

Pedigree Dogs Mystery

This is a fun activity that introduces DNA and forensic applications. A bit of background knowledge is required and using the **DNA & Forensic** presentation can cover that.

Alternatively, you can cover the background in a classroom discussion. You can discuss how we can follow inheritance in families from characteristics that we can see and explain that just in the same way we can look at those, we can also look at and follow the inheritance of DNA using DNA patterns (See below). Once they have mastered following the inheritance of the DNA bands they can easily proceed to the Pedigree Dogs Mystery. A working knowledge of the inheritance is all that is required rather than a full understanding of how it exactly works.

Introduction to dogs and pedigrees

As we are going to be mentioning pedigree dogs in our Pedigree Dogs Mystery you can use this as an introduction to family trees (pedigree trees) and inheritance. Firstly, start by asking about what they understand by the term pedigree dog and as a fun aside you can see how many breeds they can name.

What is a pedigree dog?

Usually refers to dogs that are of a recognised breed and that their lineage/heritage can be shown to be pure to that breed. Typically, a five-generation pedigree (as in pedigree tree below) is required as a minimum

How many different breeds of dogs can you name?

I have only got 32 here...

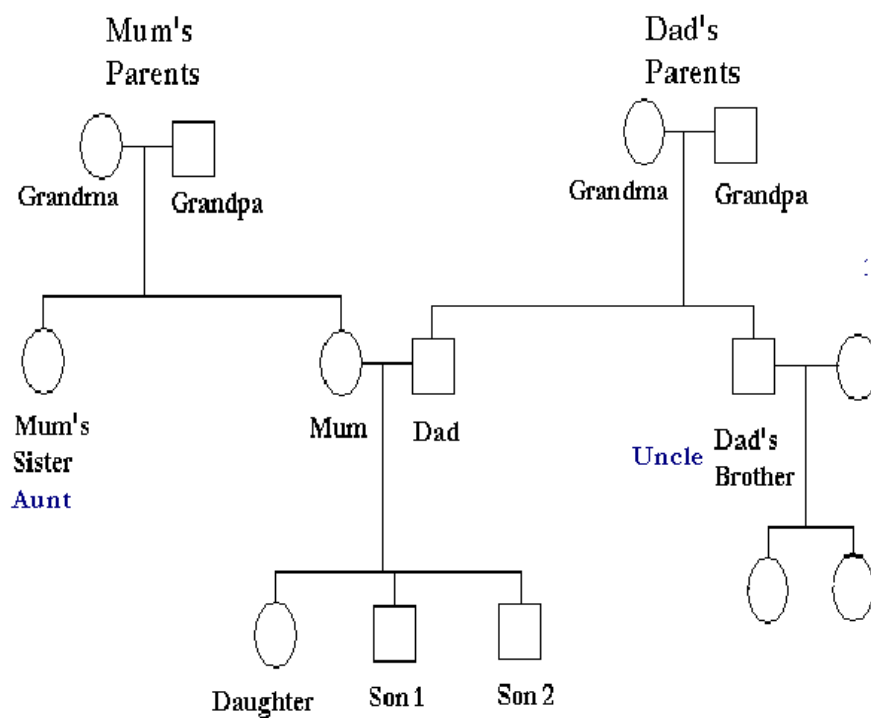
Dalmatian, Alsatian, Beagle, Terrier (e.g. Cairn, Fox, Bull, Airedale, Yorkshire), Boxer, Dachshund, English Bulldog, Red Setter, Sheepdog, Collie (e.g. Border), Scottie dog, Labrador, Irish Wolf Hound, Doberman, Pekinese, Poodle, Pug, Afghan, Spaniel (e.g. Cocker, King Charles), Chihuahua, St Bernard, Basset Hound, Shih tzu, Bloodhound, Chow-chow, Jack Russell, Huskie...etc..

Family Trees

Linking into the idea of pedigree dogs and being able to trace their lineage you can introduce family/pedigree trees.

