

Review

- What are the conditions that made it possible for life to evolve on Earth?

GENETIC DIVERSITY

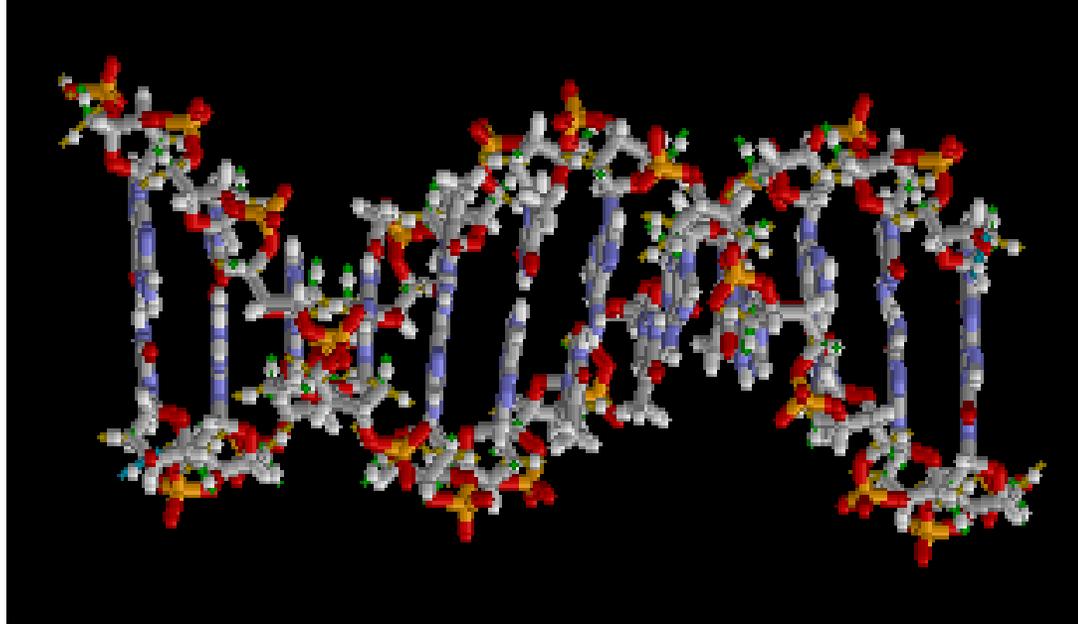
Cellular Reproduction

- The whole process of cellular reproduction is focused on the passing on of genetic material

- What do we mean by genetic material?
 - What do you know about:
 - DNA?
 - Genes?
 - Chromosomes?

DNA

- DNA stands for Deoxyribonucleic Acid
- DNA is the hereditary material of most organisms:



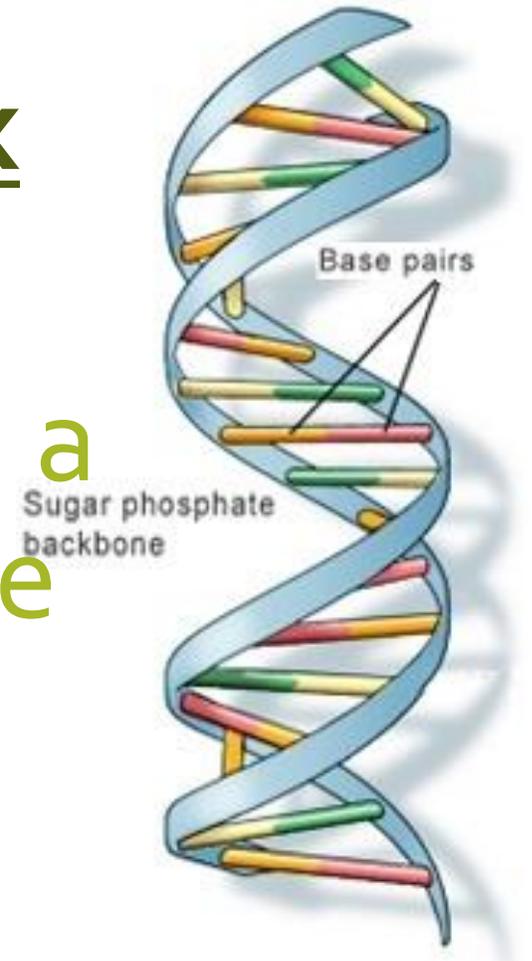
DNA

- It contains the "code" that will program the different processes that are required for building and maintaining an organism
- Reading the code tells the cells and its structures what to do

