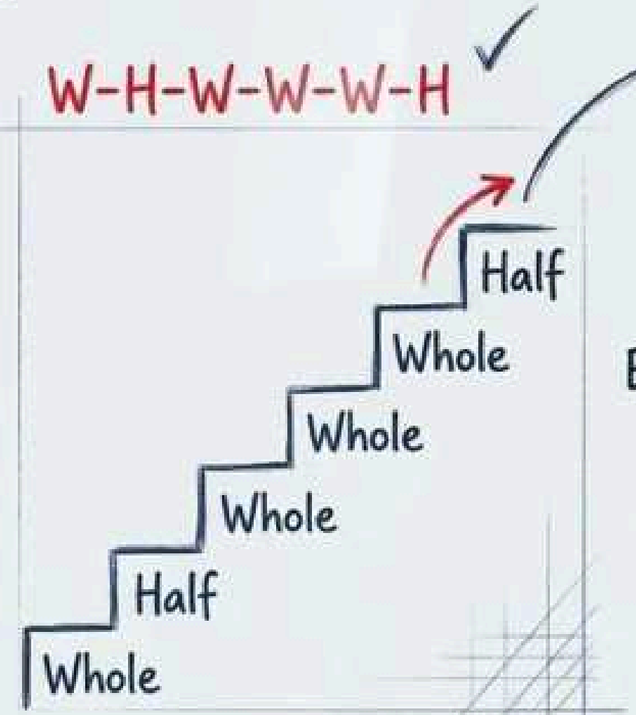
Gemini Notebook

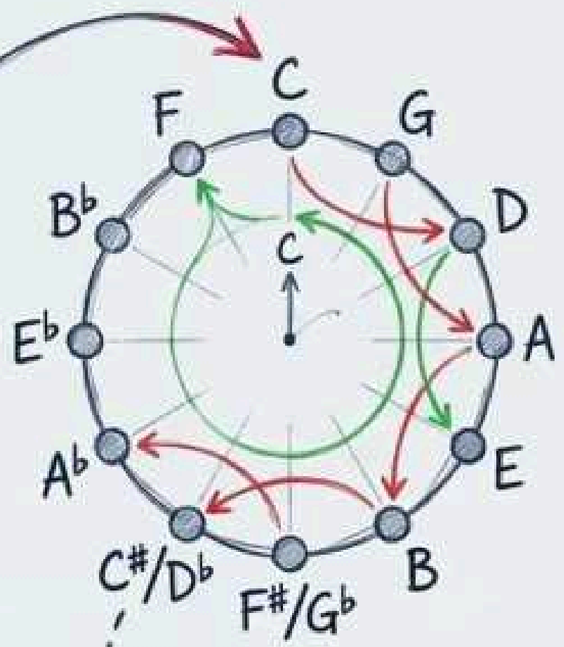
Module II: The Mathematical Architecture of Scales and Chords

