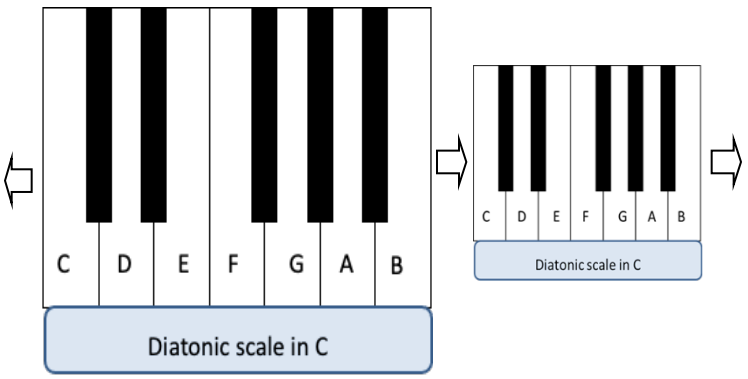
The Diatonic Scale:

The scale is, of course, one of the fundamental building blocks of music. Rock and Blues guitarists are all familiar with the pentatonic (five note) scale and it's time tested "box" fingering on the fretboard. The classic pentatonic scale is really just a "Diatonic" scale with two notes removed.

What is a "Diatonic" scale? The dictionary definition for Diatonic is: "of, relating to, or being a musical scale (as a major or minor scale) comprising intervals of five whole steps and two half steps." We can most easily hear the diatonic Major scale by playing the white keys on the piano, starting on C.

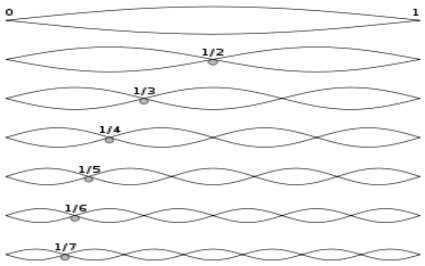
This specific organization of half steps and whole steps is what makes up the diatonic scale. There are of course several ways to organize five whole steps and two half steps, but in the Diatonic scale there is a specific arrangement of whole and half steps. In the Diatonic scale the half steps are inserted between the whole steps in specific places, one is after 2 whole steps (between the 3rd and 4th in the Major scale - the E to F in the C Major scale) the other is after 3 whole steps (between the 7rd and the 8th which is really a return to the "root" or "tonic" in a Major scale - the B to C in the C Major scale). You would not have a diatonic scale if, for example, you constructed a seven note scale with 2 half steps in a row, followed by 5 whole steps. This specific structure is the same for all diatonic scales.

Figure 1: Keyboard View of C (Diatonic) Scale – the placement of half steps is quite visually apparent



The Diatonic scale is actually very logically based on math and the natural phenomenon of the vibration of a string – and you can really easily demonstrate this on the guitar (you have no doubt done this many times) by playing harmonics on the guitar. Here you are splitting the string into 2, 3, 4 or more segments and demonstrating how this arithmetic relationship relates to different pitches. Splitting the string into different segments produces a series of overtones (the Harmonic Series) that basically map to the Major Scale – this is why the Major scale and the Major chord that is built from the first, third and fifth note of this scale is so pleasing and provides a comfortable "home base".

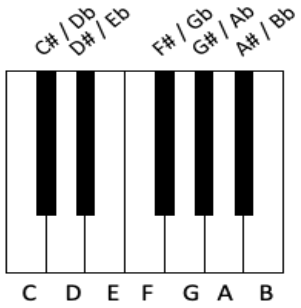
Figure 2: String divisions and Harmonic Series



Intervals:

The Diatonic Scale of course uses just seven of the total twelve notes in Western music – these 12 notes divide the octave evenly into half step tonal increments that are then repeated in multiple octave configurations – the scale name for all 12 of these notes is the Chromatic Scale.

Figure 3: Keyboard View of 12 Tones



All intervals are constructed from a discrete number of these half steps:

Interval	Construction	Examples
Half Step	1 Half Steps	Between E & F or G and G#
Step	2 Half Steps	Between D and E or Ab and Bb
Minor Third	3 Half Steps	Between E and G or C and Eb
Major Third	4 Half Steps / 2 Steps	Between C and E or Gb and Bb
Fourth	5 Half Steps/ 2 ½ Steps	Between D and G or F and Bb
Tri-Tone	6 Half Steps / 3 steps	Between C and F# or F and B

Fifth	7 Half Steps / 3 ½ steps	Between C and G or E and B
Minor 6th	8 Half Steps / 4 steps	Between C and Ab or C and Bb
Major 6th	9 Half Steps / 4 ½ steps	Between C and A or D and B
Minor (Flat) Seventh	10 Half Steps	Between C and Bb or C# and B
Major (Natural) Seventh	11 Half Steps	Between C and B

Basic chords are constructed from the first, third and fifth notes of a scale and the three most fundamental chord types are:

- **Major Chords** - in a Major chord the interval between the first and third is a major third (2 whole steps / four frets), and the interval between the third and fifth is a minor third (one whole and one half step / three frets). The Major Chord is considered to be the most "stable" and "happy" chord. This is due to its natural alignment with the Harmonic Series.

