

A microscopic view of a plant stem cross-section, showing various layers of cells including the epidermis, cortex, pith, and vascular bundles. The cells are stained, highlighting their structure.

# Genealogy

Introduction to Creating Family History

## Section ONE: DNA

Why DNA Matters In Your Family Research





# Why Does DNA Matter In Genealogy?

There are often barriers or brick walls that show up during genealogical searches. DNA can break through these walls. A very good article published by Family Search can explain exactly why DNA is so important. The name of the article is “Over Coming Brick Walls in Your Family Tree with a Genealogy DNA Test” Here is a link to this article

<https://www.familysearch.org/blog/en/genealogy-dna-test/> .

You will have to write that link down to connect to that page- it's a good read.

## Basic TERMS:

Genetics

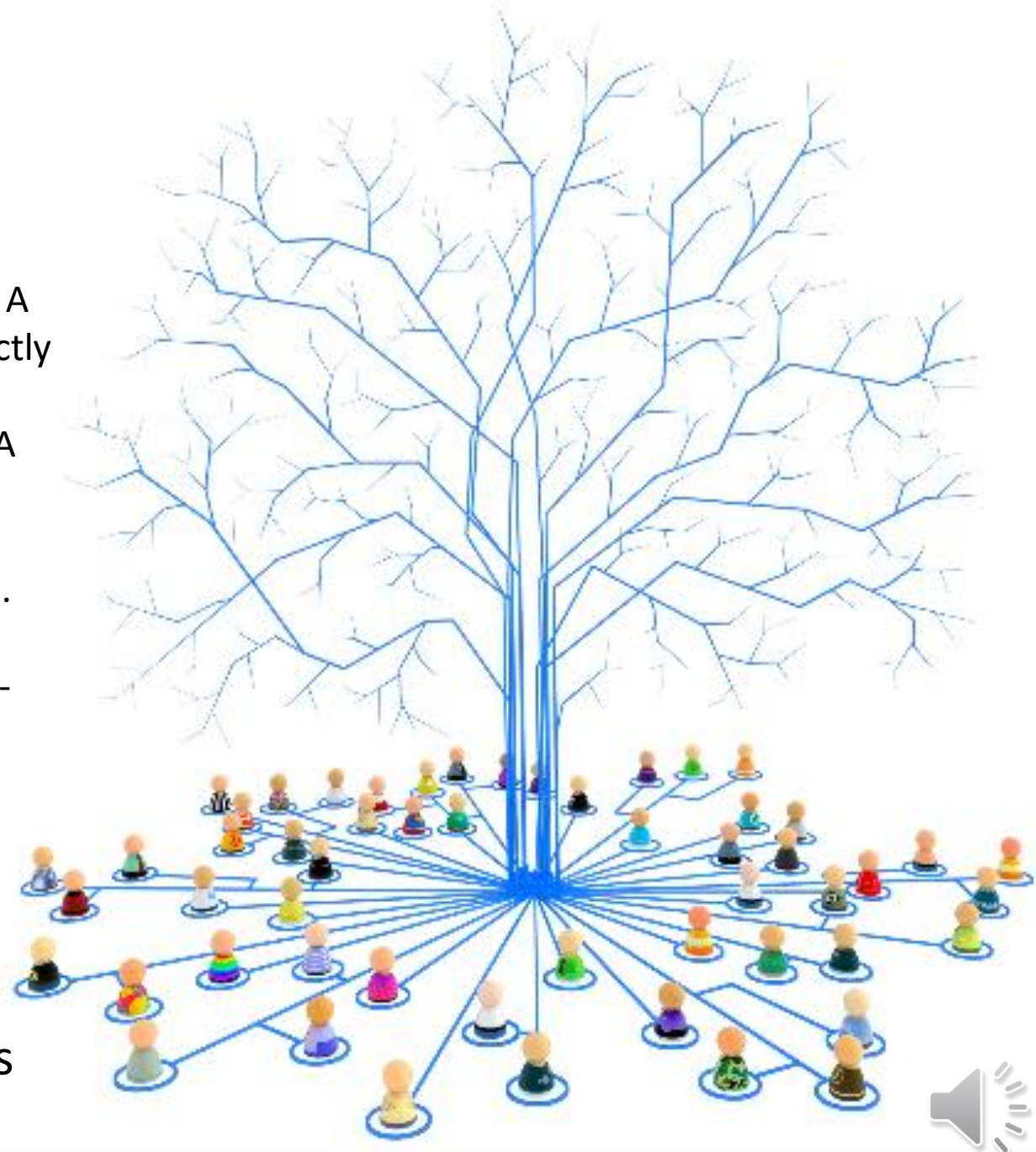
Centimorgan

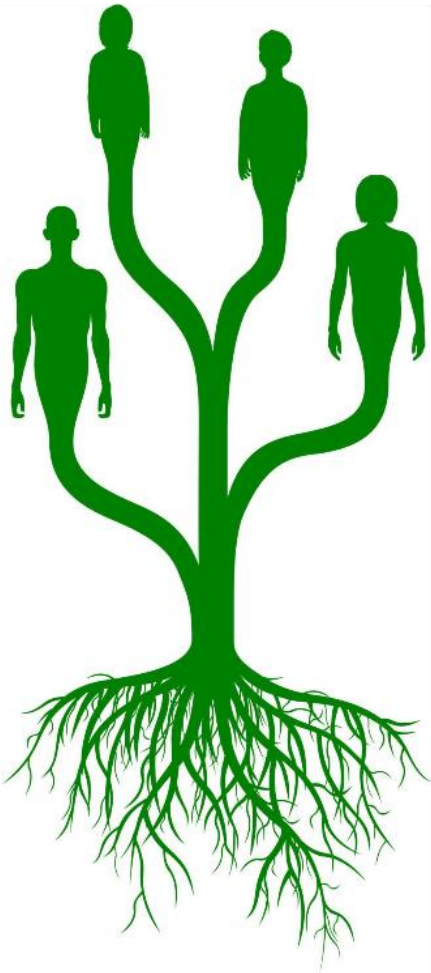
Genes

Meiosis

DNA

Relationships or Classifications





## Step 1: Understanding Terms & Relationships

### What Is **GENETICS**?

**Genetics** is the study of heredity. Heredity is a biological process whereby a parent passes certain genes onto their children or offspring. Every child inherits genes from both of their biological parents and these genes, in turn, express specific traits. A **GENE** is the basic physical and functional unit of heredity. Genes are made up of DNA.





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## Step 1: Understanding Terms & Relationships

