

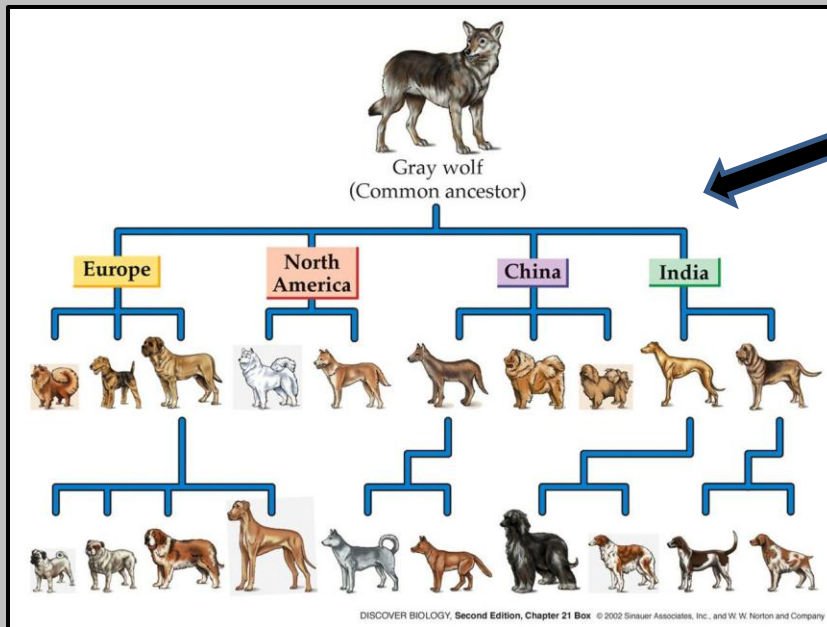
REVIEW: Biotechnology and Genetic Engineering

Biotechnology

Manipulating organisms to make useful products

Artificial Selection (Selective Breeding)

- PICK traits you LIKE
- Cross individuals to get desired trait
- DNA is NOT CHANGED



All dogs are related to the wolf!

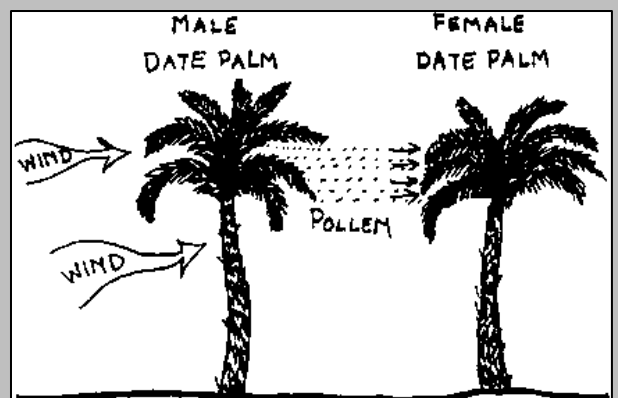
Inbreeding

- Mate individuals that have the desired trait
- It is BAD because genetic variation DECREASES
- Self-pollination in plants

The Gene Pool

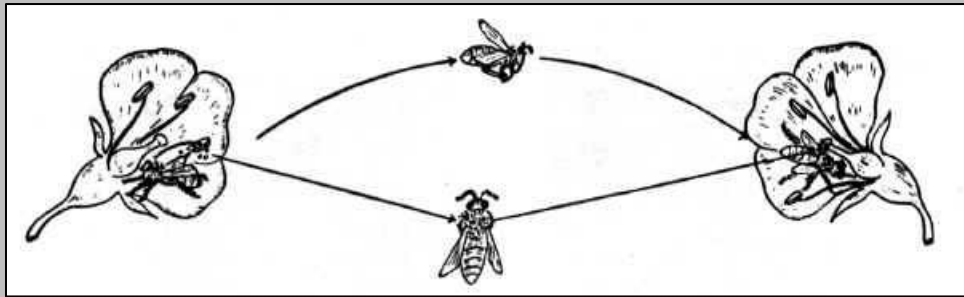
Is SMALLER!

Pollen comes from the SAME PLANT!



