

# Diatonic and Tertian Sets in humdrumR

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## Diatonic Sets

As mentioned in the Pitch and Tonality vignette, a normative diatonic key consists of a set of seven consecutive pitch chroma on the Line of Fifths.

A diatonic set can be ordered either by line-of-fifths position:

<b>LoF</b>	-1	0	1	2	3	4	5
Note	F	C	G	D	A	E	B

or in “scale-order,” which corresponds to steps of +2 (or  $-5$ ) modulo 7.

<b>LoF</b>	0	2	4	-1	1	3	5
<b>Note</b>	C	D	E	F	G	A	B
<b>Step</b>	1	2	3	4	5	6	7

## Tertian Sets

The set of seven notes in a diatonic key can be reimagined as a *chord*—a set of notes played at the same time. Specifically, a full seven-note diatonic chord is referred to as a 13th chord. However, most chords used in tonal music are subsets of the full diatonic set, in particular three-note *triads*.

When viewing a diatonic set as a chord, we traditionally order the set as a sequence of ascending thirds, corresponding to intervals of +4 on the line-of-fifths, modulo 7. These *tertian* steps are usually not wrapped to the octave, resulting in steps 9, 11, and 13, instead of 2, 4, and 6.

<b>LoF</b>	0	4	1	5	2	-1	3
<b>Note</b>	C	E	G	B	D	F	A
<b>Step</b>	1	3	5	7	9	11	13

There are  $2^7 = 128$  possible subsets that can be formed from the full diatonic set. Of these, the seven possibilities that are built from consecutive tertian steps are theoretically privileged : i.e.,  $\{\{1\}, \{1,3\}, \{1,3,5\}, \{1,3,5,7\}, \{1,3,5,7,9\}, \{1,3,5,7,9,11\}, \{1,3,5,7,9,11,13\}\}$ .

A few other possible sets are fairly commonplace in Western theory as well:  $\{1, 5, 11\}$  (“sus4”),  $\{1, 3, 5, 9\}$  (“add9”),  $\{1, 3, 5, 13\}$  (“add6”), etc.