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Formula Grouping by Number of Notes

You can describe and organize scales by number of notes in the scale. The names of these groupings are derived from Greek number names.

- Monotonic: 1 note
- Ditonic: 2-note scales
- Tritonic: 3-note scales (not to be confused with tritone)
- Tetratonic scale: 4-note scales
- Pentatonic: 5-note scales
- Hexatonic: 6-note scales
- Heptatonic: 7-note scales
- Octatonic: 8-note scales
- Nonatonic: 9-note scales (also called “enneatonic”)
- Decatonic: 10-note scales
- Undecatonic: 11-note scales
- Dodecatonic: 12-note scales

Symmetrical & Palindrome Scales.

There are 2 kinds of symmetrical scales: scales with rotational symmetry and with reflective symmetry.

Rotational symmetry

These are scales that repeat themselves note for note, after you transposed the scale up or down a certain interval.

Examples:

1) Whole Tones Scale

When you transpose a whole tone scale up a whole step, you get a copy of the same scale.

C D E F# G# A# transposed up a whole step becomes D E F# G# A# C, transposed up another whole step becomes E F# G# A# C D etc.

2) Augmented Chord

An augmented chord, which consists of major 3rd intervals, repeats itself note-for-note when it's transposed up in major 3rds.

C E G# transposed up a major 3rd becomes E G# C, transposed up another major 3rd becomes G# C E. Transpose that up a major 3rd and you rotate back to C E G#

That's why it's called "rotational symmetry". As you keep rotating through the different notes that make up the symmetrical scale, choosing any given note as a new starting note, you keep getting the same repetitive succession of consecutive intervals from any starting note in the scale. In other words: the scale keeps repeating the same interval structure whichever note you start the scale on.

A scale that has rotational symmetry reproduces its own tones by transposition. This happens when the distance (interval) between the original key and the key you transpose that scale up or down to, is equal to the interval that makes up the scale. You can see this in the above Whole Tone scale example. The scale consists of all whole steps, and because it cuts an octave into all equal whole step sections, transposing this scale up or down in whole steps, will reproduce the same scale over and again.

Here are all the scales that have rotational symmetry

1) Divide by 12 = 12 semitones

- 1 b2 2 b3 3 4 b5 5 b6 6 b7 7 → 2048 → Chromatic scale

2) Divide by 6 = 6 whole steps

- 1 2 3 b5 b6 b7 → 849 → Whole Tone scale

3) Divide by 4 = 4 minor 3rds → dim7 chord

- 1 b3 b5 6 → 164 → dim7 chord
- 1 b2 b3 3 b5 5 6 b7 → 1636 → Half-Whole Diminished Scale
- 1 2 b3 4 b5 b6 6 7 → 1739 → Whole-Half Diminished scale

4) Divide by 3 = 3 major 3rds → augmented chord

- 1 3 b6 (/ #5) → 43 → Augmented triad
- 1 b2 3 4 b6 6 → 712 → Messiaen's Truncated Mode 3

Asian (b), Asian, Oriental, Mixolydian b5 b9, Raga Ahira-Lalita, Hungarian Minor inverse,
Tsinganikos (Greece)
5th mode of Double Harmonic Major

1229) **1 b2 3 4 b5 6 7** (C Db E F Gb A B)

Chromatic Lydian, Raga Lalit, Bhankar

1230) **1 b2 3 4 b5 b7 7** (C Db E F Gb Bb B)

1231) **1 b2 3 4 5 b6 6** (C Db E F G Ab A)

Mela Gayakapriya (13/72, Agni Chakra), Gypsy Hexatonic, Raga Kalakanti, Romani Hexatonic

1232) **1 b2 3 4 5 b6 b7** (C Db E F G Ab Bb)

Phrygian Dominant, Phrygian Major, Altered Phrygian, Mixolydian b9 b13, Dominant b2 b6, Spanish Romani, Mela Vakulabharanam (14/72, Agni Chakra), Raga Jogiya, Ahiri, Vativasantabhairavi, Zilof, Ahava Rabba, Freygish, Fraigish, Jewish 2, Maqam Hijaz-Nahawand, Hitzaz, Hijaz (Arabic), Humayun (Azerbaijan), Dorico Flamenco, Harmonic Major inverse, Altered Hungarian, Dastgāh-e Homāyoun (Iran). Common in Arabic, Egyptian, Klezmer, Indian, Middle Eastern, Eastern European, Central Asian, and Flamenco music. Also used in Hebrew prayers.