Outbreeding

- Mate *different species*



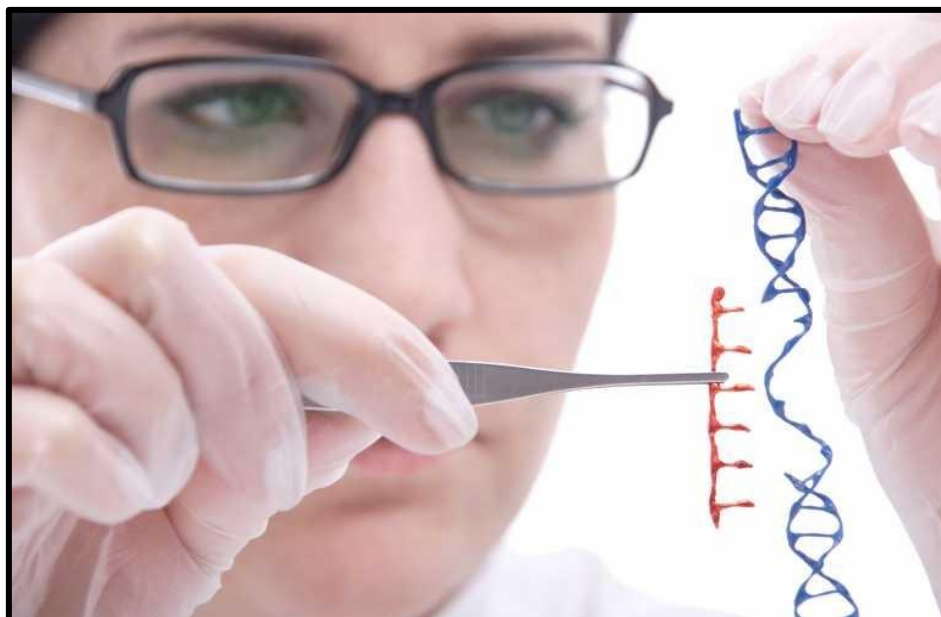
Pollen comes from different plants

In animals, you can get something like a ZORSE!



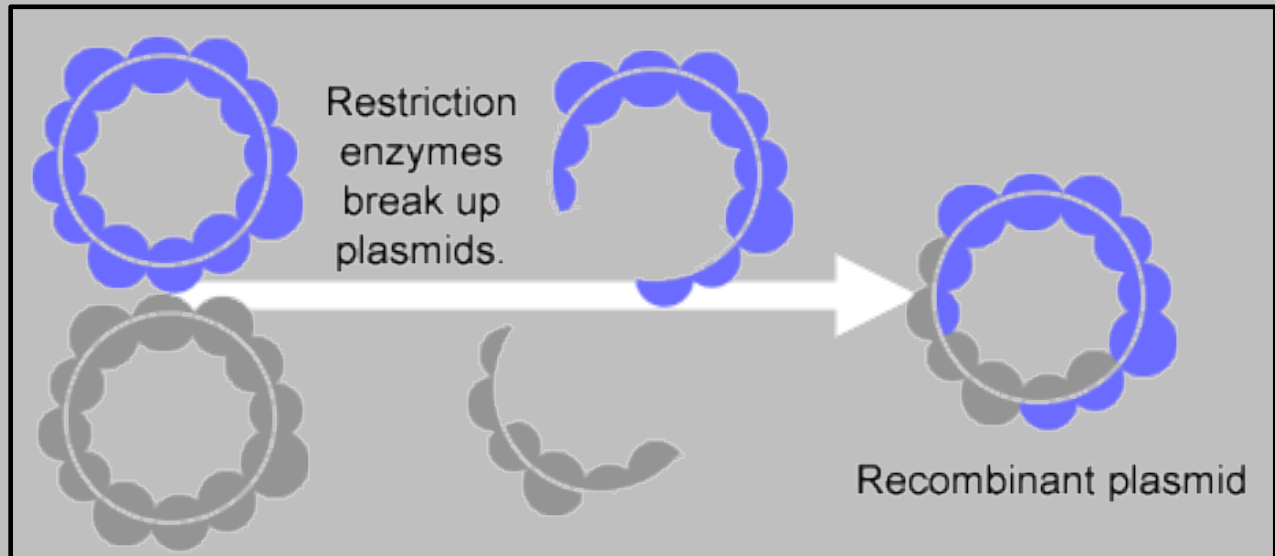
Genetic Engineering

manipulates DNA / messes around with DNA



Gene Splicing → BREAKING DNA strand to INSERT NEW GENE

Example: Bacterial DNA is spliced with human gene to make INSULIN



★ **Restriction Enzymes** → CUT DNA into small pieces

★ **Plasmid** = CIRCULAR DNA of a BACTERIUM (Not found in human cells!)

