

Diversity of Organisms

TAXONOMY

The science of identifying, naming and grouping organisms.



"BINOMIAL SYSTEM OF CLASSIFICATION"

Two Name



American grizzly bear ⇒ *Ursus americanus*



Polar bear ⇒ *Ursus maritimus*

RULES

- Genus name is capitalized, species is not.

- When typing use *italics*, when handwriting underline.

TIP!

GENus = GENeral
SPECies = SPECific

GENUS: This part indicates a group of species that are very closely related and share a common ancestor.

SPECIES: Group of organisms which can interbreed and produce fertile offspring.

GENERAL

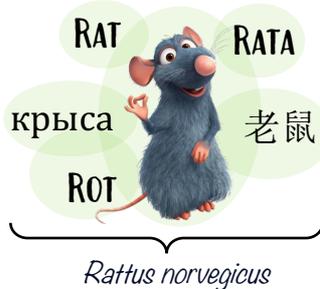


@TeachMe-Official

SPECIFIC

HOW TO REMEMBER??

DEAR KEVIN PLEASE, COME OVER FOR GREAT SOUP



The names can be universally understood.

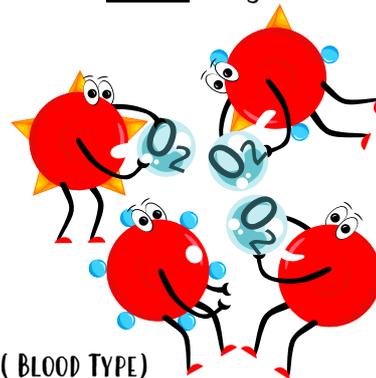
BINOMIAL SYSTEM WHY???

Each organism has a unique name and cannot be confused with another.

Stability, cannot just change names without valid reason.

DISCONTINUOUS VARIATION

(When variation can be placed in distinct categories)



CONTINUOUS VARIATION

(When variation has a wide range of possibilities)

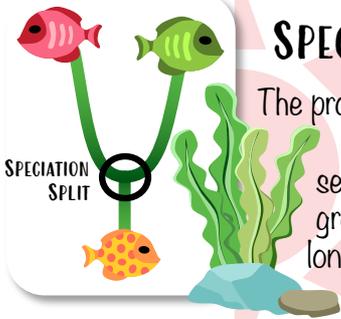


(HEIGHT, EYE COLOR)

Diversity of Organisms

BIOLOGICAL SPECIES CONCEPT

To be classified as the same species, two organisms must be able to breed together and produce fertile offspring



SPECIATION

The process by which a population is separated into two groups that can no longer reproduce together

PROBLEMS?

- Asexually Reproducing Organisms.
- Hybrids are **NOT** always infertile.
- Extinct Species.

(By using the fossil record we cannot tell whether organism were able to interbreed to produce fertile offspring). For example; woolly mammoth.

- Organisms made up of DNA from multiple organisms.



CHROMOSOME DIVERSITY

KARYOTYPE

"The number and appearance of chromosomes present in a nucleus"

