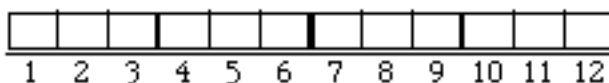


THE SCALE & THE STRING

Everywhere you look while you are learning to play an instrument, you keep hearing about the scale. As confusing as scales may seem, we can take a systematic approach to what they do in music. To be able to improvise to a piece of music, we need to utilize the scale and the patterns it makes on your instrument.

To do this I remember what someone told me when I was starting to play, If you can count to twelve you can play music. How do we arrive at the number twelve? I could start to explain that here, but I advise to you pick up a basic music theory book to help you in this. I want to look at scales and how they relate to the basic number twelve. And of course, how this twelve and the string relate together to form what we call music.

Music is discussed in different terms but I want to start with one scale that is made up of twelve tones, This is where I start to learn my scales. The chromatic scale is an even number of half-steps. The number of half-steps is 12. This way of thinking needs a graph to help show what we are talking about. Here is a blank graph.



*The numbers represent frets or finger position.
What you use depends on your instrument.*

Each blank box can be used to place information that relates to a string. We have 12 places and we know that music uses a twelve tone chromatic scale. One group of 12 is an octave. This means if we learn one octave on a string, then to learn the next octave is as easy as adding 12. In other words music theory repeats every twelve half-steps. We use a short cut by learning it once and applying the theory to the octaves.

The above graph is how a look at any given string. By filling in the blocks with the appropriate information, we make scale charts. Let's move on and take a closer look...

The Scale & The String

Below we will take our graph and add the twelve tones that we use chromatically. Notice how the use of numbers makes easier to change keys because the numbers are generic.

	1	b2	2	b3	3	4	b5	5	b6	6	b7	7
Frets	1	2	3	4	5	6	7	8	9	10	11	12

This shows a chromatic scale with the start in the first position. If you don't understand the tones shown like this, get a basic music theory book and study the basics.

Above we see a graph that represents one octave of the chromatic scale. The notation inside each block is in basic music theory language. Below we see fret numbers that let us place the theory of music on our strings.

If we know that we have to repeat this chromatic scale 12 times, then we can do it by moving the entire pattern in our graph up one position. Still looking at one octave of twelve, we see the second fret has the starting tone #1, Here is what I am talking about,

	7	1	b2	2	b3	3	4	b5	5	b6	6	b7
Frets	1	2	3	4	5	6	7	8	9	10	11	12

This shows the first tone of the chromatic scale "chaniging" keys on a string. The 1 is now in position 2.

Our next graph shows all twelve starting positions of the chromatic scale on one string. Notice how our pattern walks across the graph. We see how each scale tone changes as each key changes.

pos 1	1	b2	2	b3	3	4	b5	5	b6	6	b7	7
pos 2	7	1	b2	2	b3	3	4	b5	5	b6	6	b7
pos 3	b7	7	1	b2	2	b3	3	4	b5	5	b6	6
pos 4	6	b7	7	1	b2	2	b3	3	4	b5	5	b6
pos 5	b6	6	b7	7	1	b2	2	b3	3	4	b5	5
pos 6	5	b6	6	b7	7	1	b2	2	b3	3	4	b5
pos 7	b5	5	b6	6	b7	7	1	b2	2	b3	3	4
pos 8	4	b5	5	b6	6	b7	7	1	b2	2	b3	3
pos 9	3	4	b5	5	b6	6	b7	7	1	b2	2	b3
pos 10	b3	3	4	b5	5	b6	6	b7	7	1	b2	2
pos 11	2	b3	3	4	b5	5	b6	6	b7	7	1	b2
pos 12	b2	2	b3	3	4	b5	5	b6	6	b7	7	1

Now if we know that each key makes the pattern change, we need one other factor to give us enough data to work with any given string.

The missing factor is what the string is tuned to. The note that you tune your string to gives you a starting point.

So far we have only worked with one scale. The others are made up from the chromatic scale. Let's see how...

The Scale & The String

We know that the chromatic scale has twelve tones that are each a half step apart. It includes all notes in the smallest interval that we work with. An interval is how we talk about the distance between two notes. Once again, for an in depth study see *My Approach To Pedal Steel* or a basic music theory book.

Here are the twelve tones starting on a C. We use the key of C to learn in because it is the easier to talk about. You then learn to transpose to whatever key you need. Here is the key of C and the chromatic scale.