Have you heard of family trees, also known as pedigree trees?

You can show a simple family tree such as the one below and explain that you can follow the inheritance of characteristics in a family. If you like you can give an example here, either your own family, make one up or ask if they can think of a suitable example. I often use the inheritance of ear shape.



The symbols used in pedigree drawing are standard.
Squares represent males.
Circles represent females
Horizontal lines indicate a relationship – married/partners
Vertical lines show the next generation - children

You can follow DNA patterns in families

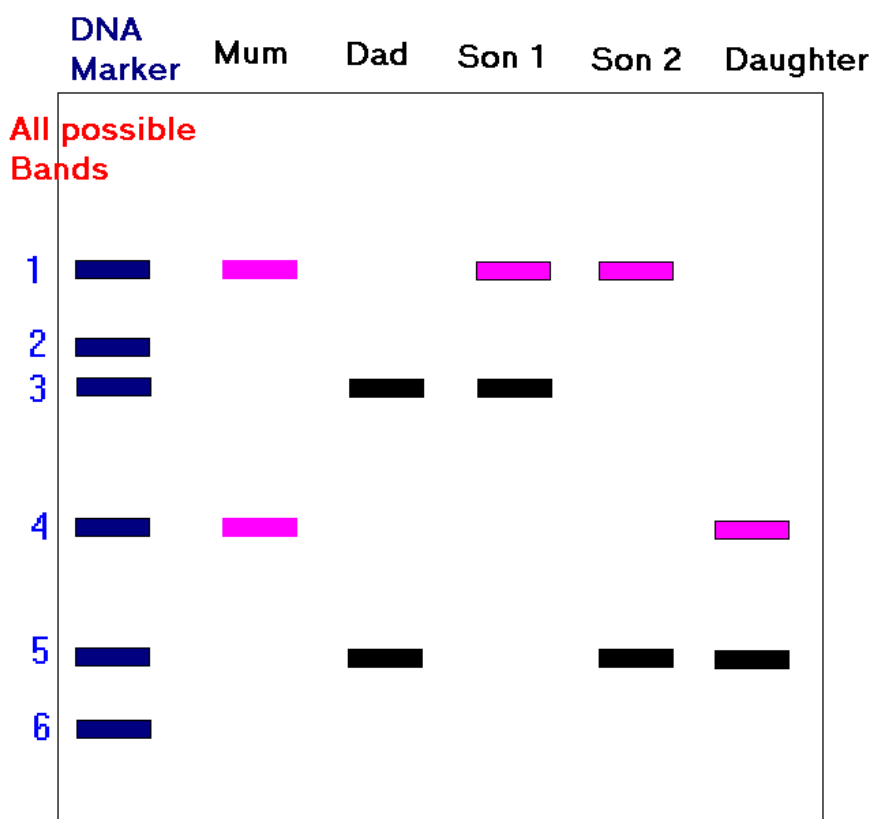
Just like you can follow the inheritance of characteristics in a family we can look at DNA and follow how that is inherited.

You can look at DNA fingerprints and see how people are related by their DNA patterns. These can be very complicated and are sometimes difficult to interpret.



DNA Fingerprint

Sometimes you can use very simple patterns of DNA to look if people are related. These often look at one place in the DNA at a time. So instead of seeing lots of bands making a pattern, you only look at a pair of bands. Why do we get a pair of DNA bands? This is because we get half our DNA from our Mum and half our DNA from our Dad. So, for every bit of DNA we look at we can see what comes from our Mum and what comes from our Dad. Like the diagram below we can see which DNA band is inherited from which parent



These sections of DNA that we look at have a lot of variation, so it is possible to have a large number of different bands. In this example there are 6 different versions. These sections that we look at are not generally genes but non-coding stable sections of DNA that are inherited in the same way as genes. We refer to them as DNA Markers

This example of a simple DNA profile is the same as those used in the Pedigree Dogs Mystery. Once this is understood, or at least can be followed you can proceed to the activity.