FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

GENE CLONING CONCEPT-AND BASIC STEPS

- The term cloning used to describe the production of **genetically identical copies** of an organism by **asexual means.**

- For example the propagation of plants from cuttings.

- In animals, the term ‘clone‘ applied to offspring produced by the process of nuclear transfer.

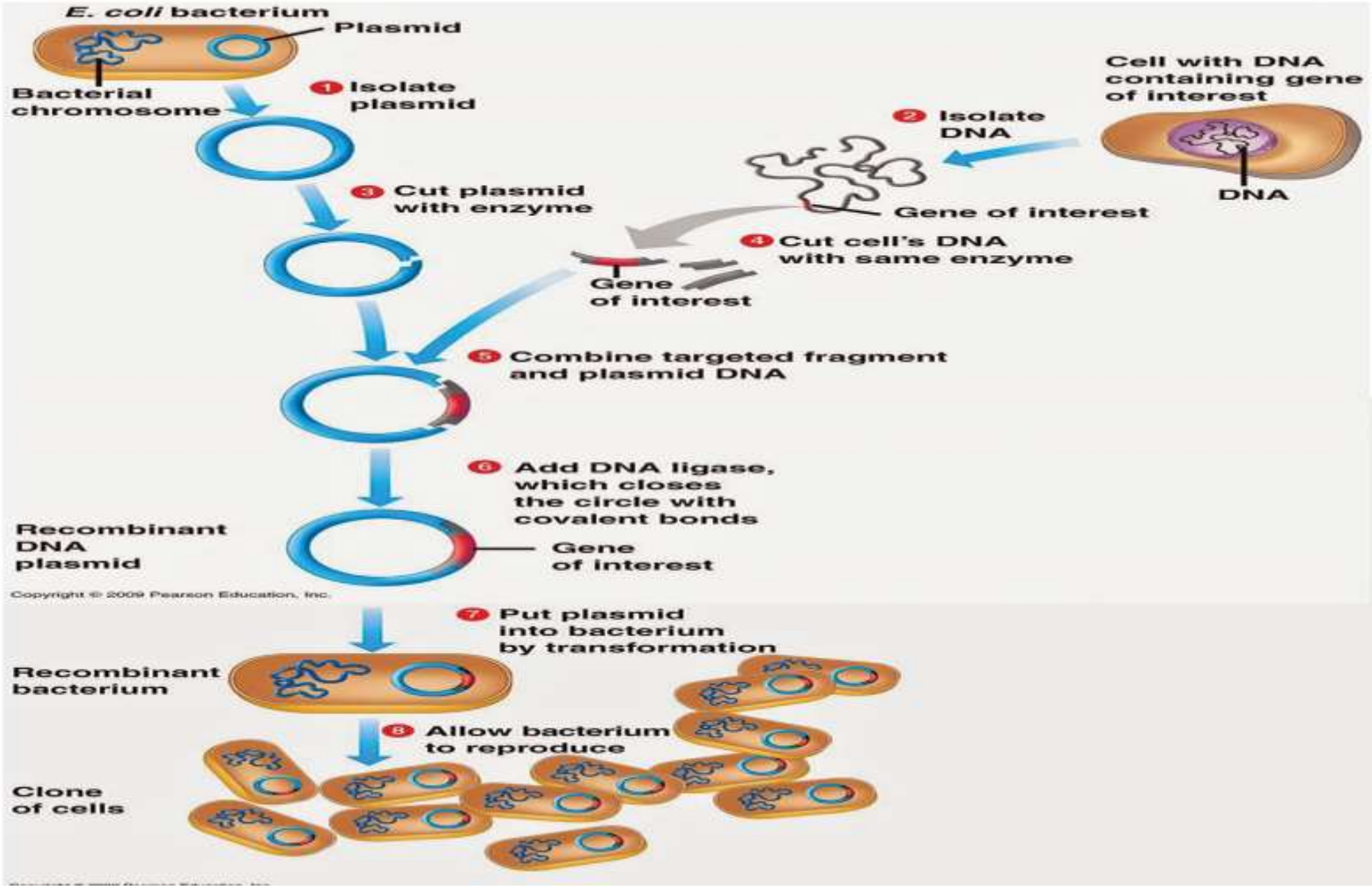
- Cloning is the introduction of a DNA fragment into a vector, which makes it possible to increase this DNA to an abundant quantity.

GENE CLONING CONCEPT-AND BASIC STEPS

- Cloning process involves

1. Digestion of vector and DNA fragments,
2. Purification
3. ligation with one another,
4. Transformation
5. Selection

GENE CLONING CONCEPT-AND BASIC STEPS



Genetic recombination technology consists of the breakage and joining of DNA molecules.

