1. Why must gametes be haploid?

   ☐ so the chromosome number does not double at every generation

   ☐ so they are lighter and can move faster

   ☐ so they carry more chromosomes than body cells

   ☐ so they can photosynthesise to get energy

2. An allele is:

   ☐ the position of a gene on a chromosome

   ☐ a whole chromosome

   ☐ a type of protein

   ☐ one version of a gene

3. A Punnett square is used to predict the offspring genotypes and ratios of a genetic cross.

   ☐ True ☐ False

4. How does a faulty allele change the phenotype?

   ☐ it has no effect on the protein the gene codes for

   ☐ it adds a new chromosome to every body cell

   ☐ it makes a faulty protein, which changes the feature the protein controls

   ☐ it changes the total number of genes in the cell

5. A regulatory gene:

   ☐ always codes for an enzyme

   ☐ controls whether other genes are switched on

   ☐ makes the cell wall

   ☐ is never expressed

6. Meiosis halves the chromosome number, producing _____ gametes (one set of chromosomes each).

   _____

7. A recessive allele:

   ☐ always masks the dominant allele

   ☐ is never inherited

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   ☐ shows its effect with just one copy

8. In a Tt × Tt cross, what fraction of the offspring (as a decimal) are expected to be short (tt)?

   _____

9. A faulty allele changes the phenotype because it codes for a faulty protein.

   ☐ True ☐ False

10. An enzyme that is made only when it is needed (like the lac enzymes) is described as _____.

    _____

1. **so the chromosome number does not double at every generation**

   If gametes were diploid, fertilisation would double the chromosome number each generation; meiosis halves it.

2. **one version of a gene**

   An allele is a version of a gene; its position on the chromosome is the locus.

3. **True**

   It combines every possible pairing of the parents' gametes.

4. **it makes a faulty protein, which changes the feature the protein controls**

   A gene codes for a protein; a faulty allele makes a faulty protein, altering the phenotype.

5. **controls whether other genes are switched on**

   Structural genes code for proteins like enzymes; regulatory genes control whether other genes are switched on.

6. **haploid**

   Two haploid gametes fuse at fertilisation to restore the diploid number.

7. **only shows its effect when two copies are present**

   A recessive allele is only expressed when homozygous; a dominant allele shows with a single copy.

8. **0.25**

   One of the four boxes (TT, Tt, Tt, tt) is tt, so $1/4 = 0.25$ are short.

9. **True**

   The DNA sequence sets the protein's shape; change the sequence and you change (or break) the protein.

10. **inducible**

    Inducible enzymes are produced only when required, which avoids wasting resources.

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