5th mode of Harmonic Minor

Used over V7/III and V7/VI secondary dominants

1233) **1 b2 3 4 5 b6 7** (C Db E F G Ab B)

Double Harmonic, Double Harmonic Major, Major Romani, Hungarian Romani, Persian, Double Harmonic Major, Enigmatic, Byzantine, Flamenco Mode, Bhairav That (North India), Bhairav Theta, Mela Mayamalavagaula (15/72, Agni Chakra), Raga Paraj, Kalingada, Gaulipantu, Lalitapancamam, Chromatic 2nd Byzantine Liturgical, Hitzazkiar, Maqam Zengule, Hijaz Kar, Suzidil, Shad 'Araban

1234) **1 b2 3 4 5 6 b7** (C Db E F G A Bb)

Harmonic Minor Inverse, Mela Cakravaka, Mela Chakravakam (16/72, Agni Chakra), Raga Ahir Bhairav, Bindumalini, Vegavahini, Makam Hicaz, Zanzaran. I've also seen this called "Neapolitan Mixolydian". This scale can be heard in the folk music of Bulgaria, where they often also lowered the 6th.

1235) **1 b2 3 4 5 6 7** (C Db E F G A B)

Mela Suryakanta, Mela Suryakantam (17/72, Agni Chakra), Bhairubahar That, Raga Supradhipam, Sowrashtram, Jaganmohini, Major-Melodic Phrygian, Hungarian Romani inverse

1236) **1 b2 3 4 5 b7 7** (C Db E F G Bb B)

Mela Hatakambari (18/72, Agni Chakra), Raga Jeyasuddhamalavi

1237) **1 b2 3 4 b6 6 b7** (C Db E F Ab A Bb)

1238) **1 b2 3 4 b6 6 7** (C Db E F Ab A B)

1239) **1 b2 3 4 b6 b7 7** (C Db E F Ab Bb B)

Epilogue: Can You Still Invent Your Own New Scales?

Given the thoroughness and completeness I strived for in this book, this is a valid question.

Does everything exist already?

First off: this book really exhausts absolutely EVERY possible scale that has all notes within the octave for 12-TET tuned instruments.

Yet, the answer to that question is “no”. You CAN still come up with new scales that have not been explored yet. Yes, even in our 12-TET system: you don’t even have to mess with different tunings.

Here’s some ways you can invent your own scales.

- 1) Let’s start with the most obvious first: you can of course create a guitar neck where you space the frets at unusual distances. You basically come up with your own tuning system when you do this. This will surely create some out there, unique sounding music.
- 2) While doing that, you can also divide the octave on your guitar neck in other numbers than 12. You could have 5 frets in the octave, or 26, or 27, or 3, or 53, or any number really.
- 3) Heck: you could even choose not to have a fret exactly at the octave point, in which case you wouldn’t have the note available an octave above the open string. You could even space your frets in the Gamma, Delta, Theta etc. tunings I mentioned in a previous chapter.
- 4) You could research what the ancient cultures in Greece or Mesopotamia used and space your frets to their ancient tunings.
- 5) Or how about this idea: space the frets to the well temperament tuning of the time of Bach, Beethoven and Mozart.
- 6) You could scale the fret positions to mathematical proportions, like for example the Golden Mean. God only knows what that would sound like.
- 7) Of course, other than messing with fret calibrations, you could also come up with your own music scales, creating various unique compound scales. An example of a compound scale, is the Algerian scale. You basically create a scale that exceeds the range of an octave. The notes in the 2nd octave are ONLY played in that octave, and the notes in the first octave are only played in that octave. As an example, you could have a scale: C D Eb F G A B C# D E. The C note is only played in the first octave, the C# note is only played in the 2nd octave, the E note is never played in the first octave, you get the idea. All notes are fixed in their octave. You only write or improvise in that 10 note range provided by the scale. You could come up with a vast amount of new scales using this technique. You’d also break a lot of new ground, and create very interesting, highly unique sounding music. Try it out! You’ll be surprised at the cool, otherworldly sounding music this will allow you to create.
- 8) Ascending - Descending type of scales. An example of this is the melodic minor scale. The melodic minor in classical music, has an ascending and a descending form.
 - a. Ascending: 1 2 b3 4 5 6 7 (melodic minor)
 - b. Descending: 8 b7 b6 5 4 b3 2 1 (Aeolian)

You can use this idea to come up with your own scales. Pick any interval pattern ascending, and any interval pattern descending. Turn these ascending and descending interval series into 1 scale by simply thinking of these patterns as 1 scale that has 2 forms, and using both patterns back to back as an ascending and descending form. Then stay very disciplined in not deviating from these patterns at all in