

CHAPTER 12

Genetic Engineering
Section 12-2**SKILL ACTIVITY**
Applying concepts

DNA Recombination

DNA fragments from donor cells must become part of the genetic material of living cells before the genes they contain can be activated. For example, DNA fragments may be combined with bacterial DNA so that they can later be inserted into a bacterial cell. Bacteria often contain small circular DNA molecules known as plasmids in addition to their chromosomes. Scientists use restriction enzymes to cut segments of genetic material from plasmids. When the plasmids are cut, unpaired bases are left at the ends. These exposed bases are sometimes called sticky ends because new segments of DNA can be attached to them as if they were sticky, like tape. In this activity you will make and use a model of the technique used to combine pieces of DNA. In so doing, you will form a new plasmid that contains a piece of foreign DNA. This new plasmid is called recombinant DNA.

A new segment of DNA can be attached to the plasmid only if its exposed bases are complementary to the exposed base on the DNA of the plasmid. The plasmids shown below have been chemically cut at the nucleic acids indicated by dashed lines. Trace and cut out the following figures.

1. Label the blank boxes in Segment A to show the base sequence necessary to attach the complementary plasmid.
2. Label the blank boxes in Segment B to show the proper base sequence.
3. Attach the DNA segments to the corresponding plasmids. Where are the "sticky ends"? _____

4. Explain why the mutated segment has been labeled as such. _____

To which plasmid might the mutated DNA segment attach? _____

Explain how a mutated segment might change the intended result of this recombination DNA experiment. _____
