

Electronic structure

Big Manny: Alright, Cool.

Every atom hides a set of invisible layers filled with electrons.

Understanding how those electrons are arranged is key to understanding the element itself.

Now this is known as the electronic structure.

Electrons aren't just placed at random, they are arranged in energy levels or shells around the nucleus.

Each shell can hold a maximum number of electrons.

For atomic numbers up to 20, there are up to two electrons in the first shell, up to eight in the second, and up to eight in the third.

Electrons always fill the innermost shell first, the one closest to the nucleus before moving outward.

An element's electronic structure and its place in the periodic table are directly linked.

Sodium has an atomic number of 11, which means it has 11 electrons in total.

Two electrons occupy the first shell, eight electrons fill the second shell, and that leaves one electron in the third shell.

So we can actually check this out you know.

As we know, the number of shells is equal to the period number, sodium is in period three meaning it has three shells in total.

The number of outer-shell electrons is the same as the element's group.

Sodium is in group one because it has only one electron in its outer shell.

Now it's over to you.

Man's got a little challenge there.

Oxygen has an atomic number of eight.

Can you work out its electronic structure?

You can pause the video while you have a little think.

All right.

I'm going to give you the answers now, yeah.

Oxygen has eight electrons.

Two in the first shell and six in the second.

Did you check your answer on the periodic table?

Two shells means it's in period two and six outer electrons place it in group six.

It fits perfectly.

And when it comes to predicting an element's electronic structure, don't forget, the total number of electrons equals the atomic number.

The number of shells equals the period number.

And the number of outer shell electrons equals the group number.

Electronic structure can tell us a lot about an element's place in the periodic table.

Keep practicing with as many elements as you can, and you'll know them like the back of your hand.

You done know.

Electron tings.