¶ 0.5

Lecture 3

W-H-W-W-W-H ✓





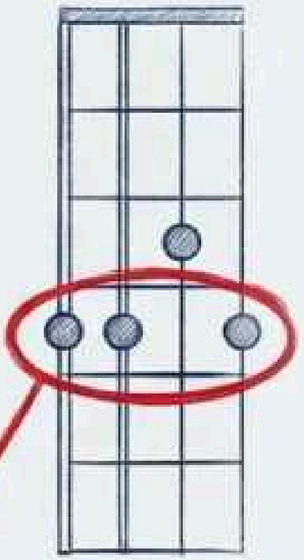
Relative Minors

a, e, b, f♯, c♯, g♯, d♯/e♭, a♯/b♭, f, c, g, d

Lecture 4

Root + 3rd + 5th = Triad

7th, 6th, sus



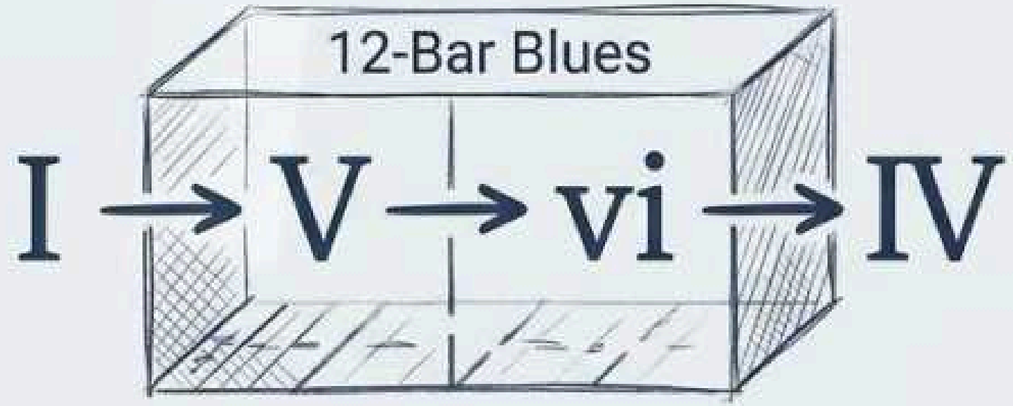
Why does a 3-note chord on 4 strings double one note?