DNA

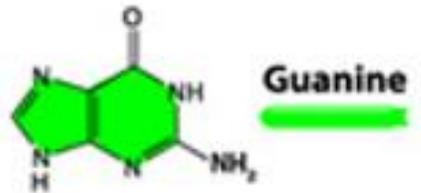
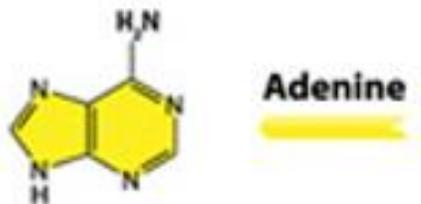
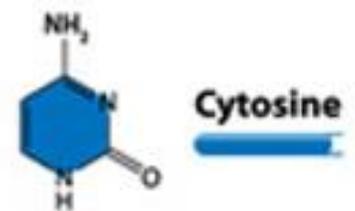
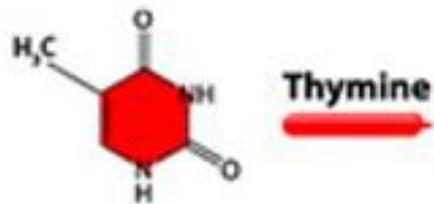
A complete molecule of DNA is called a chromosome.

- A DNA molecule is a double helix structure (a twisted ladder)
 - Each “bar” in the ladder is called a **nucleotide** and is made of 2 base pairs.

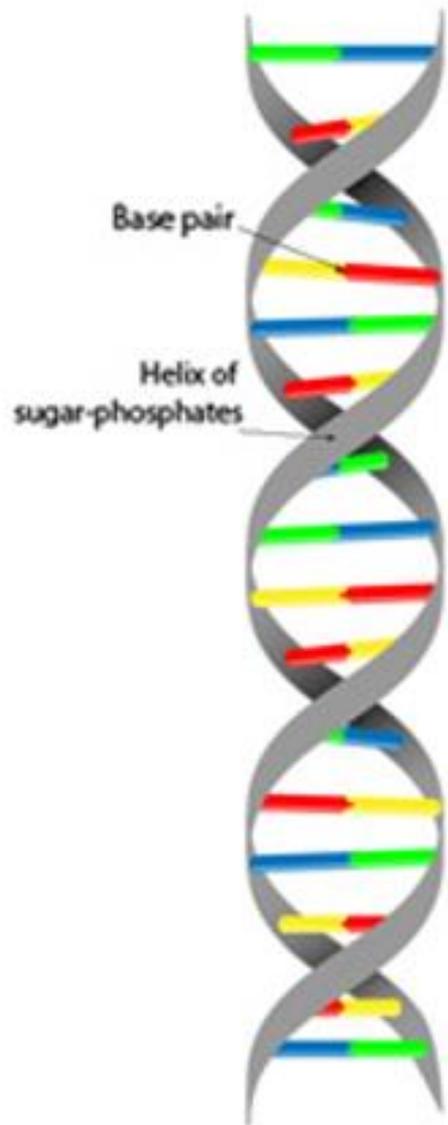


DNA

- There are 4 bases:
 - Adenine (A), Cytosine (C), Guanine (G) and Thymine (T)
- They are always paired: A – T and G – C
- The order in which these base pairs are arranged determines the genetic information (the “code”)



