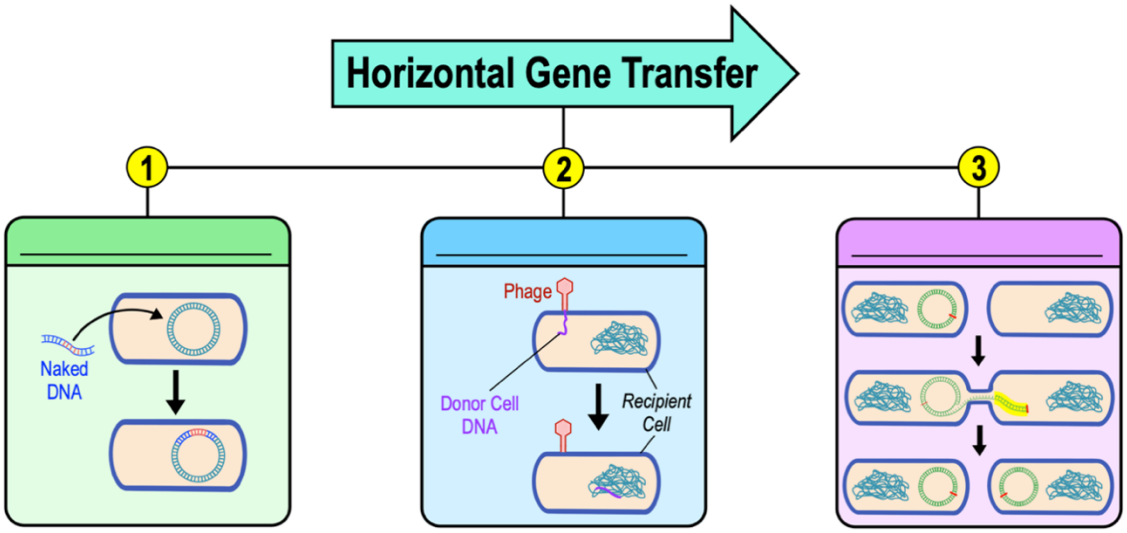
CONCEPT: HORIZONTAL GENE TRANSFER

●*Recall:* **Horizontal gene transfer** is between 2 organisms that are _____ direct descendants of one another.

□ Allows cells to quickly acquire new traits & drives genetic diversity among organisms.

●There are ____ known mechanisms of *horizontal gene transfer* in bacteria:

1) **Transformation:** horizontal gene transfer via _____ of free (naked) DNA in the *environment* by the cell.
2) **Transduction:** horizontal DNA transfer between cells mediated by a _____ virus.
3) **Conjugation:** _____ horizontal DNA transfer between cells during cell-to-cell contact.

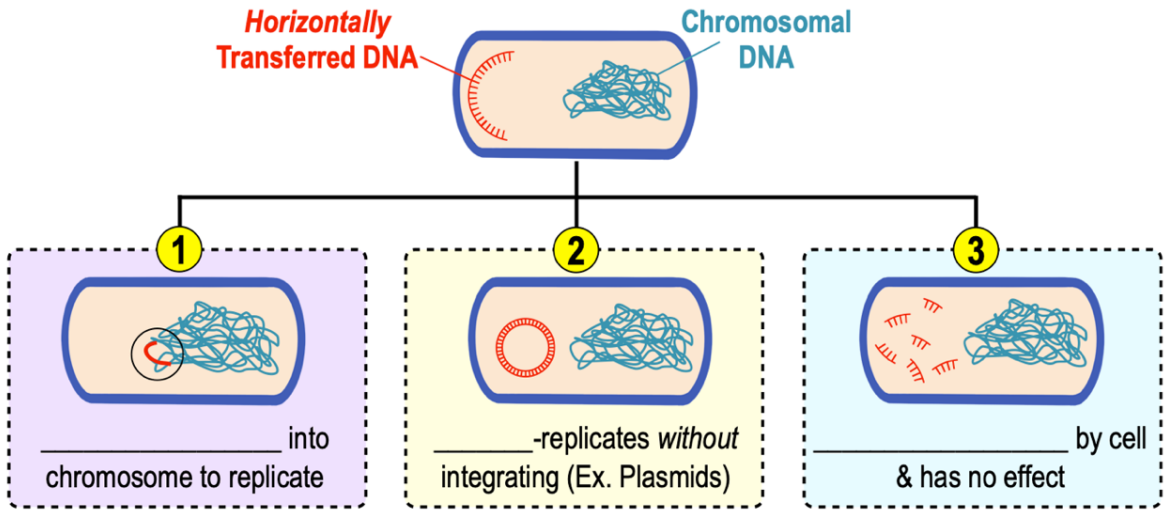


PRACTICE: Which of the following is not a type of horizontal gene transfer?

a) Transduction. b) Transformation. c) Transamination. d) Conjugation.