- **Minor Chords** - in a minor chord the interval between the first and third is a minor third, and the interval between the third and fifth is a major third. This is the basic "sad" chord - this emotional phenomenon is due to the very subtle conflict between the major third that is part of the harmonic series of the root note of the chord (the "1") and the minor third actually played in the chord. This underlying tension (which isn't even really heard directly) is the reason for the intrinsic unrest or moodiness of this chord.

- **Dominant Chords –** the Dominant chord is the major chord built on the 5^{th} note in the Diatonic scale. This chord has a clear momentum to return to the 1 chord – in the key of C this is the G chord and it wants to resolve back to the C Major (or minor) root chord or tonic. Dominant chords often include the 7^{th} as well, and as you recall from our review of Modes (the Mixolydian in this case) the Dominant 7^{th} chord contains the root (1), Major 3^{rd}, 5^{th}, and a flatted 7^{th}. This flat 7^{th} adds to the Dominant chords push to resolve back to the root by introducing a tri-tone interval (three whole steps – this interval splits the octave in half) between the 3^{rd} and the 7^{th}. The tri-tone interval is probably the most "unstable" as is clashes with the natural 5^{th} which is part of the stable Harmonic Series. This also sets up a very elegant and pleasing resolution when the tri-tone resolves to the root Major chord as the Dominant Chord 3^{rd} moves up a half step and the Dominant Chord 7^{th} moves down a half step. Listen to how this works on the keyboard with a G7 chord (G, B, D , F) resolves to a C chord, with the B moving to C and the F moving to E – you will find this to be a very familiar sound and the momentum is very clear.

Chord Movement:

In general there is a “root” chord (also called the “tonic”) that is the “gravitational center” of a entire piece of music or at least a chord progression. You will hear of a “key change” within a piece and this is a shift to a new root, or tonal center.

Chords tend to move around this center in a number of time-tested ways – one way is through a “circle of fifths” concept that builds off the strong tendency of the V (5) chord (a dominant chord above) to resolve to the I (1) chord. The circle of fifths mechanism extends this movement from V to I – you can think of it as a stack of fifths like: C, G, D, A, E, B, and the chord progression basically starts from someplace up the stack and “unwinds” its way back to the I (or C in this case).

It is very common to just refer to a chord as a number in relation to the root – for example in the key of C, Dm is the II chord, Em is the III, F is the IV chord, G is the V, Am is the VI and B (half diminished) is the VII. So, going back to our circle of fifths concept, we can call out a common progression as a “III – VI – II – V – I” progression. This is Em, Am, Dm, G, C. Using numbers is easy because it can be applied to any key, or tonal center, whether you are in a major or minor key.

