

Solutions

Each answer shows the steps, then the **result**.

2.1

- A change in a single DNA base (substitution)

2.2

- An insertion or deletion (frameshift)

2.3

- A base change that does not change the amino acid coded

3.1 C

- a nonsense mutation

3.2

(a)

- A frameshift (deletion); it shifts the reading frame so all following codons change

(b)

- A substitution changes at most one amino acid, but a frameshift changes every downstream codon, usually ruining the whole rest of the protein

3.3

- Harmful mutations can disrupt a protein and cause disease, but mutations also create new alleles (variation) that natural selection can act on, sometimes benefiting the organism