Nucleobases
of DNA

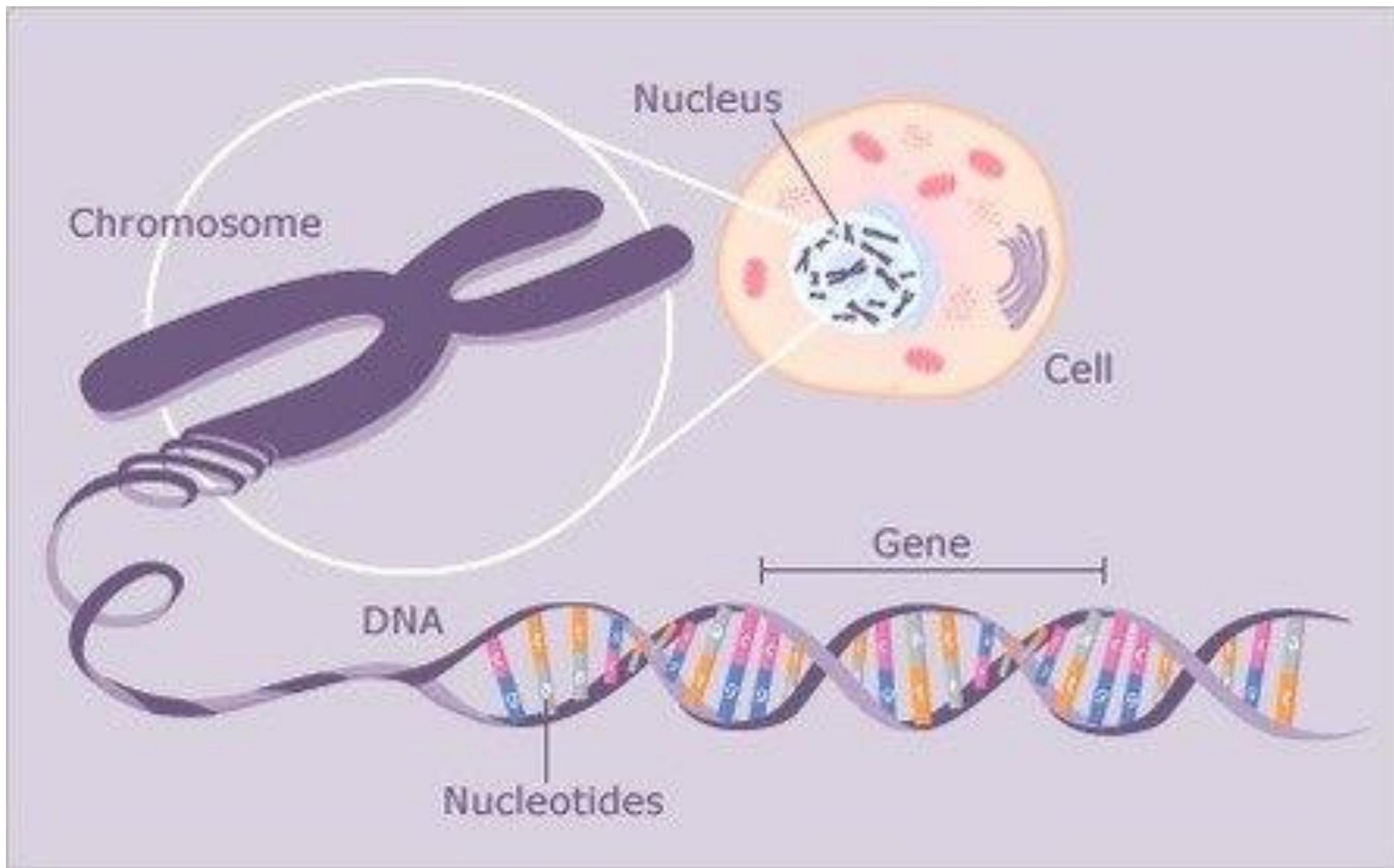


DNA
Deoxyribonucleic Acid

Chromosomes & Genes

- **Chromosomes:**

- Structures containing an individual's genetic code (a complete molecule of DNA). In animal and plant cells, the chromosomes are located in the nucleus.
- Chromosomes form when DNA packs itself up tightly by coiling itself again and again until it is shaped like an X.