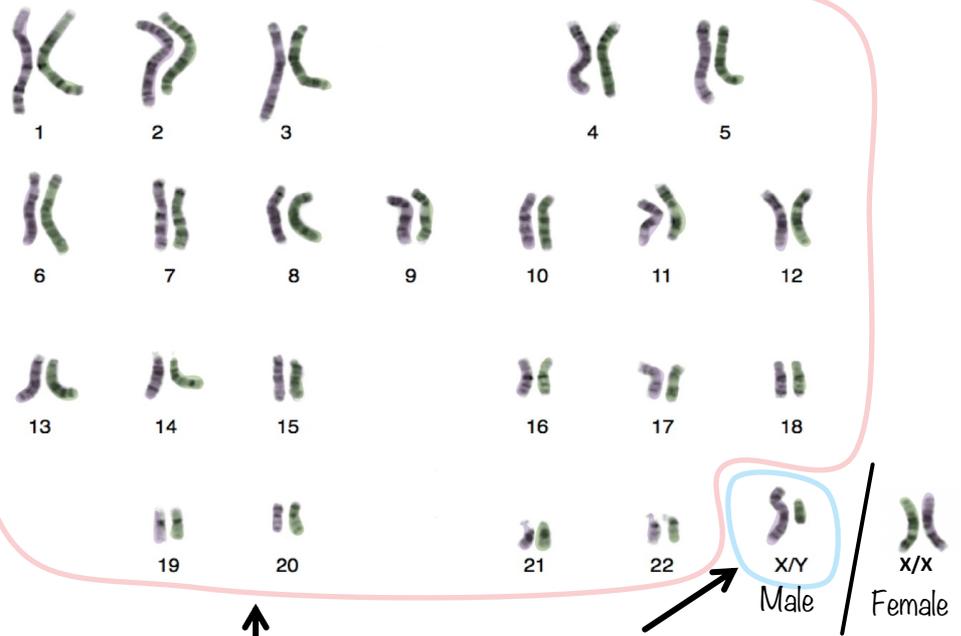
Used for { Gender
Prenatal diagnosis

KARYOGRAM
"A picture of the chromosomes from an organism, arranged in a standard format"

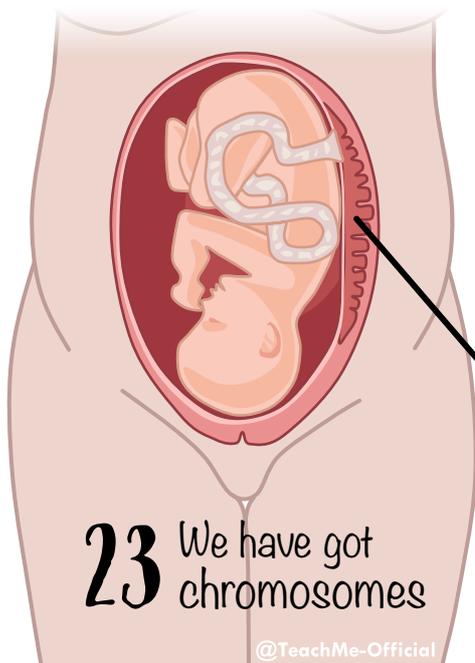
Different species = Different number of chromosomes

AUTOSOMES

Most cells in the body are **DIPLOID (2N)** except gametes (sex cells) which are **HAPLOID (N)**

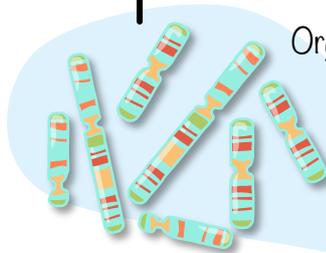


SEX CHROMOSOMES



23 We have got chromosomes

Take sample from:
Amniotic fluid of the foetus.
Blood sample.
Chronic Villus sampling.



