

# DNA cloning with plasmid vectors

Look at this video and answer the following questions or select the correct answer(s).

Select the one or more of the true statements.

1. At their most basic level, plasmids are:

small circular pieces of DNA foreign DNA stable  
difficult to isolate easy to manipulate

2. Plasmids \_\_\_\_\_ independently from the host DNA compared to

integrate replicate imitate participate

3. In 1952 that Nobel laureate Joshua Lederberg coined the term plasmid a combination of the words cytoplasm and id (Latin for "it"). True /False

4. In nature plasmids often contain genes that provide a competitive advantage, such as antibiotic susceptibility. True/ False

5. Select the one or more of the true statements.

Plasmids created in the lab are known as

constructs injections manipulators vectors

6. Select the one or more of the true statements.

All plasmids contain an origin of replication, or Ori.

The Ori:

tells the plasmid where to begin replication.

tells the plasmid to terminate replication.

tells the plasmid to delay replication.

tells the plasmid duplicate replication.

7. Select the one or more of the true statements.

How do scientists use antibiotic resistant genes to separate cells that contain the plasmid from those that do not have plasmids?

Scientists can see which cells have plasmids by looking at plate and identify bigger cells with plasmids.

Scientists grow the cells on antibiotic plates, and only plasmid containing cells will grow.

Scientist can see which cells have the plasmid by looking at green glow emitted by cells as general standard protocol.

8. The wonderful thing about plasmids is that they can be easily engineered to include.

restriction sites

site interest gene

enzymes

9. A promoter site which is upstream of the inserted gene of interest on the plasmid and allows gene transcription. True or false

10. Select the right words from the drop-down menu to describe the diagram below:

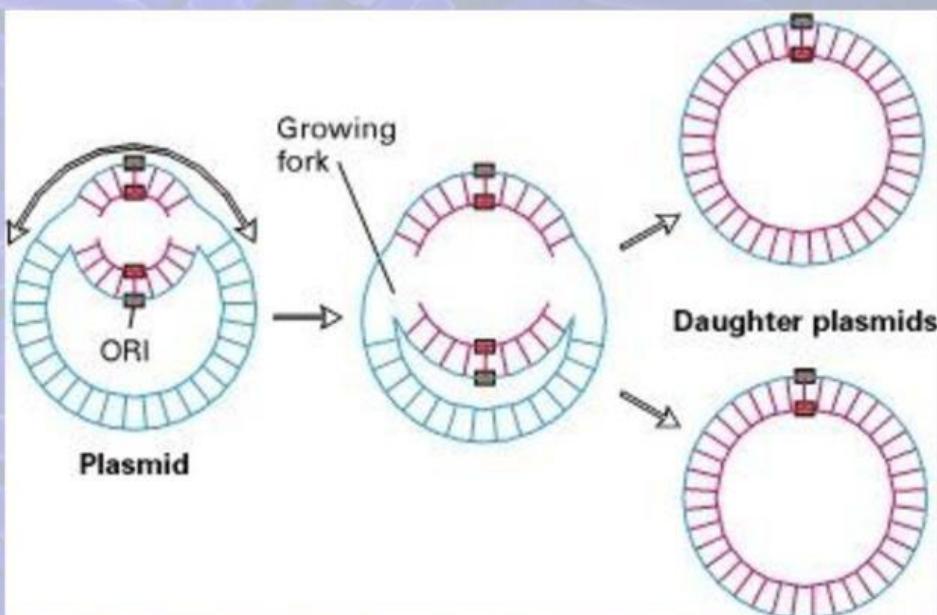
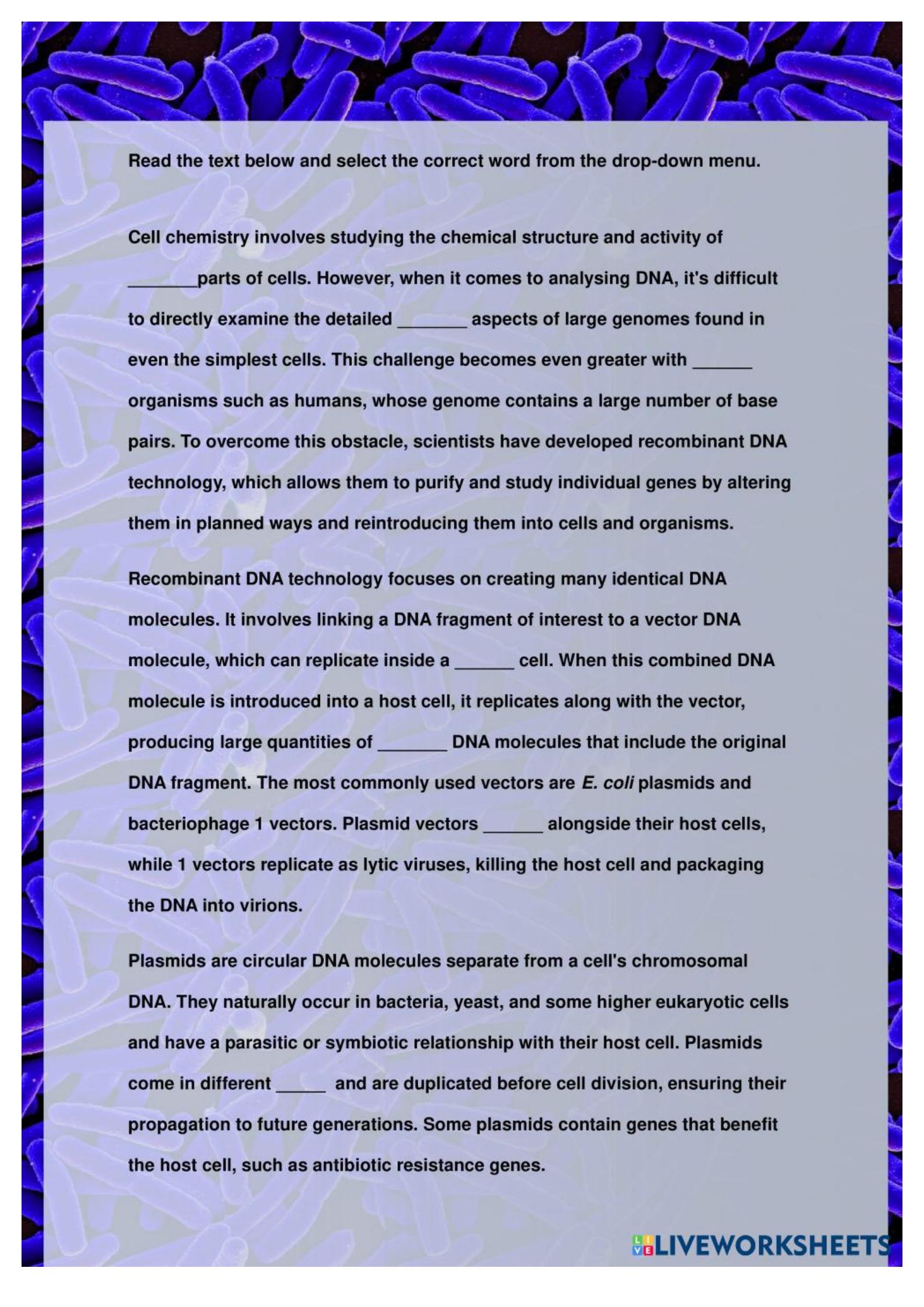