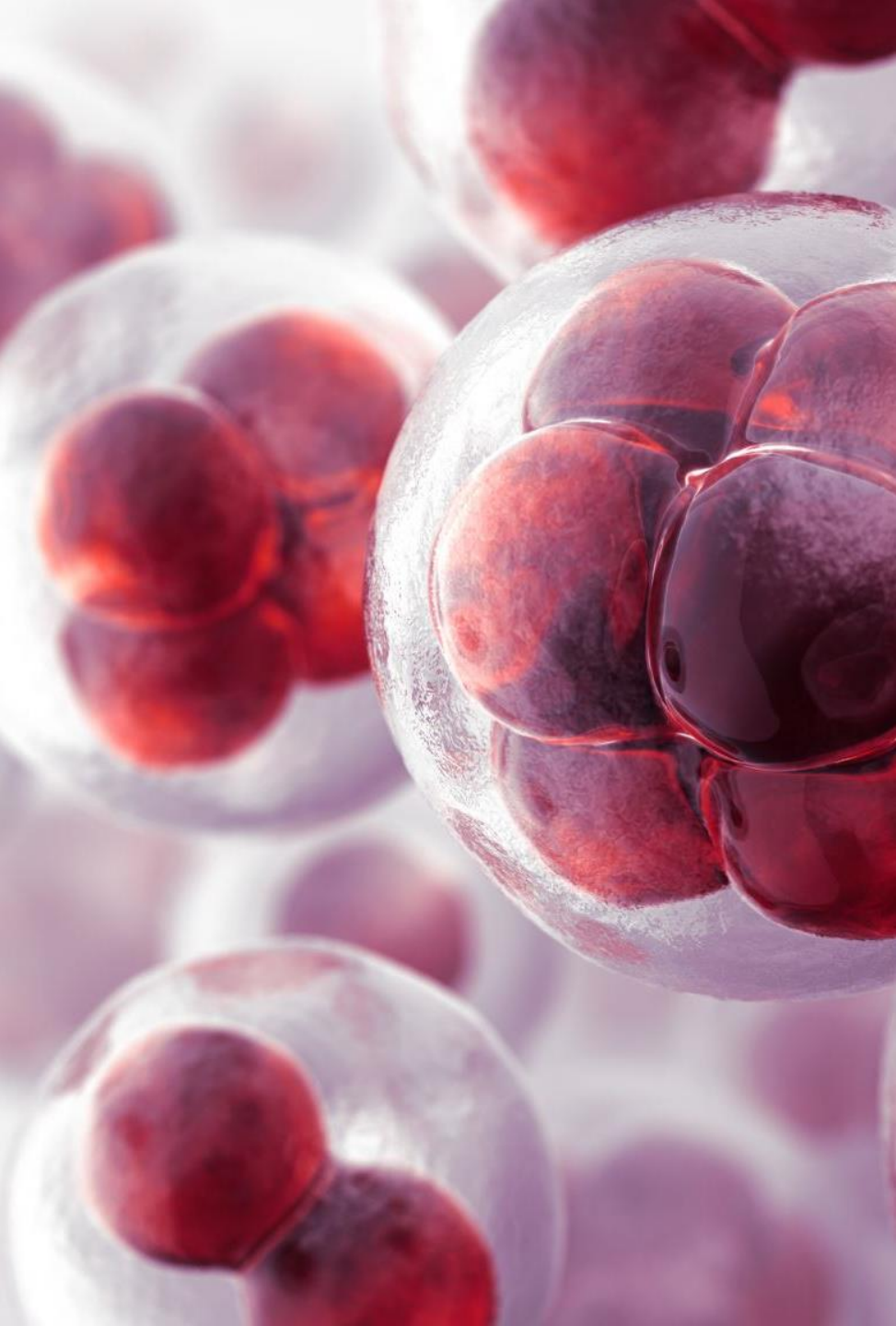
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### **What is DNA?**

DNA, or deoxyribonucleic acid, is the hereditary material in humans and almost all other organisms. Nearly every cell in a person's body has the same DNA. Most DNA is located in the cell nucleus (where it is called nuclear DNA), but a small amount of DNA can also be found in the mitochondria (where it is called mitochondrial DNA or mtDNA).







