Bacterial Reproduction

Bacteria normally reproduce asexually by binary fission. Under harsh environmental conditions, or for dispersal, they can also undergo sporulation. And to create genetic diversity bacteria rely on transduction, transformation, and conjugation.

Binary Fission

This reproductive process produces ________________ daughter cells from a single parent bacterium. It begins with duplication of the ________________ ________________. Just like in eukaryotic cell divisions, this is necessary to guarantee that the daughter cells have the correct genetic makeup. The DNA attaches itself to the ________________ ________________ before it is duplicated. As duplication occurs, the bacterium begins to ________________.

When the chromosome has been copied, a ________________ begins to form. This structure will eventually ________________ the parent cell. The two daughter cells are ________________ in size to the parent and genetically ________________.

Binary fission is similar to eukaryotic cell mitosis in that (1) ________________ ________________ ________________, (2) the daughter cells and parent cell are genetically identical, (3) ________________ ________________ occurs before division begins. It differs from mitosis in that (1) there are no cytoplasmic ________________ to duplicate, (2) no mitotic ________________ is formed, (3) there is only one chromosome involved and (4) the daughter cells and parent are ________________, not diploid.

Complete the following matching questions to do with

Binary Fission.
**Remember:** A bacterium is a haploid cell which contains only a single circular chromosome.

1. **The chromosome is attached at one point to the interior surface of the cell membrane.**

2. **The chromosome replicates: there are now two copies attached to specialized regions (side-by-side) of the interior cell membrane (diploid cell).**

3. **The two chromosomes are separated by the inward growth of the membrane (septum) between the two chromosomes.**

4. **A cell membrane (some bacteria: cell wall) forms down the middle of the cell, eventually giving rise to two cells.**

5. **Once cell membrane (some bacteria: cell wall) is (are) complete, the two cells split apart and each is haploid again.**

6. **Cells grow until, at an appropriate size, induces cell division again.**

Under ideal conditions, the process of **binary fission** takes about 20 minutes (therefore, a bacterium will divide every 20 minutes).

If this continues for just **48 hours**, about 20,000,000,000,000,000,000,000,000,000,000,000,000,000,000 bacteria would be formed! They would have a mass much greater than that of the **earth**!