The 12 Bar Blues

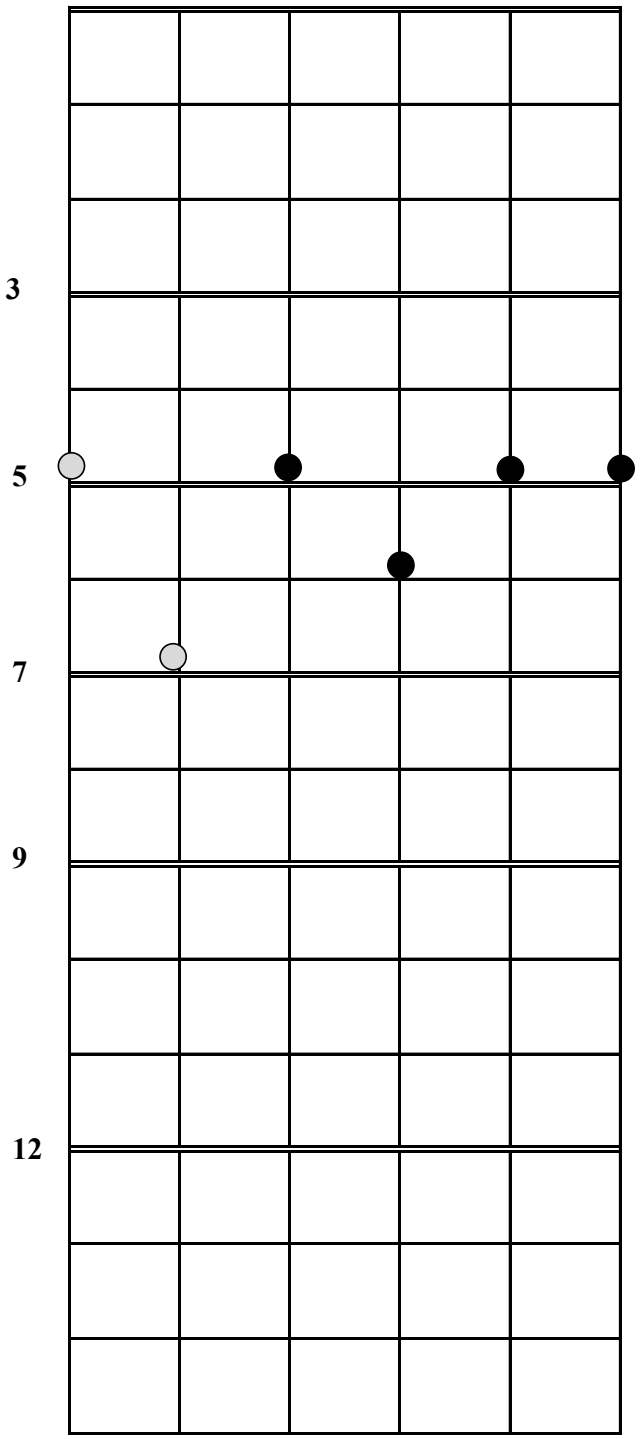
The basic structure of the 12 bar blues is (1 being the “root” key we are playing in):

| 1 --- | 4 --- | 1 --- | 1 --- | 4 --- | 4 --- | 1 --- | 1 --- | 5 --- | 4 --- | 1 --- | 5 --- |

In the Blues progression above, all the chords are Dominant Chords, and this provides a lot of the “perpetual motion” of the 12 bar blues – it just wants to keep going, and this is largely due to the construction with all Dominant chords, which have (as we have discussed earlier) a built-in momentum. The correct chord chart for this progression is really:

| A7 --- | D7 --- | A7 --- | A7 --- | D7 --- | D7 --- | A7 --- | A7 --- | E7 --- | D7 --- | A7 --- | E7 --- |

Fundamental Dominant 7 Chords for Blues in A



A Dominant Chord

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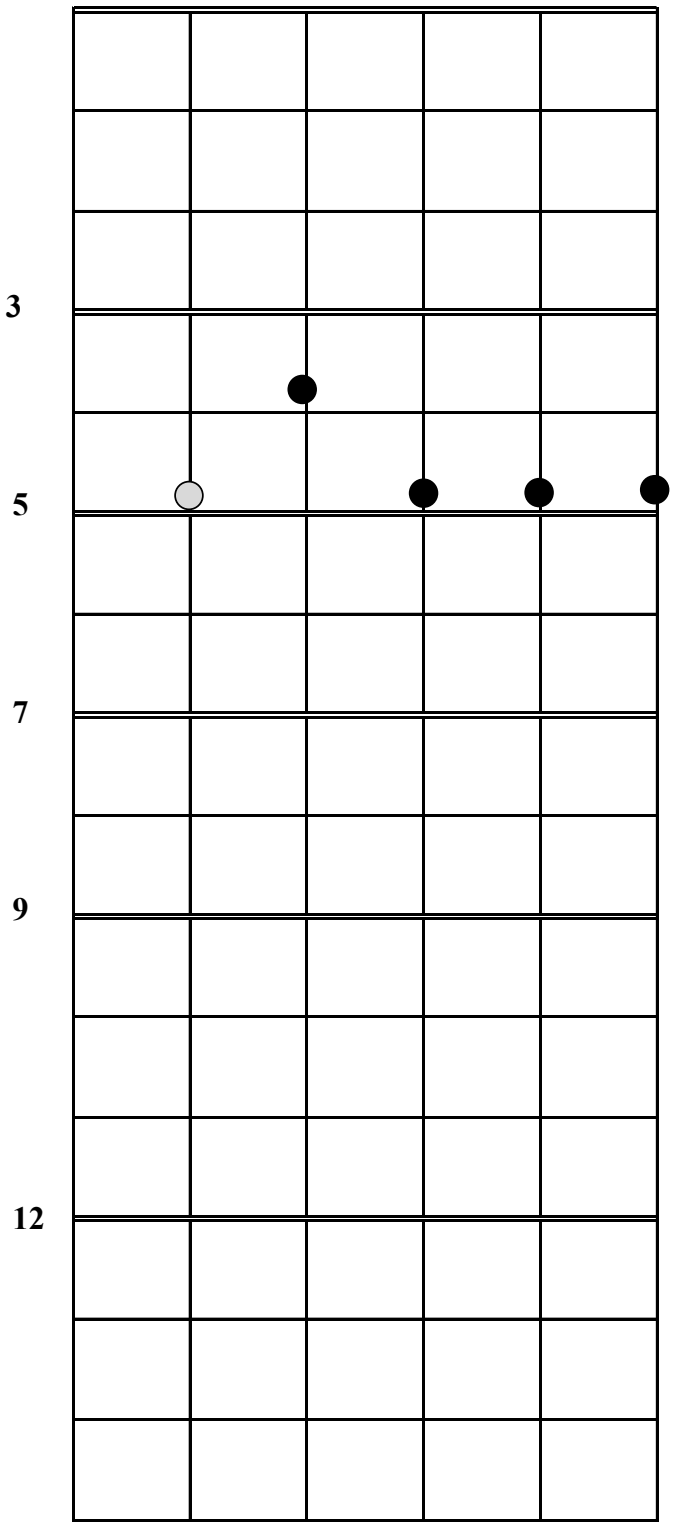
D Dominant 9 Chord