Organized according to size & Stained

With computer software



Cells grown in culture

Diversity of Organisms



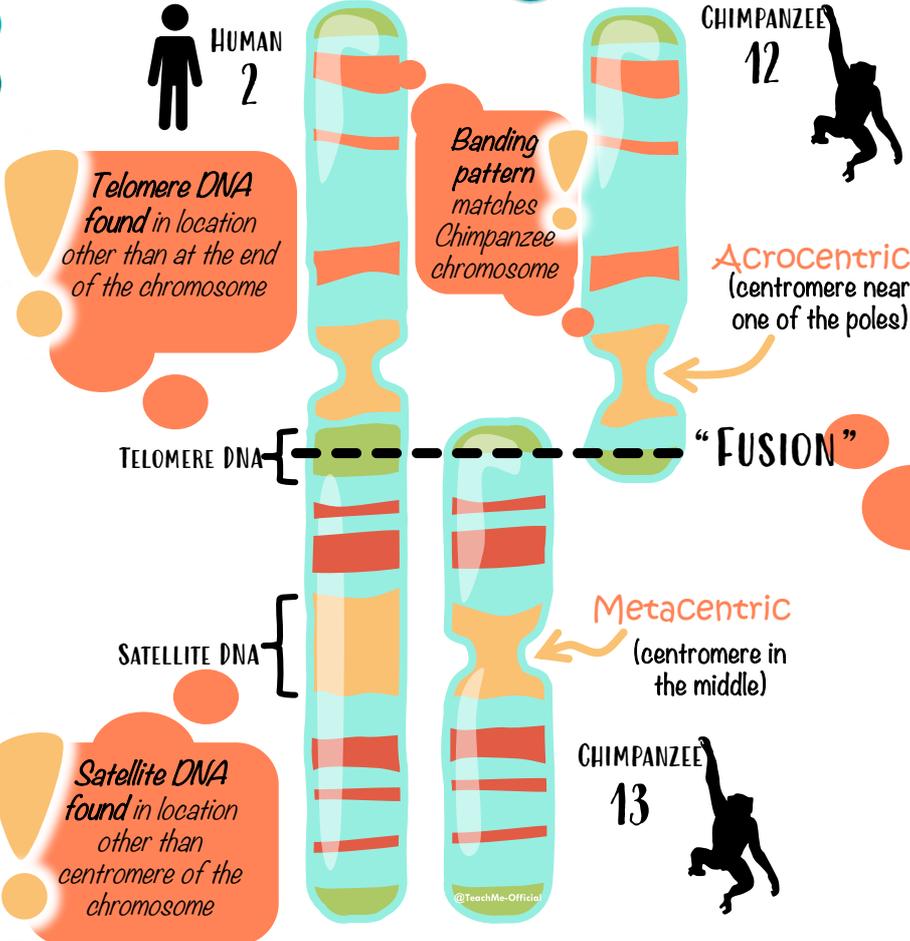
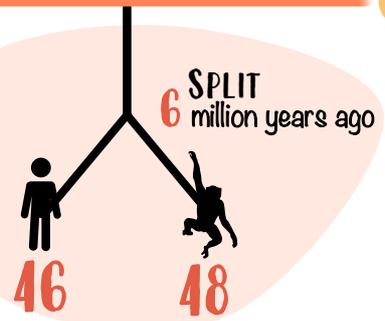
EVOLUTION OF HUMAN CHROMOSOME 2

2 Hypotheses

I. A complete chromosome disappeared.

II. Two chromosomes of an earlier common ancestor fused.

Chromosome 2 arises from the fusion of chromosome 12 and 13. Similar length when overlapped.