1-	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
2-	1	^b 2	2	^b 3	3	4	^b 5	5	^b 6	6	^b 7	7
3-		D ^b		E ^b			G ^b		A ^b		B ^b	
4-		^b 9	9th	#9		11	#11				13	

Along the left I numbered each row so as to explain what everything is. Below we see:

1. This is the chromatic scale in the key of C. It is represented in sharps.
2. The second row is the musical function of each note as it relates to the key of C.
3. This shows the enharmonic notes. They are two names for the same thing. C# & Db are the same note. I use sharps going up and flats coming back down.
4. This is musical terminology for the tones when they extend into more than one octave. We have was of measuring the intervals to determine the distance between two notes. When I write the scales using numbers, I use only row 2. What we call the note depends on how it is used.

The Scale & The String

C	C#	D	D#	E	F	F#	G	G#	A	A#	B
1	b2	2	b3	3	4	b5	5	b6	6	b7	7

On the previous pages we've seen our graph with twelve squares that represent music. We are going to use them in all twelve starting positions to show you all twelve chromatic scales. To do this we read the key on the left side and the scale tones along the pot. Along the right side we have the keys written with flats.

KEY		KEY												
C	<table border="1"><tr><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td></tr></table> C C# D D# E F F# G G# A A# B	1	b2	2	b3	3	4	b5	5	b6	6	b7	7	C
1	b2	2	b3	3	4	b5	5	b6	6	b7	7			
C#	<table border="1"><tr><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td></tr></table> C C# D D# E F F# G G# A A# B	7	1	b2	2	b3	3	4	b5	5	b6	6	b7	Db
7	1	b2	2	b3	3	4	b5	5	b6	6	b7			
D	<table border="1"><tr><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td></tr></table> C C# D D# E F F# G G# A A# B	b7	7	1	b2	2	b3	3	4	b5	5	b6	6	D
b7	7	1	b2	2	b3	3	4	b5	5	b6	6			
D#	<table border="1"><tr><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td></tr></table> C C# D D# E F F# G G# A A# B	6	b7	7	1	b2	2	b3	3	4	b5	5	b6	Eb
6	b7	7	1	b2	2	b3	3	4	b5	5	b6			
E	<table border="1"><tr><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td></tr></table> C C# D D# E F F# G G# A A# B	b6	6	b7	7	1	b2	2	b3	3	4	b5	5	E
b6	6	b7	7	1	b2	2	b3	3	4	b5	5			
F	<table border="1"><tr><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td></tr></table> C C# D D# E F F# G G# A A# B	5	b6	6	b7	7	1	b2	2	b3	3	4	b5	F
5	b6	6	b7	7	1	b2	2	b3	3	4	b5			
F#	<table border="1"><tr><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td></tr></table> C C# D D# E F F# G G# A A# B	b5	5	b6	6	b7	7	1	b2	2	b3	3	4	Gb
b5	5	b6	6	b7	7	1	b2	2	b3	3	4			
G	<table border="1"><tr><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td><td>3</td></tr></table> C C# D D# E F F# G G# A A# B	4	b5	5	b6	6	b7	7	1	b2	2	b3	3	G
4	b5	5	b6	6	b7	7	1	b2	2	b3	3			
G#	<table border="1"><tr><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td><td>b3</td></tr></table> C C# D D# E F F# G G# A A# B	3	4	b5	5	b6	6	b7	7	1	b2	2	b3	Ab
3	4	b5	5	b6	6	b7	7	1	b2	2	b3			
A	<table border="1"><tr><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td><td>2</td></tr></table> C C# D D# E F F# G G# A A# B	b3	3	4	b5	5	b6	6	b7	7	1	b2	2	A
b3	3	4	b5	5	b6	6	b7	7	1	b2	2			
A#	<table border="1"><tr><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td><td>b2</td></tr></table> C C# D D# E F F# G G# A A# B	2	b3	3	4	b5	5	b6	6	b7	7	1	b2	Bb
2	b3	3	4	b5	5	b6	6	b7	7	1	b2			
B	<table border="1"><tr><td>b2</td><td>2</td><td>b3</td><td>3</td><td>4</td><td>b5</td><td>5</td><td>b6</td><td>6</td><td>b7</td><td>7</td><td>1</td></tr></table> C C# D D# E F F# G G# A A# B	b2	2	b3	3	4	b5	5	b6	6	b7	7	1	B
b2	2	b3	3	4	b5	5	b6	6	b7	7	1			

To use the transposition chart on the previous page, you have to see how we keep the chromatic scale constant and change the function. The numbers in the boxes change as each key does. The chromatic scale underneath the box shows what note we have for a particular function. Here's a guide to use the chart with some examples.

