

1. Explain the term codominance

- When both the alleles in a gene are expressed in the phenotype/ neither allele is dominant/recessive
- Presence of multiple alleles for a single trait
- The phenotype is intermediate/ new/ different

2. Botanist wants to produce a generation of plants that have all pink flowers. State the phenotypes of parent plants the botanist would need to cross.

- Red and white
- Offspring need to inherit red allele and white allele/ be heterozygous

3. State how sex is inherited in humans.

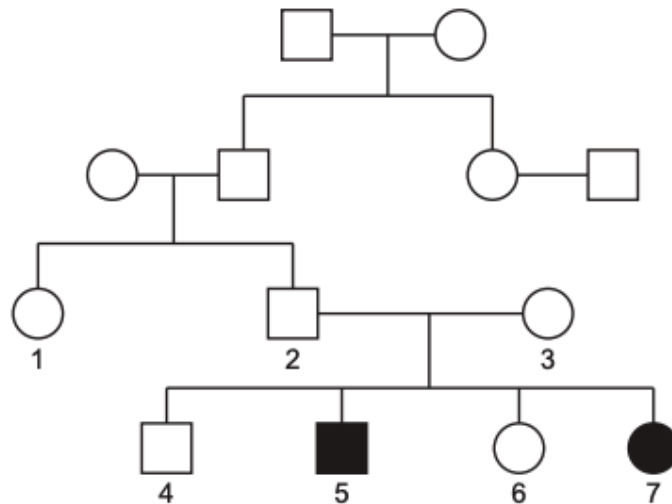
sex / X and Y chromosomes

4.

If CFTR proteins do not move chloride ions, the liquid in the pancreatic duct becomes very sticky and the duct can become blocked.

Blocked pancreatic ducts are one effect of cystic fibrosis, which is an inherited disease. Cystic fibrosis is caused by a mutation of the gene that codes for the CFTR protein.

Fig. 3.3 shows the pedigree diagram of a family that has two people who have cystic fibrosis.



Key:

- female without cystic fibrosis
- male without cystic fibrosis
- female with cystic fibrosis
- male with cystic fibrosis

Describe and explain the evidence shown in Fig. 3.3 that cystic fibrosis is caused by a

recessive allele.

- parents of 5 and 7 / parents of people with cystic fibrosis / 2 and 3, do not have cystic fibrosis ;
- parents / 2 and 3 must be, heterozygous / carriers (of the mutant allele) ;

5. Explain why body cells can have different specialised functions even though they contains the same genes

- not all genes are, expressed / switched on / activated
- cells only produce the (specific) proteins they need

6. How DNA extracted from spider webs can be used to identify different species

- Base sequences / order / pattern in DNA / genes
- each species, has unique DNA / genes
- compare with, reference DNA / base sequences / genes of known species
- if a match with DNA from known species, then DNA is from that species OR closely related species have fewer differences in their base sequences / DNA / genes

7. There are stem cells in the epithelial tissue that forms the lining of the stomach.

Explain why these stem cells are necessary.

- (stem cells) divide by mitosis
- form (named) specialised cells (in stomach)
- to replace cells (in the lining of stomach)
- idea that cells are worn away from the surface of the stomach
- for repair of any damage to tissues

8. Phenotype: observable features of an organism

9. Type of inheritance shown by blood groups: codominance

10. Haploid nucleus: one set of chromosomes

11. Explain the role of mRNA

- Moves through the cytoplasm
- Moves through the ribosomes
- Sequence of bases in mRNA determines the sequence of amino acids
- For protein synthesis

12. Some cells in shoot tips become leaf cells, others become cells in stem / flowers.

Explain why it is important that only some genes in cell of shoot tip are expressed in these cells.

- plants have different structures / parts / specialised cells
- different parts / specialised cells have different functions / roles / features
- specific proteins are required in parts / specialised cells
- genes code for proteins
- therefore some genes are required while others are not
- It would be a waste of resources if all genes were expressed

13. Explain why meiosis is necessary in the testes.

- to produce, gametes / sperm
- for sexual reproduction
- to halve the number of chromosomes / produce haploid cells
- so when fertilisation occurs number of chromosomes return to the same / diploid number
- creates genetic variation