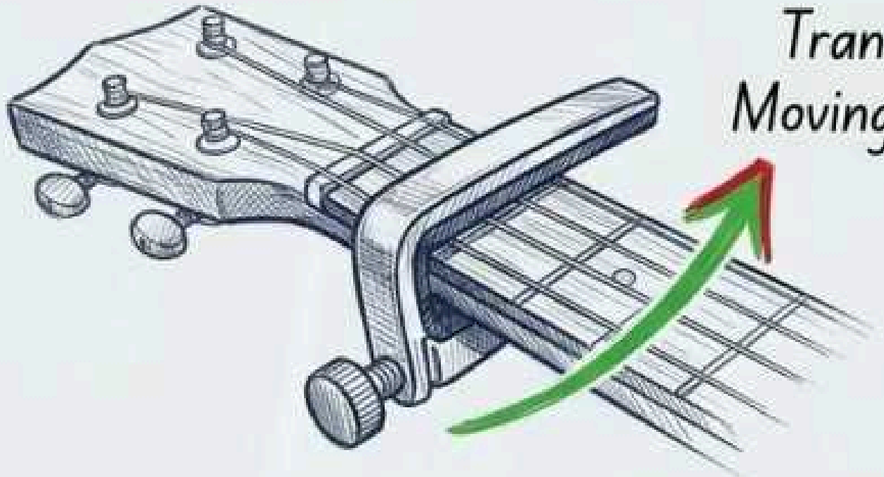
Gemini Notebook

Module III: Navigating Keys, Progressions, and Rhythm

¶ 0.6

Lecture 5

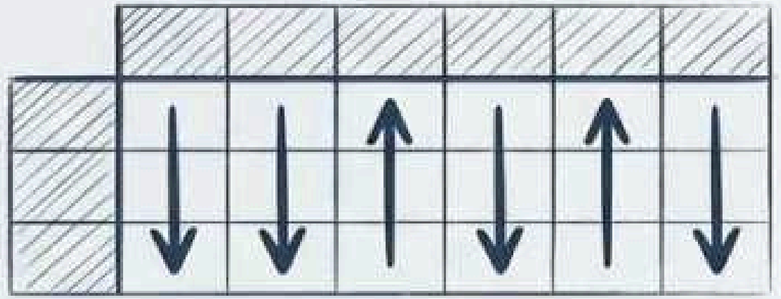




Transposition: Moving shapes up

Lecture 6

$\frac{4}{4}$

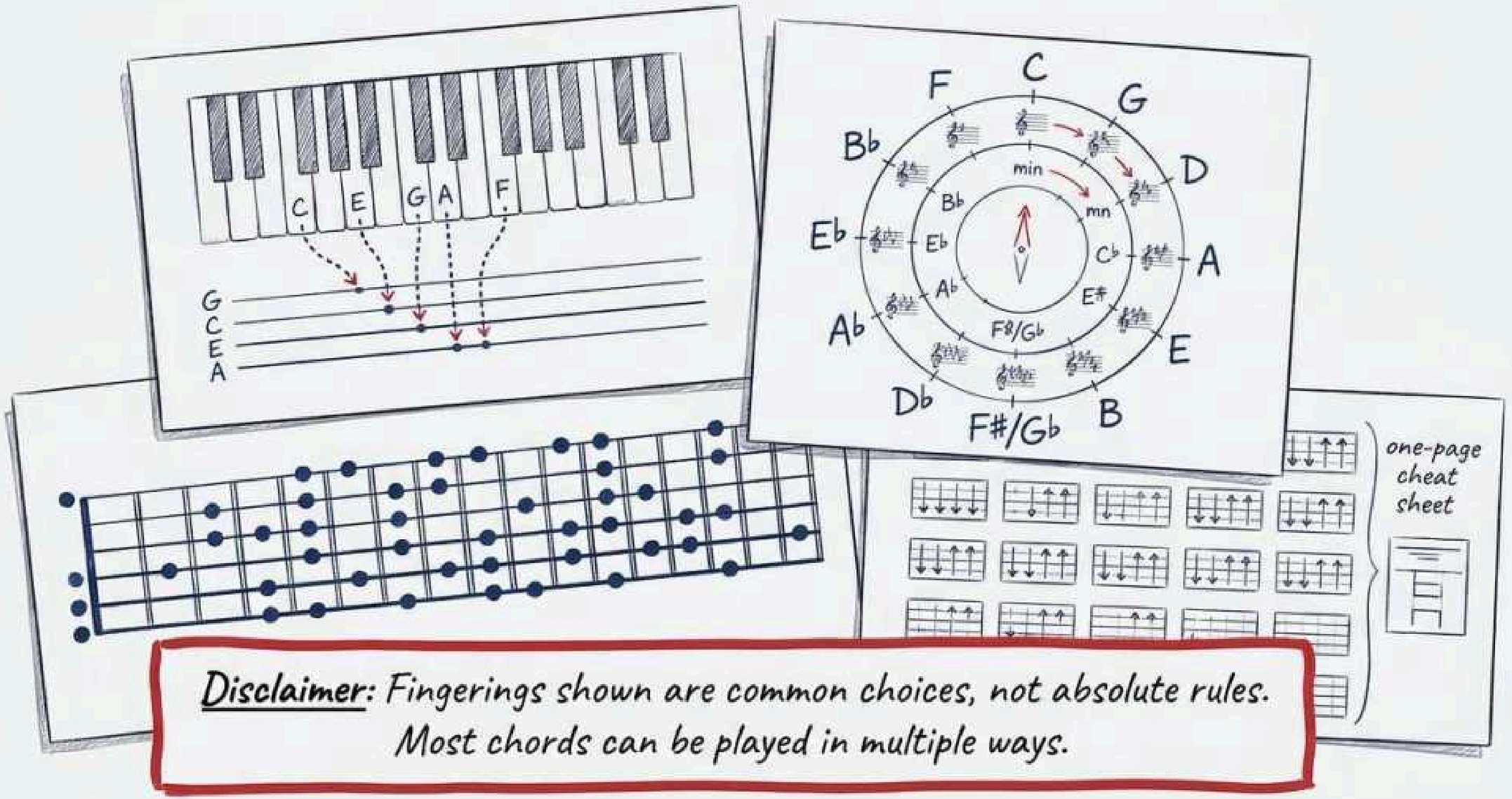