Fates of Horizontally Transferred DNA

●Following horizontal gene transfer there are 3 possible fates of the DNA:



*Options 1 & 2 *stabilize the transferred gene within the population.*

CONCEPT: HORIZONTAL GENE TRANSFER

PRACTICE: All of the following are possible outcomes of horizontally transferred DNA, except which of these answers?

a) The transferred DNA is turned into a plasmid and replicates with the bacterial cell.

b) The transferred DNA triggers the degradation of the bacterial chromosome.

c) The transferred DNA is integrated into the bacterial chromosome and is replicated with the chromosome.

d) The transferred DNA is degraded by the bacterial cell and has no effect on the cell.

PRACTICE: When DNA is transferred between bacterial cells, there are three possible fates of the transferred DNA. Which fate ensures that the transferred DNA will be retained inside of the bacterial cell the longest?

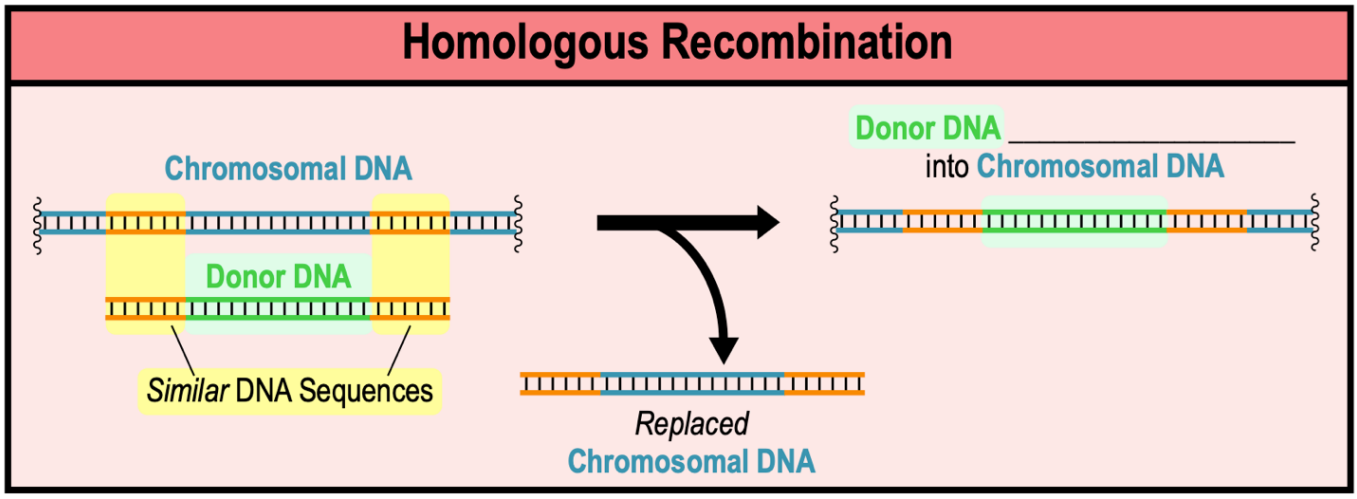
a) The transferred DNA being integrated into the bacterial chromosome.

b) The transferred DNA forming a plasmid within the bacterial cell.

c) The transferred DNA being degraded by the bacterial cell.

Integration of DNA via Homologous Recombination

- _____ **Recombination:** genetic exchange between two *similar* strands of DNA.
  - □ Only occurs if donor DNA has a _____ nucleotide sequence to recipient cell's chromosome.



PRACTICE: Homologous recombination:

a) Can occur in prokaryotes and eukaryotes.

b) Occurs when two similar strands of DNA exchange genetic material.

c) Only occurs in prokaryotes when the donor DNA has the same sequence as the recipient's DNA.

d) All of the above are true about homologous recombination.