# Understanding Terms & Relationships Continued...

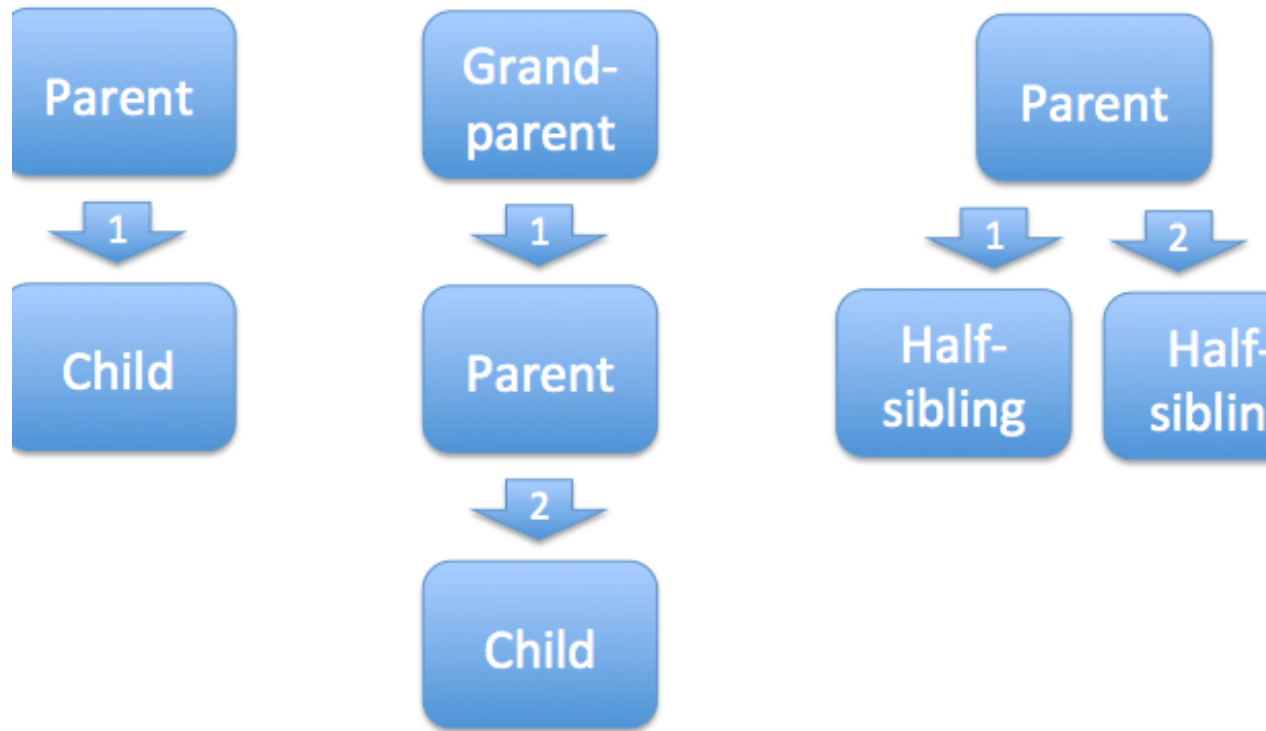
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## What Is a Centimorgan (cM)?

- A centimorgan is a unit of genetic measurement. It's what experts use to describe how much DNA and the length of specific segments of DNA you share with your relatives. These shared segments are divided up into centimorgans. The more centimorgans you share with someone, the more closely you are related.
- A centimorgan is different from the physical units we use in everyday life, such as inches or kilometers. It is less of a physical distance and more of a measurement of probability. It refers to the DNA segments that you have in common with others and the likelihood of sharing genetic traits. The ends of shared segments are defined by points where DNA swapped between two chromosomes, and the centimorgan is a measure of the probability of getting a segment that large when these swaps occur.
- These swaps are truly random so there may be infinite variations that might occur



# Step 1: Understanding Terms & Relationships



- **Meioses (mai – OW – suhs) :** The relationship between a mother and her child involves a single meiosis event, the one that formed the egg that made the child. Same goes for the relationship between a father and child: one meiosis to produce the sperm cell. That between a grandparent and grandchild involves two meioses (one in the grandparent, one in the parent). Similarly, half siblings are separated by two meioses, one in the shared parent to produce the first child, and a second in that same parent to produce the second child.