Chromosomes & Genes

Chromosomes contain:

- **Genes:**

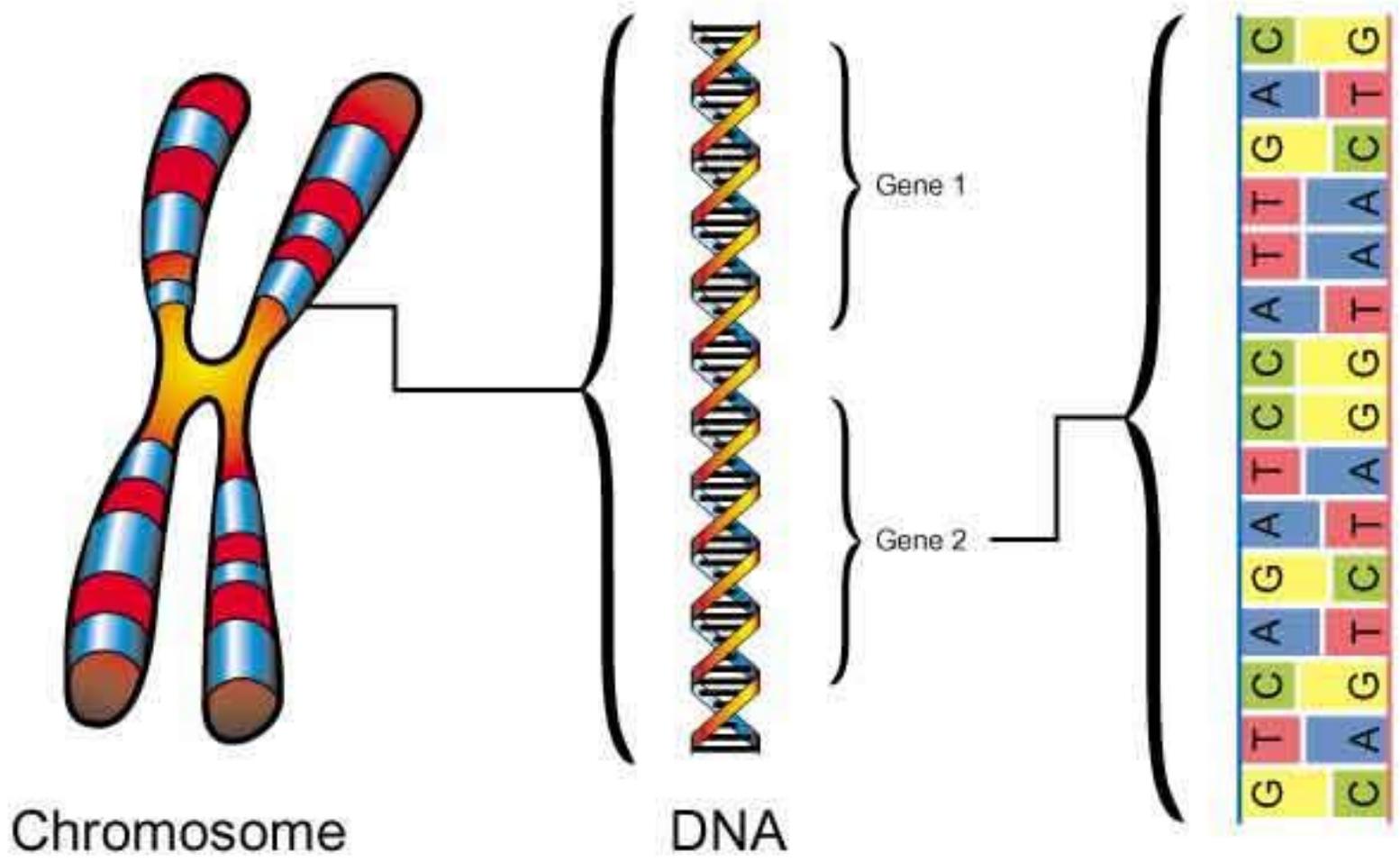
- These are chromosome segments that determine specific genetic characteristics.

- ex: eye color, skin color, etc.

Chromosomes & Genes

We all have similar genes but minor differences make us all unique.

- There are different variations of genes possible and these can be dominant or recessive.

