# A Note On Pentatonics

by Alan Lowe

My students sometimes have trouble seeing the point of Pentatonic scales. They don't really see the point of any scales for that matter. The fault is very likely all mine since I should have some way of explaining the purpose of scales. There are notes that simply don't belong with certain chords and should therefore never be played. So a scale provides a kind of roadmap of allowable notes.

Next comes the question of what you can do with them. You play the pentatonic scale from lowest to highest and back again and say, "So what?"

It's a good question. You are not likely to play many solos using just those two combinations of pentatonic scales. What you have to do is change the order of notes. So how many ways can you play a pentatonic scale?

Well, if your guitar solo consisted of just 5 notes, the number of notes in a pentatonic scale, you might think you dont have many options but consider; the first note of your solo can be any of the 5 notes of the pentatonic. That means you can play note 1, 2, 3, 4 or 5 as the first note. The second note can also be any one of the 5 available notes but with the first note, provides a total of 25 combinations. To illustrate these possible combinations, you can play (1,1) (1,2) (1,3) (1,4) (1,5) (2,1) (2,2) (2,3) (2,4) (2,5) (3,1) (3,2) (3,3) (3,4) (3,5) (4,1) (4,2) (4,3) (4,4) (4,5) (5,1) (5,2) (5,3) (5,4) or (5,5).

Adding one more note takes the total number of ways of playing them up to 125.

Adding one more note, you can play 4 notes in 625 different combinations.

Finally, adding the fifth note takes the total number of combinations up to 3,125, certainly enough to explore your creativity in just 5 notes.

Suppose you did the same thing with an ordinary C Major scale - C, D, E, F, G, A, B

These seven notes can be played in an incredible 823,543 different combinations. Your entire musical career might only see you writing 50 different songs but they can all be written using different combinations of notes from the same scale in every bar. If each song consisted of say, 120 bars, easily a 3 to 4-minute song, you have enough combinations to write more than 6,800 songs. Take your pick of any 50 of them...

Now, think about the pentatonic scale that you have been asked to practice; 2 notes per string gives you 12 notes. The numbers have progressed geometrically to a mind-boggling number that I don't have anything readily available to compare. The number of combinations of 12 notes in pentatonic form is 8,916,100,448,256

The number is quite a mouthful to say - eight trillion, nine hundred and sixteen billion, one hundred million, four hundred and forty-eight thousand two hundred and fifty-six

You couldn't RUN that many steps in your lifetime. If you could play 12 notes per second, it would be nowhere near a world record but would still be a rather brisk pace. Even so, you could not play all of

the combinations of 12 notes in pentatonic form in your lifetime. In fact it would take you 283,504 years to get through it at that pace. Steve Vai or Joe Satriani could probably get through all of these combinations in about 100,000 years if they didn't eat or sleep.

What this all means is that although you won't play every combination of pentatonic in your lifetime, you still have hundreds of millions to choose from giving plenty of scope for originality and creativity. So, practice those pentatonics and experiment with different combinations. You never know what you will create :)

If these numbers are impressive, consider the natural minor scale as played across all six strings: There are 17 notes here. The geometric progression continues to produce astronomical figures that are not easy to illustrate.

Bear with me a moment: The scientifically accepted age of the universe is, as near as makes no difference, about 14 billion years. If you could play every combination of notes from the natural minor scale across 6 strings, one combination per second, you would be knocking on the back door of world records but it would still take you a staggering 1800 times the age of the universe to play them all. This means that no matter who the musician is, the chances that you are going to play combinations of notes that they have never heard of is not only very good but extremely likely.