Genetically engineered DNA prepared by transplanting or splicing genes from one species into the cells of a host organism of a different species. Such DNA becomes part of the host's genetic makeup and is replicated.

Genetic engineering primarily involves the manipulation of genetic material (DNA) to achieve the desire goal in pre determined way.

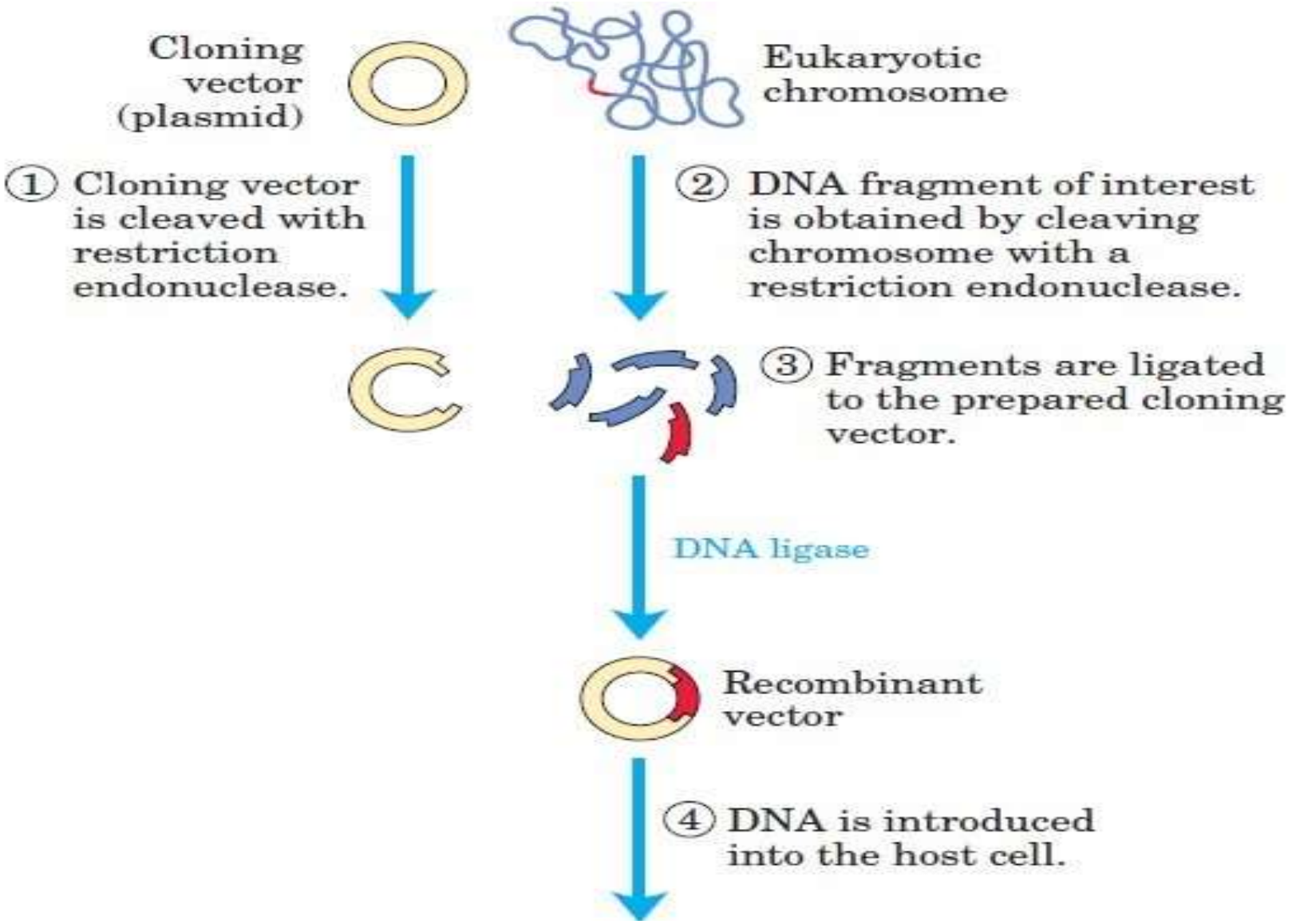
•Manipulation and alteration of genes

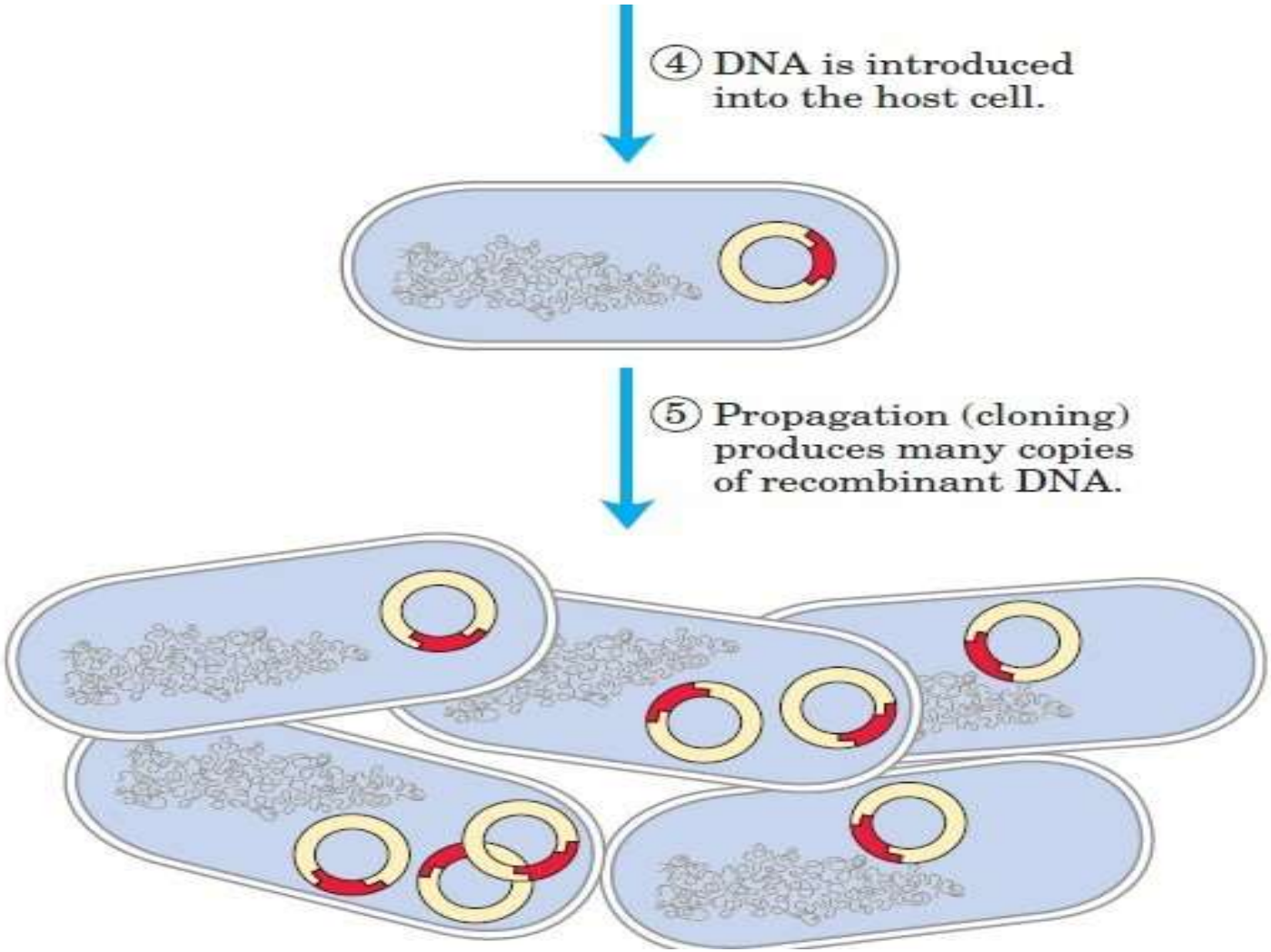
Artificially copying a piece of DNA from one organism and joining this copy of DNA into the DNA of another organism

- **Other terms** – Recombinant DNA technology

Gene manipulation Gene cloning

Genetic modifications New genetics


Cloning vector (plasmid)
Eukaryotic chromosome
① Cloning vector is cleaved with restriction endonuclease.
② DNA fragment of interest is obtained by cleaving chromosome with a restriction endonuclease.
③ Fragments are ligated to the prepared cloning vector.
DNA ligase
Recombinant vector
④ DNA is introduced into the host cell.


④ DNA is introduced into the host cell.
⑤ Propagation (cloning) produces many copies of recombinant DNA.

1. Debating whether or not we should do certain things in biology is called...

a. cloning
b. politics
c. bioethics
d. gene therapy

2. What is recombinant DNA?

a. Adding DNA from one organism into the DNA of another
b. DNA which has been changed over generations by natural selection
c. DNA that causes genetic disorders
d. DNA that has been sequenced

3. Which of the following is NOT an argument in favor of GMOs?

a. Reduced biodiversity
b. Disease resistant crops
c. Food with extra nutrients
d. Controlled production of insulin

4. True or false: Identical twins are genetic clones

a. True

b. False