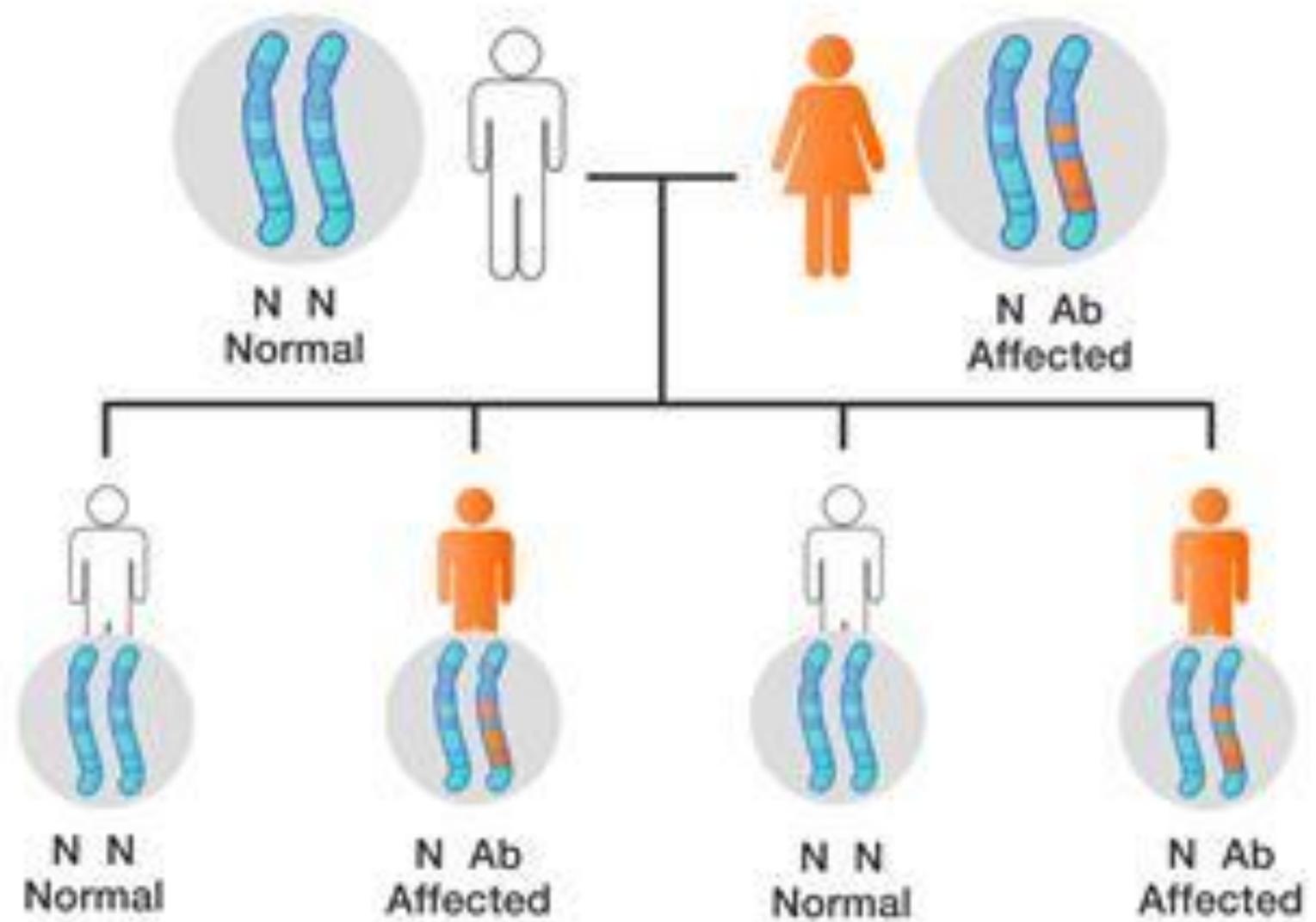


Genes

KARYOTYPES

Karyotypes

- Remember: **23 pairs** give a total of **46 chromosomes** of which $\frac{1}{2}$ come from the mother and $\frac{1}{2}$ from the father.