★ **Recombinant DNA** → contains **GENES** from **DIFFERENT ORGANISMS**

The Steps of GENE SPLICING

1. RESTRICTION enzymes cut out the gene.
2. SPLICE the new gene into PLASMID
3. RECOMBINANT DNA placed into bacterium
4. Bacterium DIVIDE rapidly (they contain the gene you want!)

Transgenic Organisms → Contain genes from other species

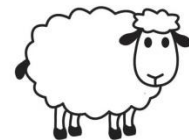
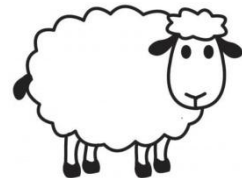
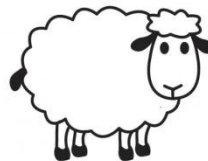
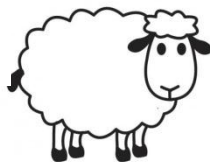
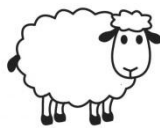


...this pig has genes from the jellyfish...so his nose glows!



Clones are organisms with the SAME DNA

Cloning produces EXACT COPIES of organisms



Why don't we CLONE humans?

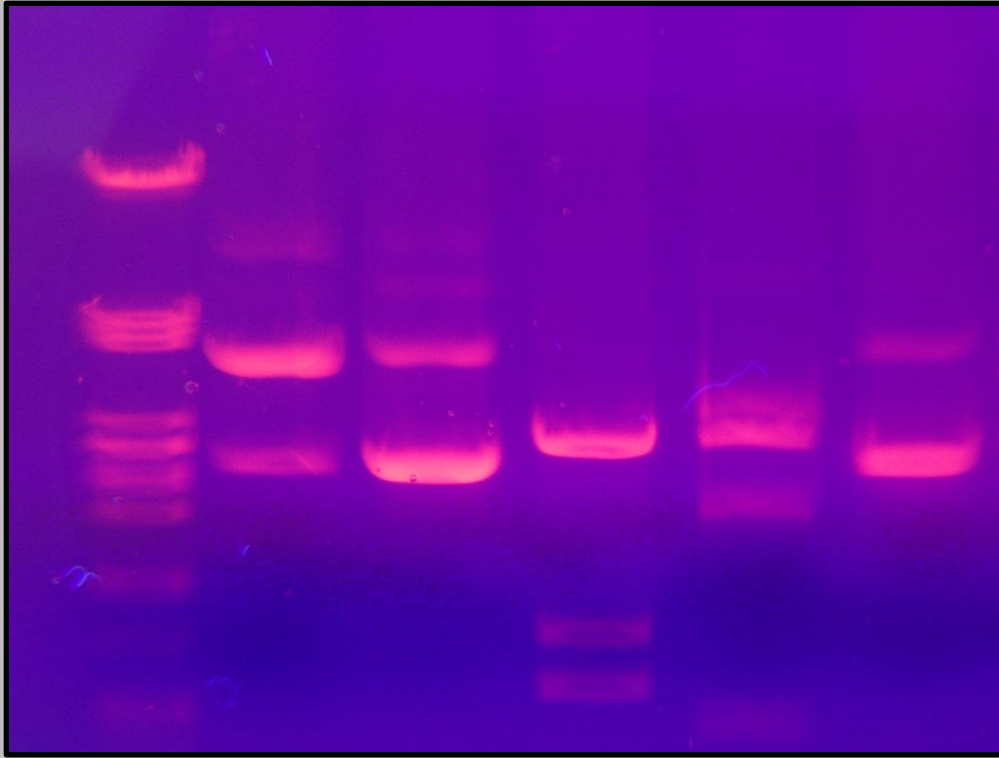
Is it ETHICAL?

Is it RIGHT or WRONG?



Gel Electrophoresis

Electricity is used to SEPARATE DNA by size



...it is used to determine PATERNITY.

...it can be used in CRIMINAL CASES.