1. The first column on the right and the last on the left determine what key you are in.

2. The chromatic scale tells you what the note is. You read each key across a row.

3. The first row across is the key of C. The second row across is C sharp or D flat. Sharps are written on the left column and flats on the right.

4. In the C row, we can find the 3rd note by looking at the 3. The third note of a C scale is an E note. Remember, the 3rd is the interval, not the order.

Now that we know how to tell all the notes and their functions to their respective keys, we need to learn how to base all this new found knowledge. To start all my scale learning I tried to use the generic key of C as a basis. We know that we can tune a string to any one of the 12 chromatic tones. How can we look at the different possible tunings and keep them all together? The answer lies in the key of C. We have to use the key of C and make them all relate to it.

What I ended up doing was assigning each tone a number based on a relationship to the key of C. The number, was 1 through 12 and was arrived at by figuring at which fret you could play a C note when tuned to a certain note. A string tuned to B would have a C note at the first fret.

The Scale & The String

The easiest way to arrive at what fret number we get a C note at if a string is tuned to a specific note, is to write a chromatic scale and then underneath each tone, write the numbers 12 to 1.

C	C#	D	D#	E	F	F#	G	G#	A	A#	B
12	11	10	9	8	7	6	5	4	3	2	1

This graph says: If a string is tuned to a note on the top row, then to play a C note we use the number below as the fret number we need. For example: If we tune a string to F# then we can play a C note at the 6th fret.

This graph gives us a home base for seeing the difference in relationships between strings and the key of C. Before we start to learn how we arrive at different scales, we first need to realize some of the facts about *any* scale.

1. A chromatic scale is the same on any string. The only difference is what the string is tuned to and what key you want to see the scale in.

2. The same theory can be applied to any stringed instrument. The difference in stringed instruments is how they are tuned and put into motion.

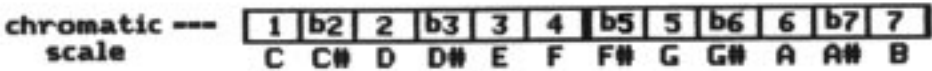
3. Most instruments have fixed string tunings. This makes studying them easier. To change them we have to retune the strings.

4. Pedal steels are fixed, with pedals that move certain strings a specific amount up or down. That amount is determined in half steps.

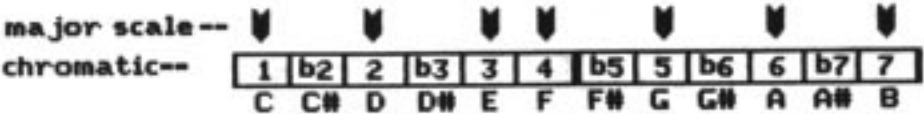
5. A string is a string.

The Scale & The String

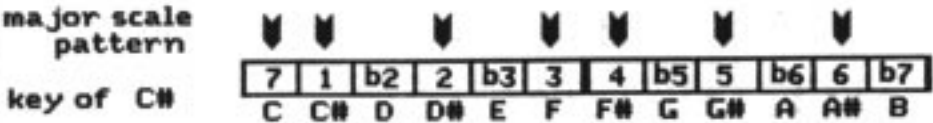
Here again we see our chromatic scale. This could represent any string. The strings are all the same in their function. The first example is a chromatic scale. The second example shows which notes we pick out to make up a major scale. The examples are written in the key of C no speed up learning.



Below we will look at the tones from the chromatic scale that make up the major scale. The formula is 1, 2, 3, 4, 5, 6, 7. These are the intervals of the scale. The arrows point to the tones that are needed to make up the major scale.



From the chromatic scale, we can start to derive different patterns to create new scales. The major scale has a distinct pattern of whole and half steps. This pattern remains constant even if you change the keys. All other scales are made up of different interval patterns. Below we will look at a major scale pattern without notes and in the second position. See how the overall pattern just walks along our graph.



There we see how we start with a chromatic scale and get the pattern of a major scale out of it. The same process is used on all of the scales. We have a starting point and then we take certain patterns out of that to make other scales. Each scale has its own characteristics. Those have to be learned by the ear and by your mind to be able to utilize them in a solo or somewhere in your playing.

The Scale & The String

Now we will see 53 scales in position number 1. That means we find the starting tone (1) in the first square of our twelve block graph. The main thing to notice is how each scale makes a definite pattern that repeats in each key. We must notice the different intervals between each scale tone. These give a scale flavor. The major scale has a distinct sound when it is used in soloing

To use scales to make chords you need to know chord formulas. *My Approach to Pedals Steel* has a section devoted to chord formulas and substitution. For now you need to remember that all of the scales are made up of select tones from the chromatic scale. The major scale is a seven tone scale. Pentatonics are five tone scales. The diminished scales are 8 tone scales. The whole tone has six tones. They all get their information from the chromatic scale. This scale gives us our foundation for learning scales and then chords. Start with the major and learn it on your instrument. And then tackle another one. Remember, a scale is just a series of tones with no value until you learn in on your guitar or instrument.