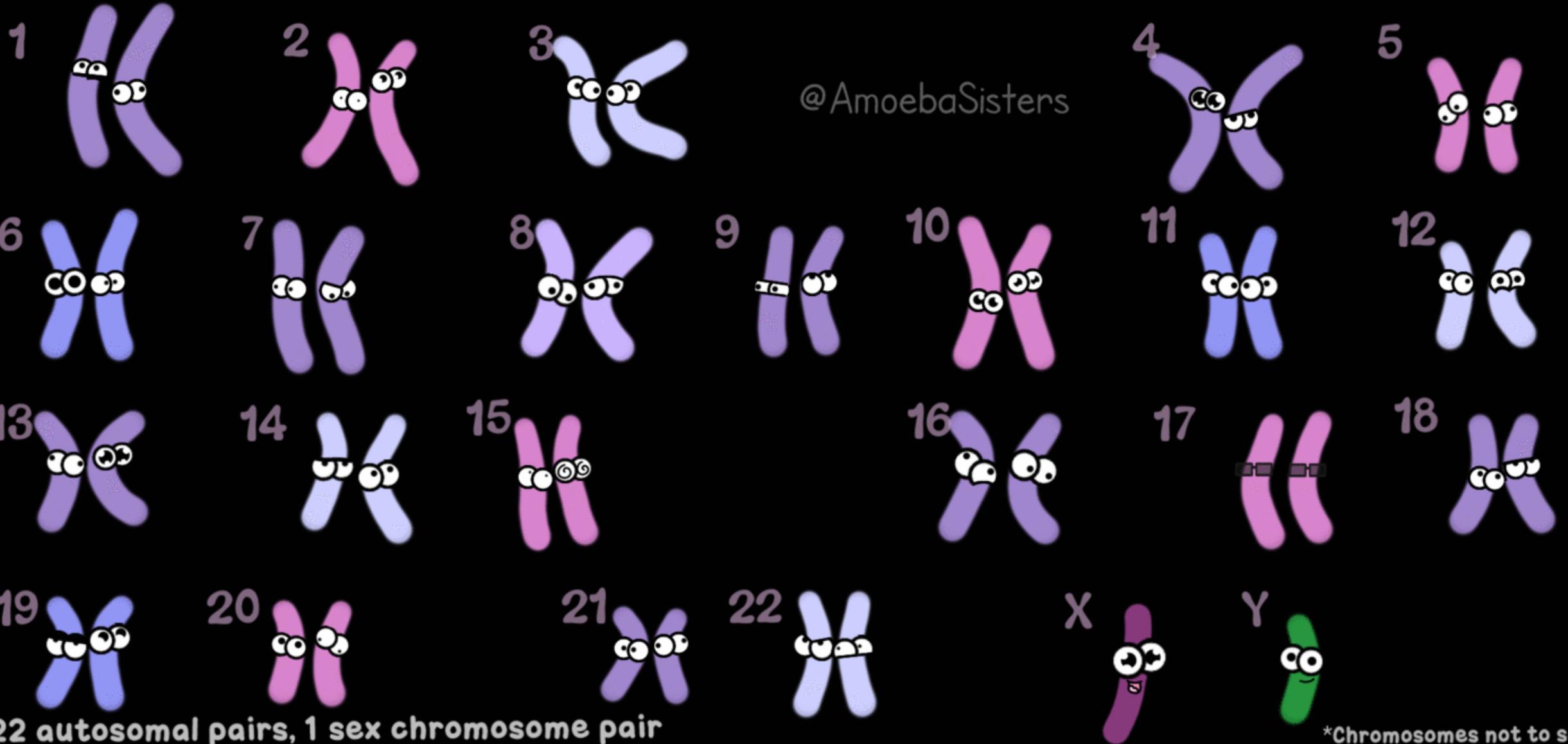
**N = CHROMOSOME WITH
NORMAL GENE**

**Ab = CHROMOSOME WITH
ABNORMAL GENE**

Karyotypes

- 22 of the 23 pairs are similar in both sexes
- The 23rd pair is made up of the sex chromosomes
- A chart showing the pairs of chromosomes in descending order of size is called a karyotype

