Section 12–4 Mutations  (pages 307–308)

This section describes and compares gene mutations and chromosomal mutations.

Introduction  (page 307)
1. What are mutations? ________________________________

2. Is the following sentence true or false? Chromosomal mutations result from changes in a single gene. ______________

Kinds of Mutations  (pages 307–308)
3. Mutations that occur at a single point in the DNA sequence are ______________ mutations.

4. A mutation involving the insertion or deletion of a nucleotide is a(an) ______________ mutation.

5. Complete the compare-and-contrast table of types of chromosomal mutations.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deletion</td>
<td>The loss of all or part of a chromosome</td>
<td>ABC•DEF → AC•DEF</td>
</tr>
<tr>
<td>Duplication</td>
<td>A segment of a chromosome is repeated</td>
<td>ABBC•DEF</td>
</tr>
<tr>
<td>Inversion</td>
<td>Part of a chromosome becomes oriented in the reverse</td>
<td>AED•CBF</td>
</tr>
<tr>
<td>Translocation</td>
<td>One chromosome breaks off and attaches to another</td>
<td>ABC•JKL GH•IDEF</td>
</tr>
</tbody>
</table>

CHROMOSOMAL MUTATIONS
6. Circle the letter of each sentence that is true about gene mutations.
   a. Point mutations affect just one nucleotide.
   b. The substitution of one nucleotide for another in the gene never affects the function of the protein.
   c. Point mutations that involve the insertion or deletion of a nucleotide change the reading frame of the genetic message.
   d. Frameshift mutations affect every amino acid that follows the point of the mutation.

Significance of Mutations (page 308)

7. Mutations that cause dramatic changes in protein structure are often ____________.
8. Mutations are a source of ________________ in a species.
9. What is polyploidy? ____________________________________________________________________