Figure showing Plasmid DNA replication.

The parental strands are shown in blue, and newly synthesised \_\_\_\_\_ strands are shown in red. The short segments represent the A•T and G•C base \_\_\_\_\_ connecting the complementary strands. Once DNA replication is \_\_\_\_\_ at the origin (ORI), it continues in \_\_\_\_\_ directions around the circular molecule until the advancing growing forks merge and \_\_\_\_\_ daughter molecules are produced. The origin is the only specific nucleotide sequence required for replication of the entire circular DNA molecule.

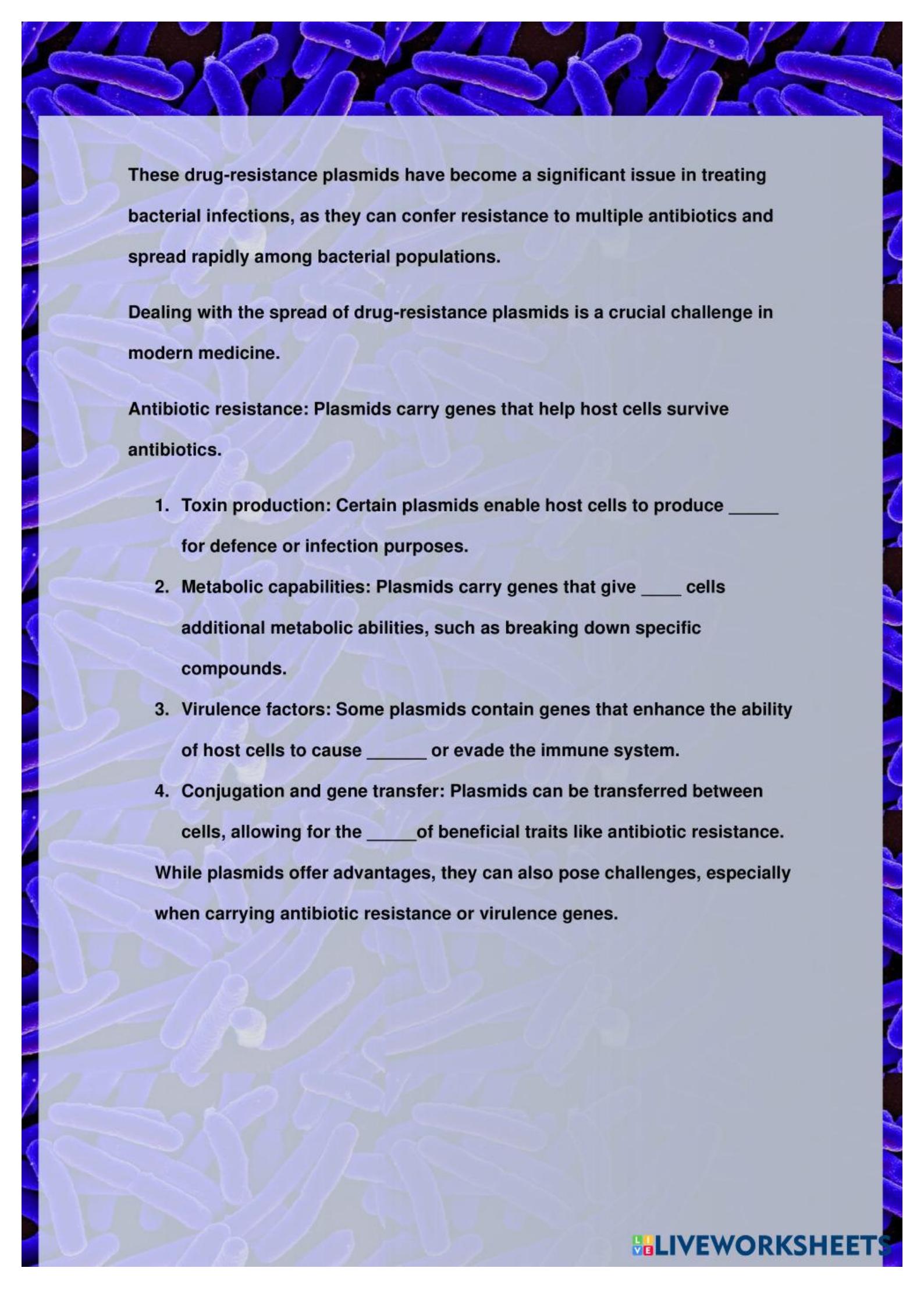


Read the text below and select the correct word from the drop-down menu.

Cell chemistry involves studying the chemical structure and activity of \_\_\_\_\_ parts of cells. However, when it comes to analysing DNA, it's difficult to directly examine the detailed \_\_\_\_\_ aspects of large genomes found in even the simplest cells. This challenge becomes even greater with \_\_\_\_\_ organisms such as humans, whose genome contains a large number of base pairs. To overcome this obstacle, scientists have developed recombinant DNA technology, which allows them to purify and study individual genes by altering them in planned ways and reintroducing them into cells and organisms.

Recombinant DNA technology focuses on creating many identical DNA molecules. It involves linking a DNA fragment of interest to a vector DNA molecule, which can replicate inside a \_\_\_\_\_ cell. When this combined DNA molecule is introduced into a host cell, it replicates along with the vector, producing large quantities of \_\_\_\_\_ DNA molecules that include the original DNA fragment. The most commonly used vectors are *E. coli* plasmids and bacteriophage 1 vectors. Plasmid vectors \_\_\_\_\_ alongside their host cells, while 1 vectors replicate as lytic viruses, killing the host cell and packaging the DNA into virions.

Plasmids are circular DNA molecules separate from a cell's chromosomal DNA. They naturally occur in bacteria, yeast, and some higher eukaryotic cells and have a parasitic or symbiotic relationship with their host cell. Plasmids come in different \_\_\_\_\_ and are duplicated before cell division, ensuring their propagation to future generations. Some plasmids contain genes that benefit the host cell, such as antibiotic resistance genes.



These drug-resistance plasmids have become a significant issue in treating bacterial infections, as they can confer resistance to multiple antibiotics and spread rapidly among bacterial populations.

Dealing with the spread of drug-resistance plasmids is a crucial challenge in modern medicine.

**Antibiotic resistance:** Plasmids carry genes that help host cells survive antibiotics.

1. **Toxin production:** Certain plasmids enable host cells to produce \_\_\_\_\_ for defence or infection purposes.
2. **Metabolic capabilities:** Plasmids carry genes that give \_\_\_\_\_ cells additional metabolic abilities, such as breaking down specific compounds.
3. **Virulence factors:** Some plasmids contain genes that enhance the ability of host cells to cause \_\_\_\_\_ or evade the immune system.
4. **Conjugation and gene transfer:** Plasmids can be transferred between cells, allowing for the \_\_\_\_\_ of beneficial traits like antibiotic resistance.

While plasmids offer advantages, they can also pose challenges, especially when carrying antibiotic resistance or virulence genes.