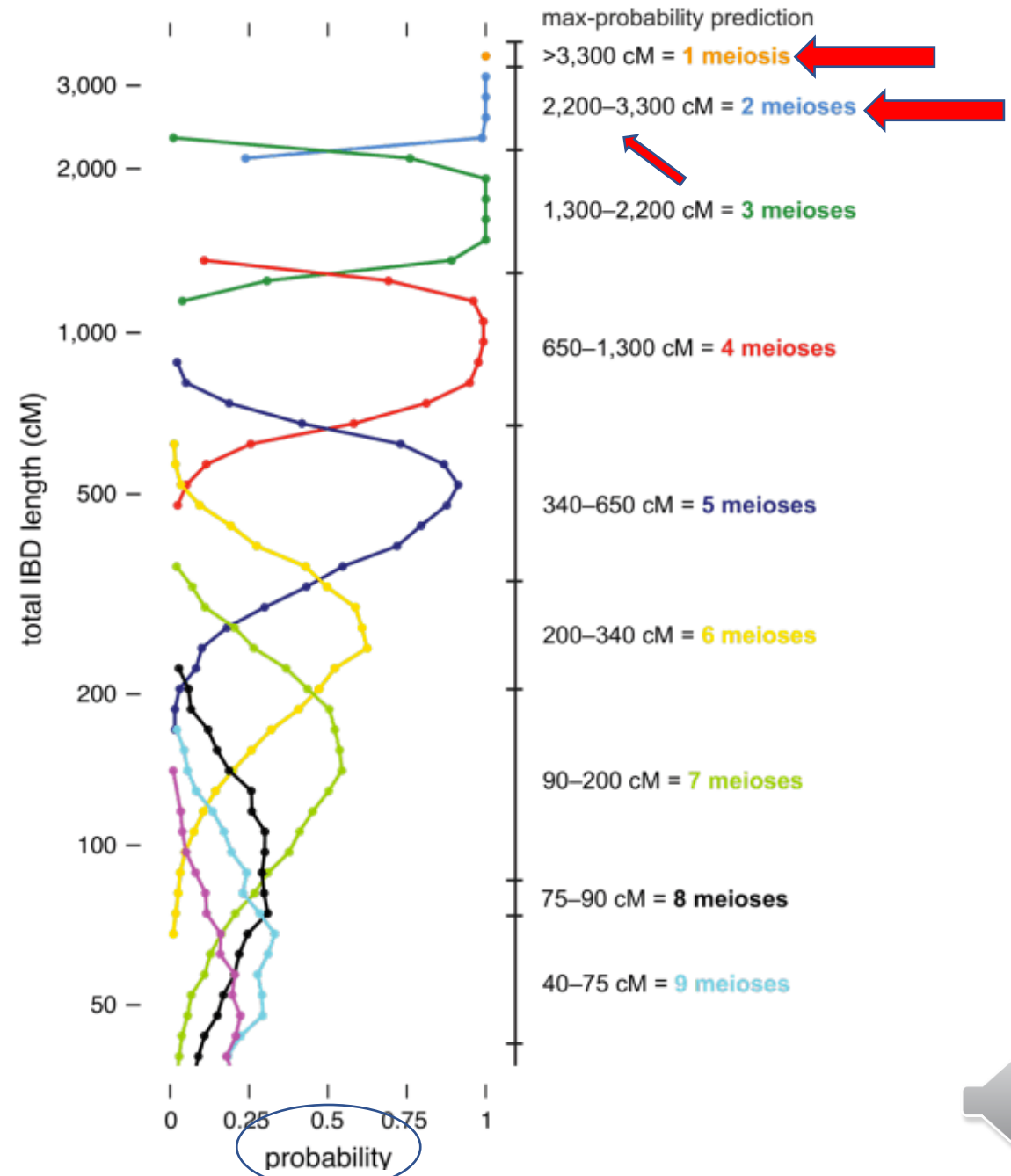


# PROBABILITY

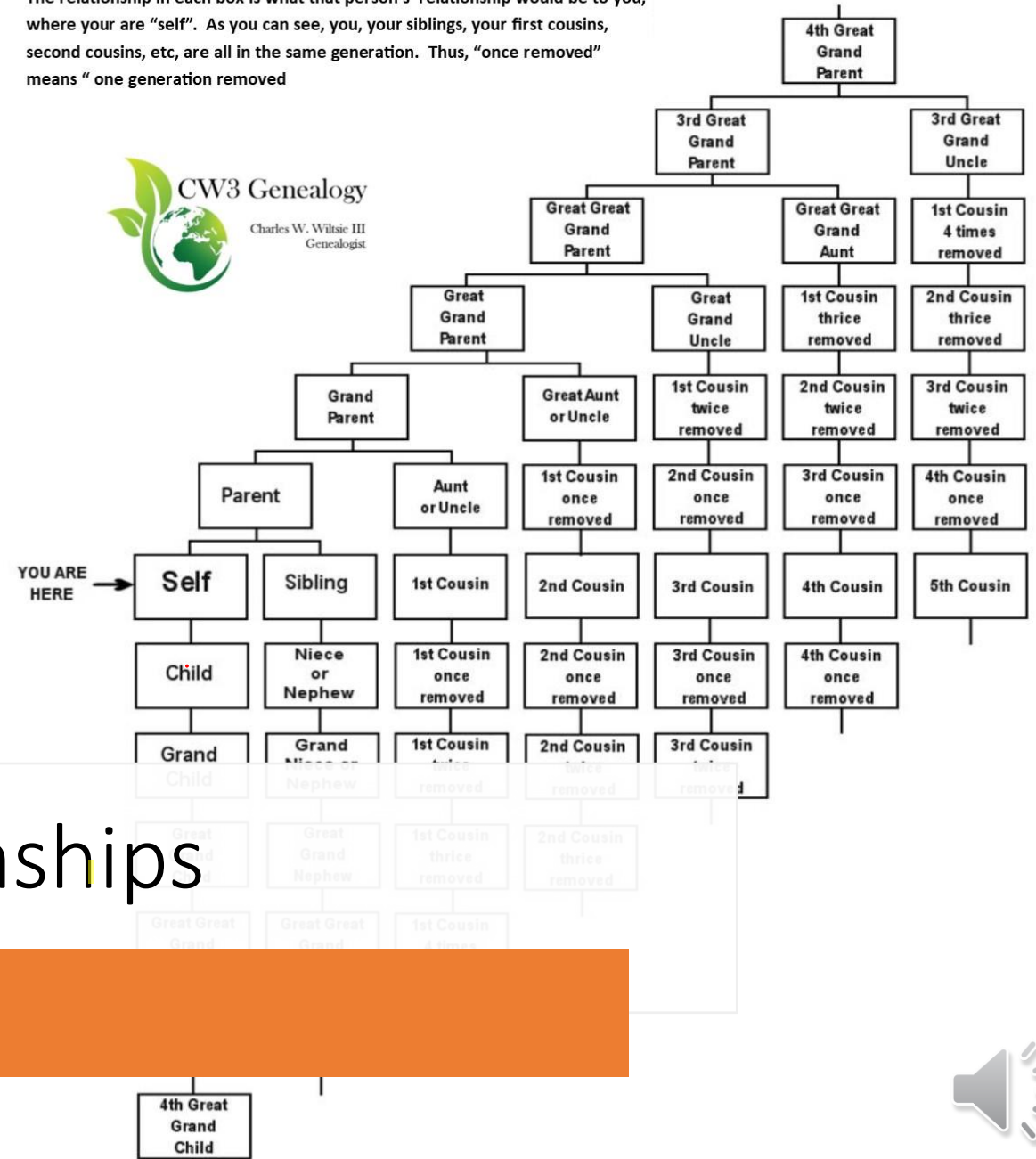
1 Meiosis = Parent to Child

2 Meioses = Grandparent

Note that there is a relationship between cM



The relationship in each box is what that person's relationship would be to you, where you are "self". As you can see, you, your siblings, your first cousins, second cousins, etc, are all in the same generation. Thus, "once removed" means "one generation removed"



