

Working with DNA

Booklet 1B: Biotechnology – Recombinant DNA and Cloning



Name: _____

School: _____

SPARQ-ed

Students Performing Advanced Research QLD

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Recombinant DNA and Cloning

1. In your own words, what is recombinant DNA?

2. The definition of cloning is to make a genetically identical _____ of a gene or organism. In gene cloning, some of the tools on page 4 are used to insert a gene into a _____, which can then _____ the gene into another cell or organism, such as *E. coli* bacteria. This organism may replicate the gene or express it (make protein) to be used or studied.

A vector is something that can transport a gene from one organism to another. In this case, the vector is a bacterial _____.

Word Bank: *vector, copy, transport, plasmid*

The Cloning Process

In the SPARQ-ed workshop, you will complete two steps in the six-step process of cloning a gene.

List the actions involved in each of the six steps below.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Recombinant DNA Tools and Techniques

Biotechnology is the utilisation of organisms, parts of organisms and their processes for biomedical, industrial or agricultural purposes. This frequently involves the cloning process, as described on the previous page. The tools and techniques of biotechnology utilise a range of molecules - many of which have been isolated from existing organisms.



A selection of tools and techniques used in biotechnology are described in Table 1 below. Fill in their names in the first column.

Table 1: A selection of tools and techniques used in biotechnology.

Tool	Purpose
1	This is an enzyme, which sticks pieces of DNA together.
2	A group of enzymes that catalyse the chemical break down of DNA at very specific places, therefore cutting it into particular sized fragments.
3	A small circular piece of DNA that occur in bacteria. Bacterial cells can share plasmids between each other and therefore share genes. We use them as DNA vectors.
4	A technique that takes advantage of the negative charge of DNA, allowing it to move through a gel towards a positive electrode when a current is applied.
5	Usually a cylindrical tube that contains a substance that binds to specific molecules e.g. through charge interactions. Used to purify molecules from a mixture.

Word Bank: gel electrophoresis, chromatography column, plasmid, restriction endonuclease, DNA ligase