**Joe Wright
1963**

53 Scales

Major	1 2 3 4 5 6 7 8 9 10 11 12
Dorian	1 2 b3 4 5 6 7 8 9 10 11 12
Lydian	1 b2 3 4 5 b6 7 8 9 10 11 12
Phrygian	1 2 3 4 5 6 7 #4 8 9 10 11 12
Mixolydian	1 2 3 4 5 6 7 8 9 10 11 b7 12
Aeolian	1 2 b3 4 5 b6 7 b7 8 9 10 11 12
Locrian	1 b2 3 4 b5 6 b6 7 b7 8 9 10 11 12
Harmonic minor	1 2 b3 4 5 b6 7 8 9 10 11 12
Harmonic minor 2	1 b2 3 4 b5 6 b7 8 9 10 11 12
Harmonic minor 3	1 2 3 4 5 6 7 8 9 #5 10 11 12
Harmonic minor 4	1 2 b3 4 5 #4 6 b7 8 9 10 11 12
Harmonic minor 5	1 b2 3 4 5 b6 7 b7 8 9 10 11 12
Harmonic minor 6	1 2 3 4 5 6 7 8 9 10 11 b3 12 #4
Harmonic minor 7	1 b2 3 4 5 6 7 8 9 10 11 b3 12 b5 b6 6
Melodic minor	1 2 b3 4 5 6 7 8 9 10 11 12
Dorian ^{b2}	1 b2 3 4 5 6 7 8 9 10 11 b3 12 b7
Lydian augmented	1 2 3 4 5 6 7 8 9 10 11 #4 12 #5 6 7
Mixolydian ^{b6}	1 2 3 4 5 6 7 8 9 10 11 b3 12 b6 b7

Above are 18 scales in the first position. If you wanted to find what names the notes are, you can use the transposition chart on page 4.