Working out song forms by ear

Gemini Notebook

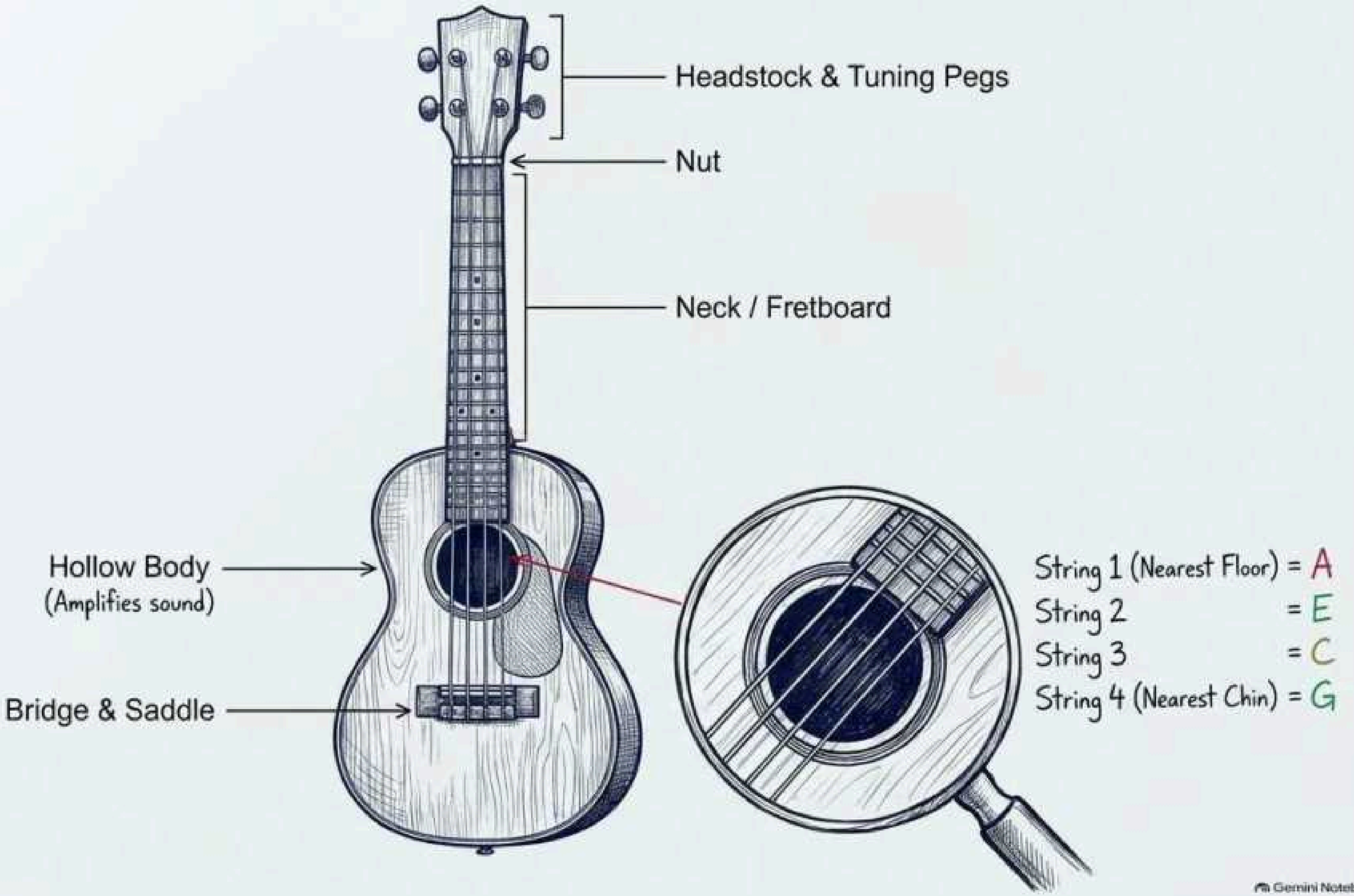
The Visual Reference Arsenal



Disclaimer: *Fingerings shown are common choices, not absolute rules. Most chords can be played in multiple ways.*

