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Hello. I'm Dr Alex Lathbridge and this is the Bitesize Biology.

This is the last episode in our series on Inheritance, Variation and Evolution.

In this episode we're going to talk about classification. We're going to take a look at three different types of classification: the Linnean System, the three-domain system and the binomial system.

Look I know, it sounds dry. But these are fundamental to how we view the world and also they give a little insight into how much things have changed over the last few centuries.

Before the invention of flat pack furniture, one of the biggest things to come out of Sweden was the Linnean System.

One of the earliest classification systems of organisms, it was proposed was by a man called Carl Linnaeus in the 1700s. The Linnean System classified organisms into different groups depending on their structure and characteristics. Basically, the biological equivalent of "you lot look kind of similar – are you related?"

Classification like this allows you to group organisms together that share similar characteristics. The largest groups are very general, and then classification of different organisms allows you to divide them down into smaller and more specific groups.

Ok, grab a pen, write this down.

The Linnean classifies organisms into seven smaller and smaller groups like this:

Kingdom, Phylum, Class, Order, Family, Genus and finally Species.

I've got an easy phrase to remember this order: Kings Play Chess On Fancy Gold Squares, where the first letter matches with the different groups: Kingdom, Phylum, Class, Order, Family, Genus, Species. Kings Play Chess On Fancy Gold Squares.

Species is the final classification stage of the Linnean System, where organisms are grouped into their specific species so they are really similar.

A species is a group of organisms capable of interbreeding and producing fertile offspring. So all dogs, despite their different breeds, size difference and everything, can interbreed to have fertile offspring, because they're all one species.

But on the other hand, zebras are one species, and horses are a sperate species, but if you do breed them together you get a hybrid, and one name for it is a "zorse." And yes, luckily, its infertile.

Remember: Kingdom, Phylum, Class, Order, Family, Genus, Species.

Kings Play Chess On Fancy Gold Squares, that's the Linnean system.

Next up is The Binomial System, this is using two Latin names to classify species.

And if you're thinking "oh no, do I have to learn Latin now?" don't worry, all you need to know is that this system uses Latin words.

And it's in two parts, the first word is the genus and the second word is the species. So it uses the last two stages of the Linnean system.

So you might have heard the name homo sapiens for humans, this is an example of the Binomial system.

The first word 'homo' is the genus, and the second word 'sapiens' is the species.

Or Felix catus for cats. Felix is the genus, catus is the species.

The binomial system is helpful because it allows scientists to name and identify individual species.

Remember, the Linnean system was invented in the 18th century. This was way before we understood genetics like we do now, so for a very long time it was like:

"Has it got wings and feathers? Cool – it's a bird. That thing – does it have scales? Oh it does? OK that's a reptile."

Sounds good, yeah? Well, no, it's not. It's not a joke when you're sitting in a university lecture, having to come to terms with the fact that a red panda is called a red panda, because apparently, if you looked at the face markings, it looks sort of like a panda (you know, the regular, big black and white ones). Imagine the surprise when we actually progressed further than sticking to a concept developed before the invention of matches, the bicycle, and chicken nuggets, and found out that genetically, they're not really closely related to pandas. Or bears. They're closer to skunks. Mind blown.

Thankfully, advances in science through time have led to the development of microscopes. This enables scientists to look at organisms in much more detail, investigating their internal structures and cells.

With all these scientific advances going on, new classification systems have been proposed, which leads us to the final system you need to know about: the Three Domain system.

The Three Domain System was developed by Carl Woese in 1990. This was based on scientific evidence from chemical analysis, so looking at the chemical reactions that happen inside organisms.

From his research, he found that some species that were traditionally thought to be closely related, were actually quite different and shouldn't be grouped together.

In this Three Domain system organisms are divided into (you guessed it) three domains:

1. Archaea. These are primitive organisms that live in extreme environments, for example one is known as Pyrococcus furiosus, and it lives in extreme environments inside a volcano.

2. Bacteria. So these are things like E. coli, the prokaryotes.

3. Eukaryota. Remember Eukaryotic cells from our first series on The Cell? Everything else pretty much falls into this category, so fungi, plants, animals and protists.

These are then categorised into the usual smaller groups we are now familiar with: Kingdom, Phylum, Class, Order, Family, Genus, Species.

And with the study of DNA sequences, scientists can see how closely related organisms are genetically.

Evolutionary trees are tools that scientists use. It's a bit like family trees but instead of grandparents and aunts and uncles, it shows how different species are related, and what common ancestors they share from millions of years ago.

If you think of a tree shape, at the very end of each branch there is a species. Species on branches that are close together indicate that they are closely related. And where the branches meet, there will be a species that is related to both of them: a common ancestor.

Species that are separated by lots of branches mean they are not closely related, even if at first glance you think they might be, like dolphins and sharks, because dolphins are mammals and sharks are fish. Or another example, red pandas and pandas.

I'm Dr Alex Lathbridge and this is the Bitesize Biology, to hear more search Bitesize Biology on BBC Sounds.