# Relationships

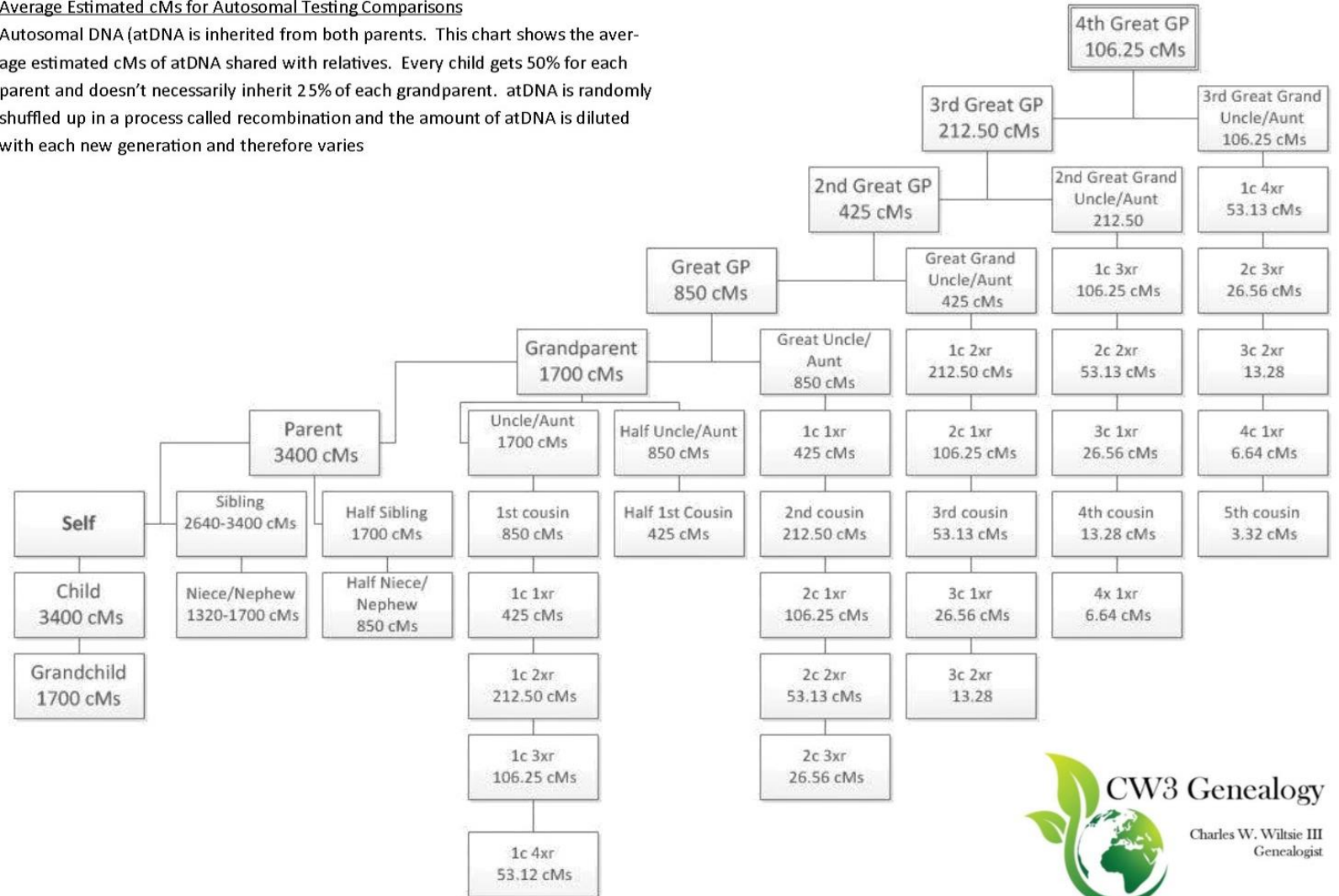




# Figuring Out Relationships

## Average Estimated cMs for Autosomal Testing Comparisons

Autosomal DNA (atDNA) is inherited from both parents. This chart shows the average estimated cMs of atDNA shared with relatives. Every child gets 50% for each parent and doesn't necessarily inherit 25% of each grandparent. atDNA is randomly shuffled up in a process called recombination and the amount of atDNA is diluted with each new generation and therefore varies



# Downloadable Relationship Chart



# Section 1 Complete

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Now it's time to move onto Section 2: Genealogical Proof Standard (GPS) Proper Record Keeping

But before you do that make sure to reflect on what you've learned so far and TAKE ACTION by

Joining a Genealogy Site and get Submit a Sample of Your DNA

Also, don't forget to download the Free Forms and Samples in this Class