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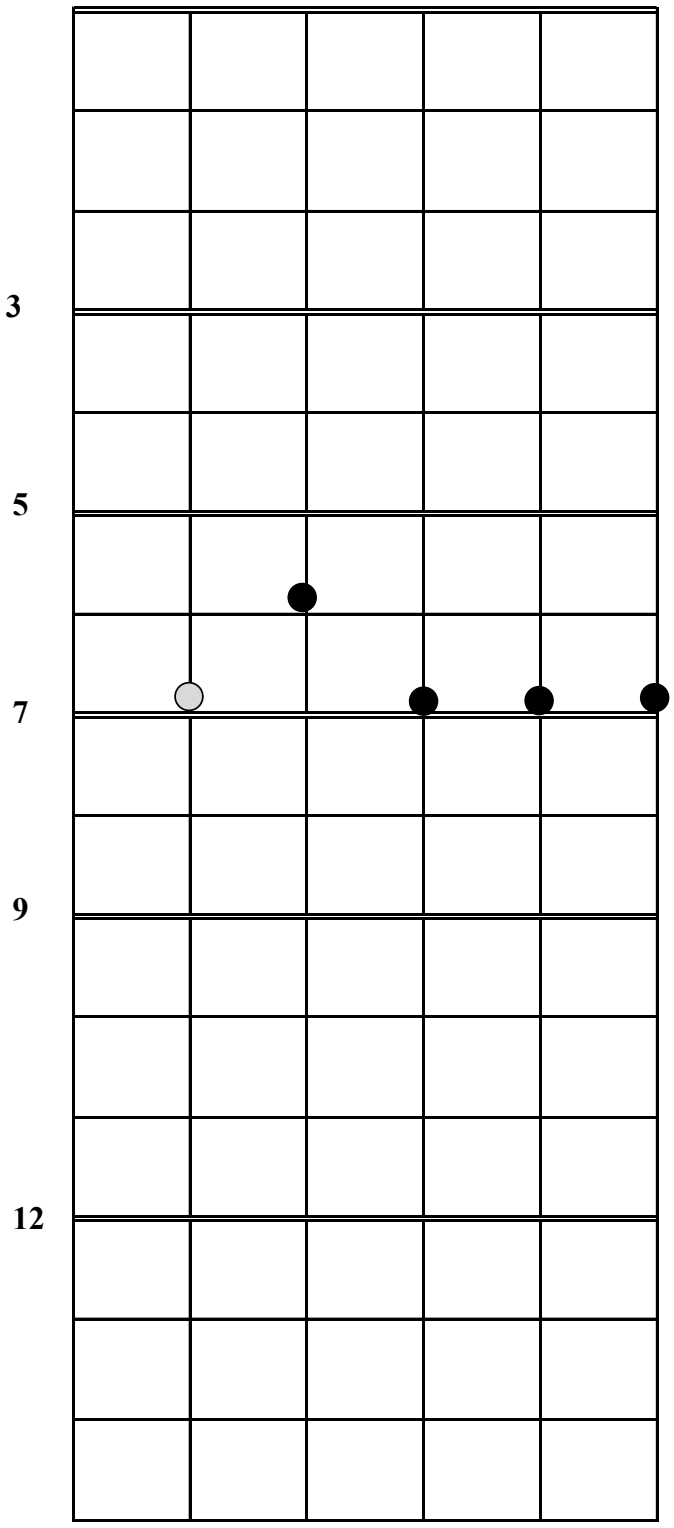
E Dominant 9 Chord



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