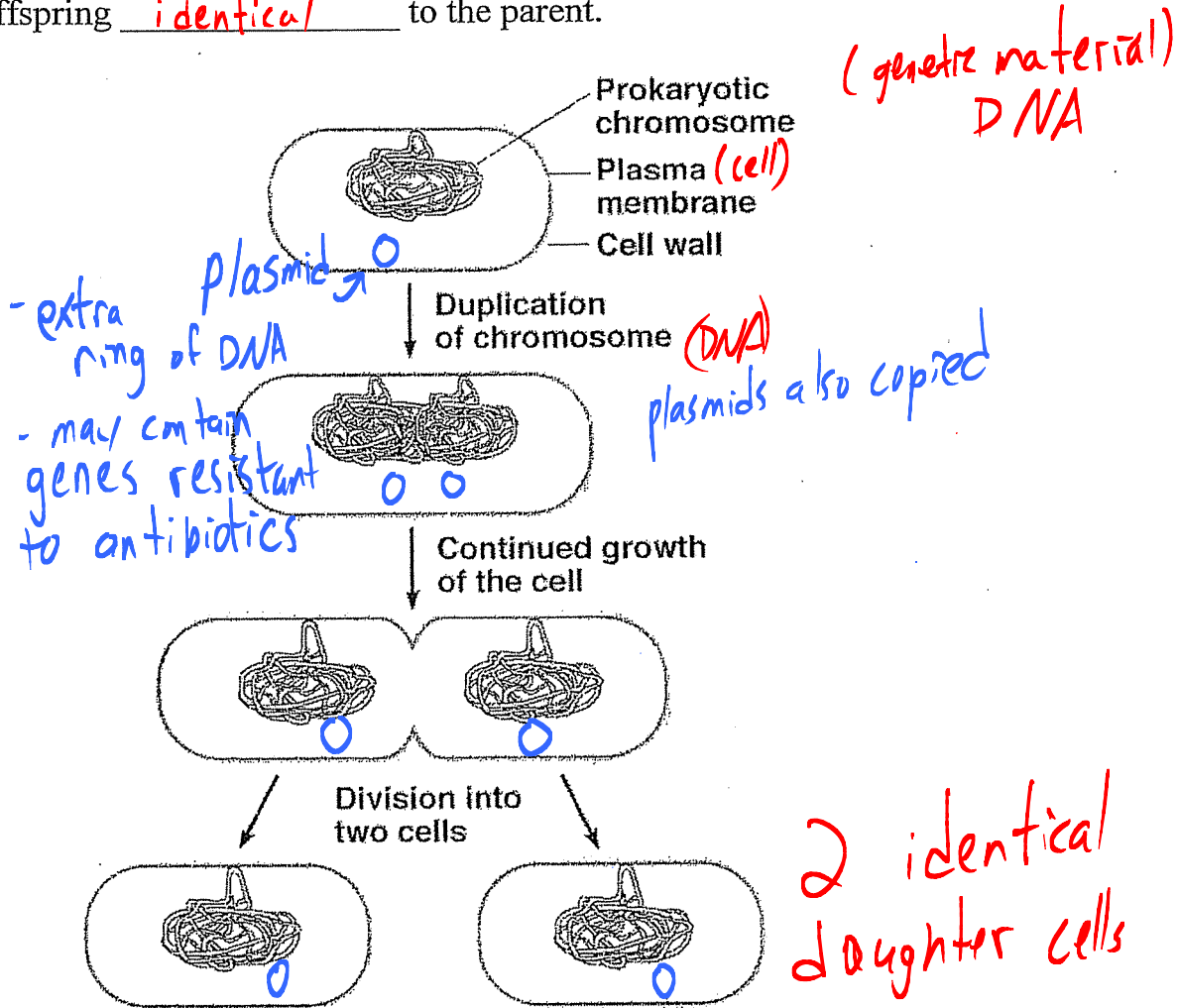


Reproduction in Bacteria

Asexual Method - Binary Fission

Bacteria reproduce asexually by a process termed binary fission. This process involves one parent and results in offspring identical to the parent.



During binary fission.

- (i) DNA is replicated. The bacterial cell's large circular chromosome is copied. (The bacterial plasmid is also copied if present)
- (ii) Two identical chromosomes (& plasmids) align at the centre of the cell, separate and move to opposite ends of the cell.
- (iii) The cell divides and 2 identical daughter cells result.

~~★~~ This is the most common form of bacterial reproduction ~~★~~

Advantages of Binary Fission:

- (i) Large number of offspring are produced quickly
- (ii) one individual can ensure species survival.
- (iii) Because of their rapid reproduction, a population of bacteria can adapt quickly to their environment. A mutation that increases the fitness of the species will be passed relatively quickly through out the population.

Disadvantage:

Offspring are genetically identical to the parent cell and each other. A change in the environment could cause the demise of the entire population.
↳ death

Sexual Reproduction – Conjugation: "Come together"

Bacteria reproduce sexually by a process termed Conjugation. This process involves 2 parents and results in offspring different from the parents.