Gemini Notebook

The Anatomy of the Ukulele



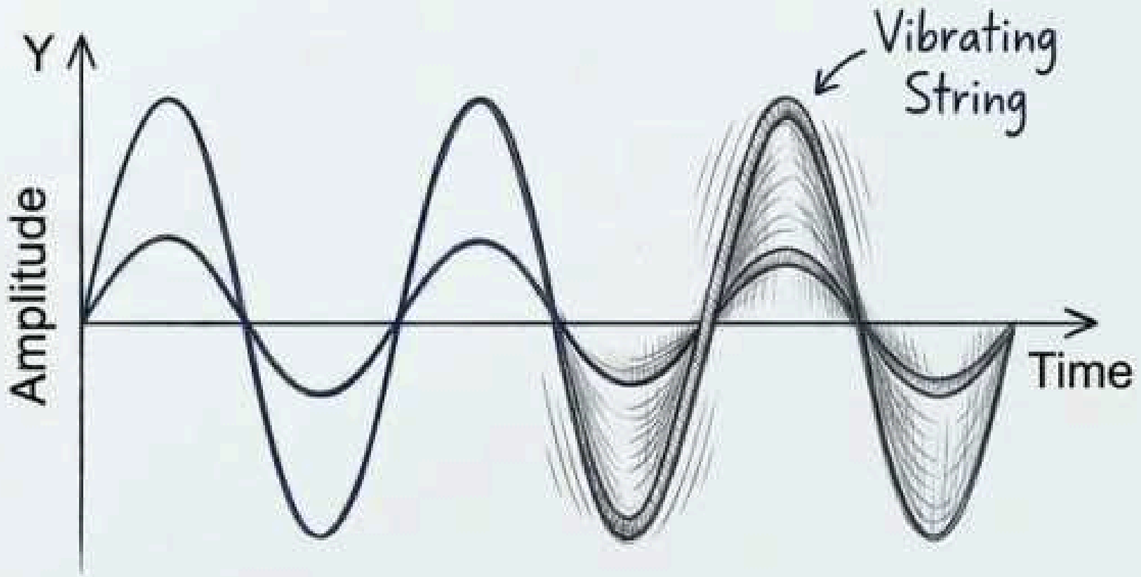
Gemini Notebook

The Academic Rigor and Physics of Pitch

Physics of Sound

$$A_4 = 440\ \text{Hz}$$

Scientific Pitch Notation: The A above Middle C4

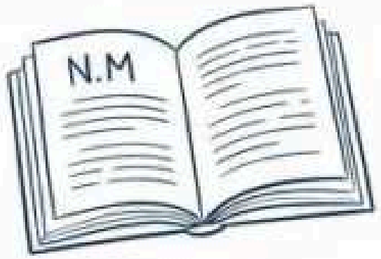


The Reading List

- [Tranquada & King, 2012]
- [Lil' Rev, 2005]
- [Wood, 2015]

Gemini Notebook

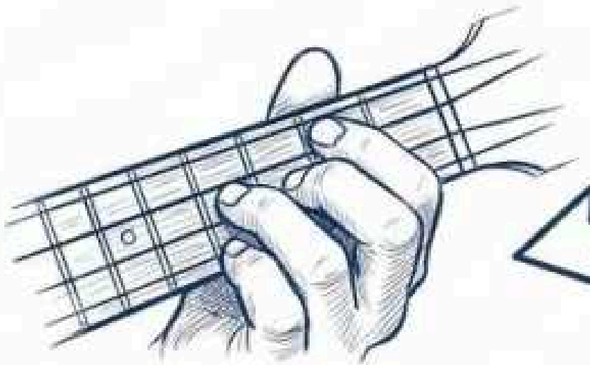
The Methodology: Integrating Mind and Muscle



1. Read/Watch Lecture



2. Ukulele in Lap



3. Fingers Find It



4. Take Quiz

Theory only sticks when your fingers have physically found it on the fretboard.

Gemini Notebook