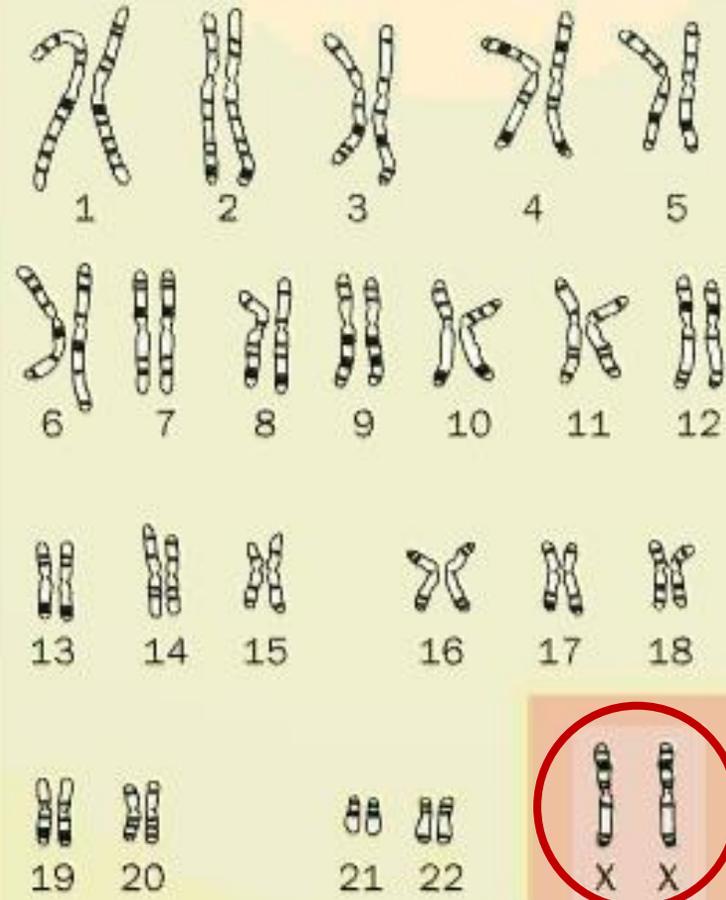
HUMAN KARYOTYPE: 46 CHROMOSOMES*



22 autosomal pairs, 1 sex chromosome pair

*Chromosomes not to scale

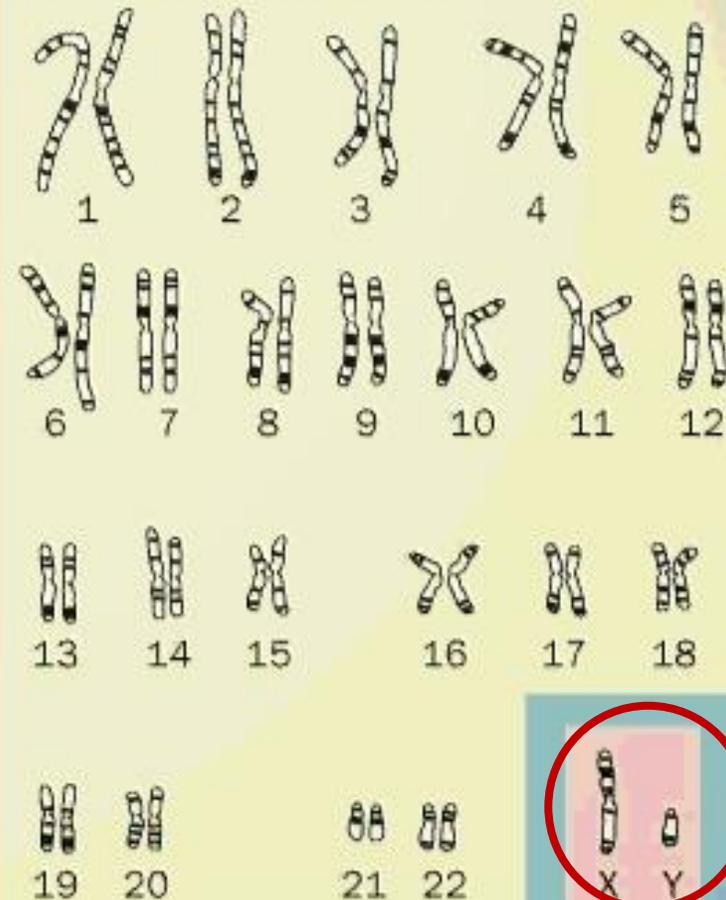
Human female karyotype



Autosomes

**Sex
chromosomes**

Human male karyotype



Autosomes

**Sex
chromosomes**

ORIGAMI DNA ACTIVITY

For 2 BONUS marks – due by Tuesday Sept 17th

<https://www.youtube.com/watch?v=ojOapfqVZlo>