53 Scales

Locrian 2

1		2	b3		4	b5		b6		b7	
1	2	3	4	5	6	7	8	9	10	11	12

Super locrian

1	b2		b3	3		b5		b6		b7	
1	2	3	4	5	6	7	8	9	10	11	12

Whole tone

1		2		3		b5		b6		b7	
1	2	3	4	5	6	7	8	9	10	11	12

Diminished w/h

1		2	3		4	b5		b6	6		7
1	2	3	4	5	6	7	8	9	10	11	12

Diminished h/w

1	b2		b3	3		b5	5		6	b7	
1	2	3	4	5	6	7	8	9	10	11	12

Augmented

1			b3	3			5	b6			7
1	2	3	4	5	6	7	8	9	10	11	12

Pentatonic

1		2		3			5		6		
1	2	3	4	5	6	7	8	9	10	11	12

Blues 1

1		2	b3	3			5		6		
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 1

1		2		3			5	b6			
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 2

1			b3		4		5		6		
1	2	3	4	5	6	7	8	9	10	11	12

Blues 2

1			b3		4	#4	5			b7	
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 3

1		2		3			5				7
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 4

1		2	b3				5		6		
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 5

1		2	b3				5		6		
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 6

1		2		3			5	b6			
1	2	3	4	5	6	7	8	9	10	11	12

Altered pentatonic 7

1		2	b3				5		6		
1	2	3	4	5	6	7	8	9	10	11	12

Minor pentatonic

1			b3		4		5			b7	
1	2	3	4	5	6	7	8	9	10	11	12

Pure minor

1		2	b3		4		5	b6		b7	
1	2	3	4	5	6	7	8	9	10	11	12

53 Scales

Harmonic major 1	1 2 3 4 5 b6 7
	1 2 3 4 5 6 7 8 9 10 11 12
Harmonic major 2	1 2 b3 4 b5 6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Harmonic major 3	1 2 b3 4 b5 6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Harmonic major 4	1 2 b3 #4 5 6 7
	1 2 3 4 5 6 7 8 9 10 11 12
Harmonic major 5	1 b2 3 4 5 6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Harmonic major 6	1 b3 3 #4 #5 6 7
	1 2 3 4 5 6 7 8 9 10 11 12
Harmonic major 7	1 b2 b3 4 b5 b6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Diminished whole tone	1 b2 b3 4 b5 b6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Seventh sus 4	1 2 4 5 6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Altered 2	1 b2 3 4 5 b6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Altered 3	1 b2 b3 4 5 b6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Pure minor b4	1 2 b3 4 5 b6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
C-ish	1 b2 3 4 5 b6 7
	1 2 3 4 5 6 7 8 9 10 11 12
Diminished b6	1 2 b3 4 b5 6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Whole tone b2	1 b2 2 3 b5 b6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
m7 ^{b5} #3	1 b2 b3 4 b5 6 b7
	1 2 3 4 5 6 7 8 9 10 11 12
Chromatic	1 b2 2 b3 3 4 b5 5 b6 6 b7 7
	1 2 3 4 5 6 7 8 9 10 11 12

The Scale & The String

Up until now we've been looking at only one string. The key to using scale charts is knowing that we have a combination of different numbers of strings that make up each instrument. The basic theory for each string is the same but it depends on what it's tuned to where we find each note. A standard guitar has six strings. It would look like this in the key of C

C Major						Guitar																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
S1	4		5		6		7	1		2		3	4		5		6		7	1		2		3	E
S2	1		2		3	4		5		6		7	1		2		3	4		5		6		7	B
S3		6		7	1		2		3	4		5		6		7	1		2		3	4		5	G
S4		3	4		5		6		7	1		2		3	4		5		6		7	1		2	D
S5		7	1		2		3	4		5		6		7	1		2		3	4		5		6	A
S6	4		5		6		7	1		2		3	4		5		6		7	1		2		3	E
Frets	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

This is the pattern the key of C produces over a standard guitar tuning. The patterns are where you find scales and chords. The chart is 6 blocks high and 24 blocks long. From left to right you read frets one through 24. Vertically you see six strings. Their tuning is to the right.

To the right we see a standard E9th tuning. There are ten strings and their tuning is to the right. 10 blocks high for the strings and 12 blocks long for one octave of music. The same pattern repeats from 13 to 24 on the fretboard. Learn it once and know it repeats.

These graphs were generated by an Excel spreadsheet. The computer calculates what key you choose and what scale type. For the pedal steels it will even show you what happens when you press a ped.al.

C Major						E-9TH							
	1	2	3	4	5	6	7	8	9	10	11	12	
S1	5		6		7	1		2		3	4		F#
S2	3	4		5		6		7	1		2		D#
S3	6		7	1		2		3	4		5		G#
S4	4	5		6		7	1		2		3		E
S5	1	2		3	4		5		6		7		B
S6	6		7	1		2		3	4		5		G#
S7	5	6		7	1		2		3	4			F#
S8	4	5		6		7	1		2		3		E
S9		3	4		5		6		7	1		2	D
S10	1	2		3	4		5		6		7		B
	1	2	3	4	5	6	7	8	9	10	11	12	

Looking at a chart we can start to see music on our instrument. The guitar above and the steel guitar have a few common strings. The E notes are common, as are the B strings. Another major difference is the way that you would approach playing these instruments. Learn to see the strings as the common denominator for learning stringed instruments.

Where I begin

The way I keep track of all the different scales is by seeing them as variations of the chromatic scale. The chromatic scale consists of twelve tones, each a half-step apart. You can have 5, 6, 7, & 8 tone scales to create music. Each scale brings certain tones of the chromatic scale. Each scale tone has its own characteristics that you need to learn.

The best way to learn these is to think of the seven major scale tones and the five altered tones. When we see the chromatic scale we realize that inside those twelve notes is our major scale. The other tones are named by altering the major scale tones. A $b2$ is also a $b9$ if you are working with extended chords. If you need more information on scales and their usage, you can find it in music theory books and in My Approach to Pedal Steel Book II.

This scale book has the patterns that each of the 53 scales create over the open tuning and then we see them applied to pedal combinations. This allows us to see a tremendous amount of music on our guitars. As with any book about steel, start slow and work your way through a scale at a time. Learn the major scale and its family of modes and then work on some of the altered scales.

The scales in this book allow you to take your solo's as far *outside* as you want to travel. Study each scale on the previous pages. They are all shown with the (1) scale tone in the first fret position. That makes them all equal. Remember, that each of the scale patterns has 12 possibilities of being applied to any one string. The spreadsheet gives a string a starting number and then additions are made to that number. After the key is chosen, scale type, and pedals, then the final number for each string tell you the pattern number that is needed to make the chart.

If you own Excel for the Macintosh or Windows 3.1 or '95, then you can order your own copy of the spreadsheet that made my scale books.. Then you can see your guitar like never before.

Joe Wright Productions
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