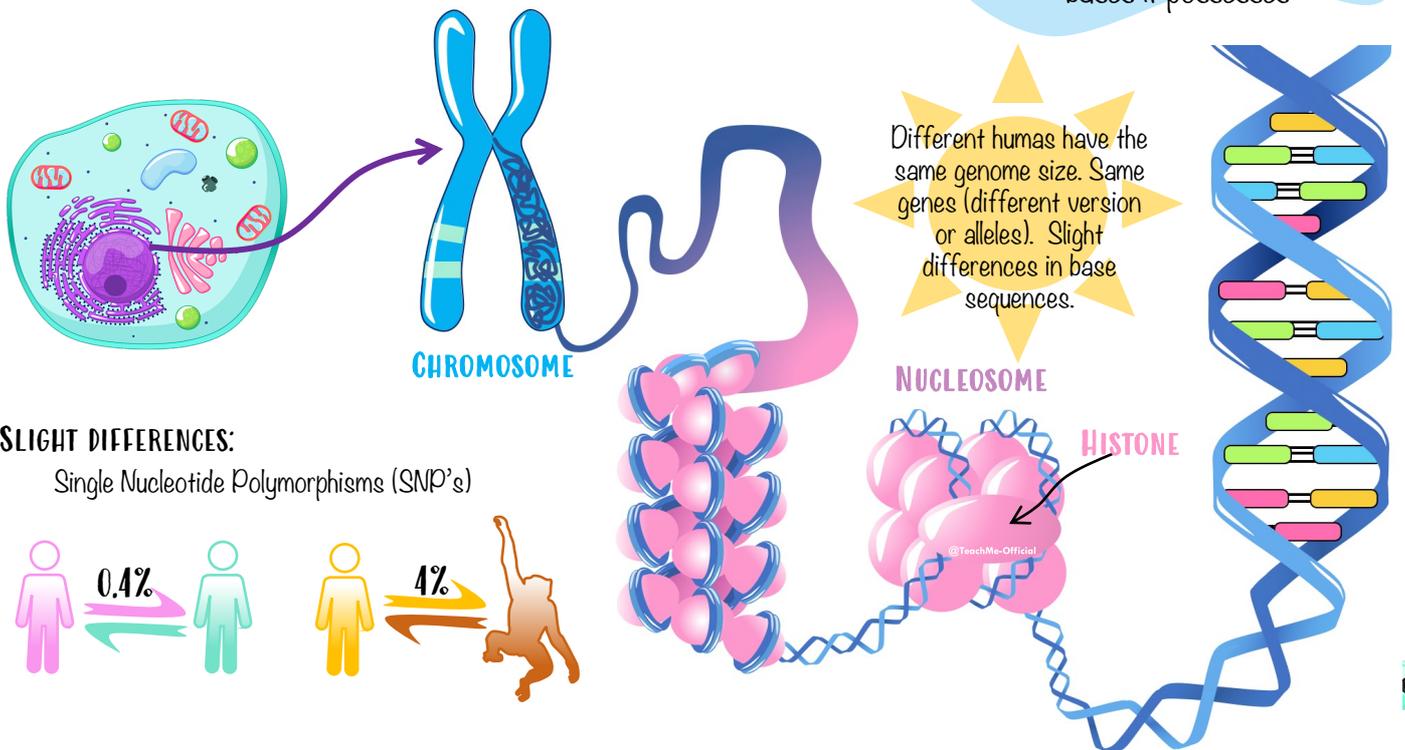
Satellite DNA found in location other than centromere of the chromosome

Telomere DNA found in location other than at the end of the chromosome

KEY

CHROMOSOME 12 GENES CHIMPANZEE	CHROMOSOME 13 GENES CHIMPANZEE	CENTROMERE SATELLITE DNA	TELOMERE TELOMERE DNA

THE HUMAN GENOME
A catalogue (collection) of all the bases it possesses



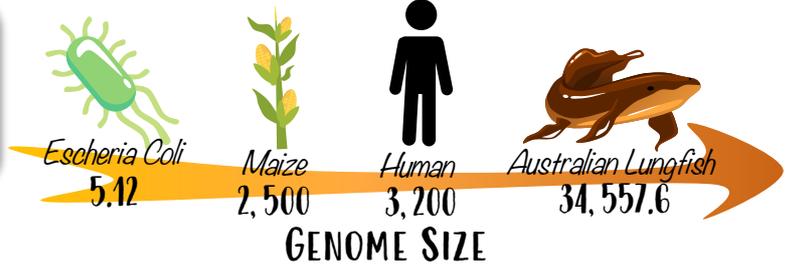
SLIGHT DIFFERENCES:
Single Nucleotide Polymorphisms (SNP's)

0.4% (Human vs Human)
4% (Human vs Chimpanzee)

Diversity of Organisms

HUMAN GENOME PROJECT

A project that aimed to find the base sequence (order) of our genome. The order of our genome is A, T, C, G. Estimate is 22,000 genes and 3,200,000,000 bases.



DECADE (BEFORE) → HOURS (NOW)



For Personalized Medicine

Between different organisms the genome size may differ. Some organisms have genes for certain things that other organisms do not.

MORE COMPLEX ≠ LARGER GENOME

Depends on definition of complex? Lung fish can survive in severe conditions. Humans can send a spaceship to mars.

“Another way to assess the similarities and differences between organisms is through their DNA & PROTEINS”