Conjugation involves the direct transfer of genetic material between two bacterial cells that are temporarily joined.

During conjugation,

- (i) Two bacteria cells come into Contact. A protein link (termed a pilus or conjugation tube) is formed between the two cells.
- (ii) Part of the DNA (usually the plasmid) from one cell is copied and passed through the conjugation tube to the second cell.
- (iii) The plasmid gets incorporated into the new cell's genome. The recipient cell now possess new combinations of genes, increasing diversity.

Note: The two cells involved in conjugation are generally of two different mating types. The donor cell carries the **F factor**.

F factor: DNA segment that codes for the ability to make the conjugation tube.

The F factor may be part of a plasmid or the bacterial chromosome.

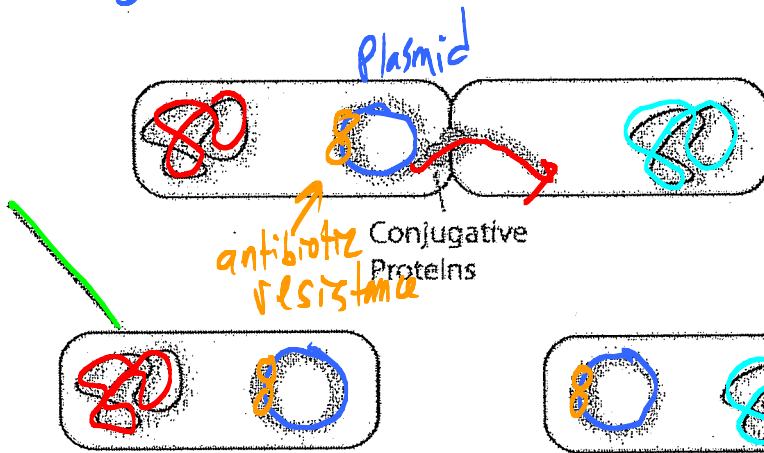
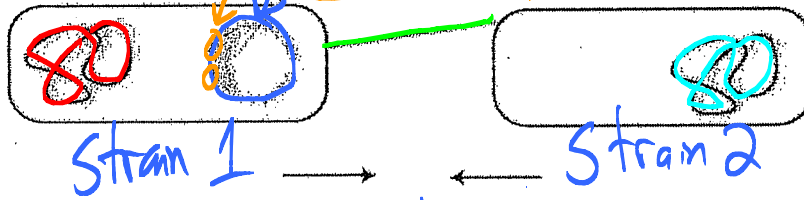
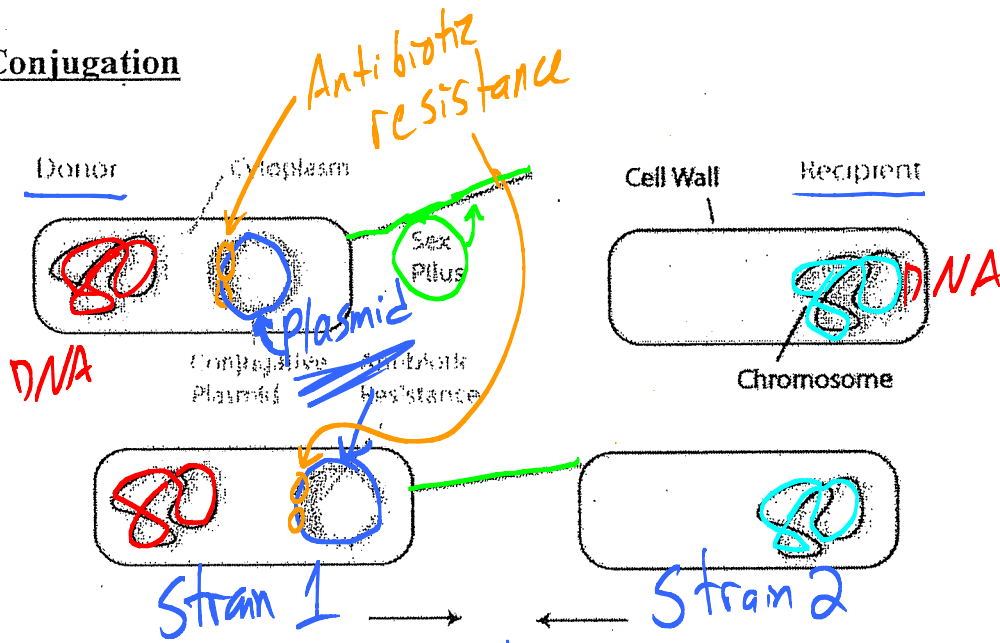
Advantage of Conjugation: Genetic diversity

The population is more likely to possess individuals who can survive a change in the environment.

Disadvantages:

- (i) Need to find a mate → only some have F factor
- (ii) Number of individuals does not increase as quickly as binary fission.

Conjugation



2 genetically different cells

plasmid with antibiotic resistance