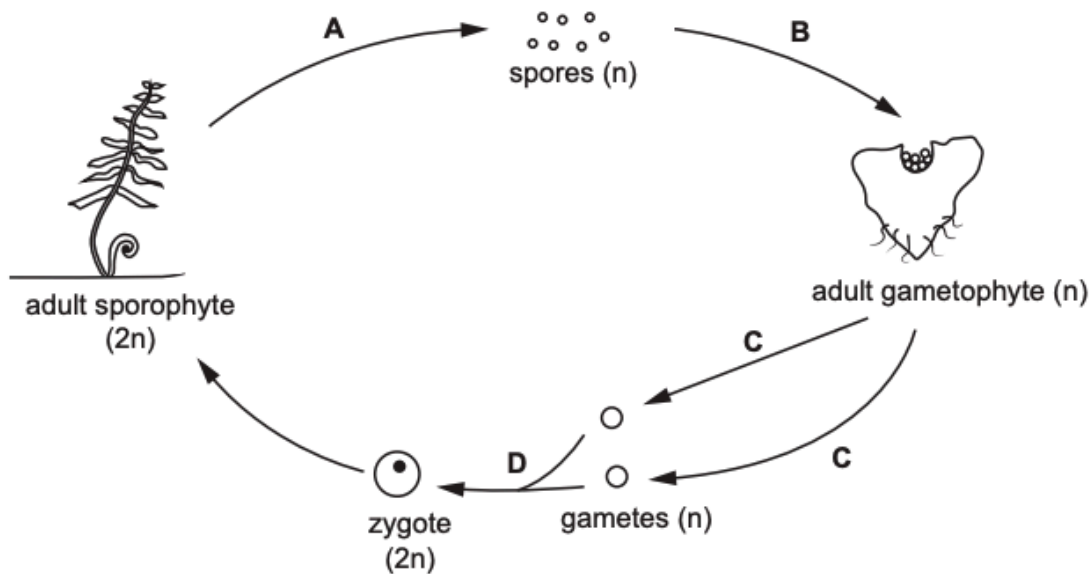
14.

Fig. 3.2 shows the life cycle of a fern. The life cycle of a fern has some similarities and some differences compared with the life cycles of other plants.

The letters represent processes that occur during the life cycle.

The haploid stages of the life cycle are represented by (n).

The diploid stages of the life cycle are represented by (2n).



Identify and describe process A

- meiosis ;
- reduction division / chromosome number is halved / single set of chromosomes (produced) ;

- producing genetically different, cells / spores ;
- ref to spore dispersal (by wind) / described;

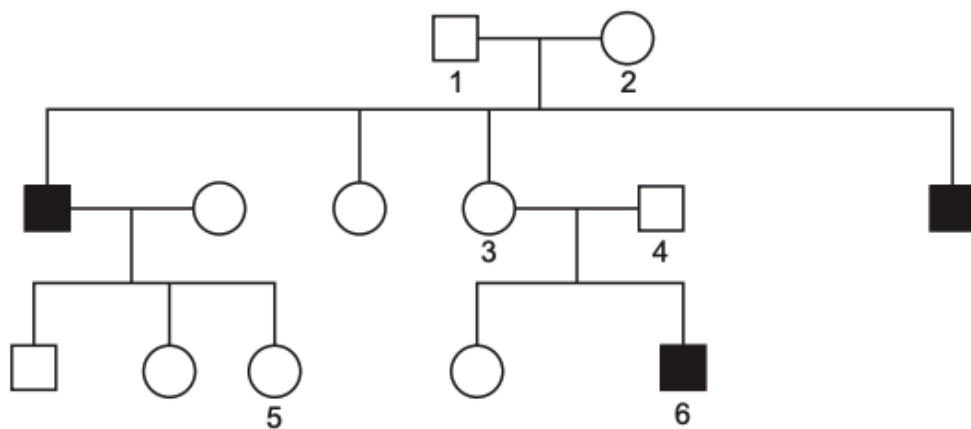
15. Explain how proteins are made by a cell.

- ribosomes make, proteins / polypeptides ;
- mRNA is copied from, gene / DNA ;
- DNA stays in the nucleus / mRNA is made in nucleus / mRNA leaves nucleus / mRNA moves to cytoplasm ;
- mRNA passes through ribosome / AW ;
- ribosome, assembles amino acids / translates mRNA (into a protein) / AW ;
- (protein synthesis) uses energy ;
- order of amino acids determined by base sequence of mRNA / DNA / gene ;

16. types of cell membrane proteins

- carriers ;
- receptor(s) (proteins) ;
- maltase / enzyme ;

17.



- Key:**
- female with normal colour vision
 - male with normal colour vision
 - male with colour blindness

Evidence that colour blindness is sex-linked.

only males are colour-blind / colour-blindness is more common in males / no females are colour-blind

18. Suggest how scientists can identify the presence of a specific allele in tissue samples.

look at DNA base sequence / amino acid sequence

19. Explain why mutations are always inherited in single-celled organisms that reproduce asexually but not always inherited in organisms that reproduce sexually.

- mutations are found in DNA
- asexual reproduction offspring are genetically identical to / clones of the parent
- (so) any existing mutations (in parent DNA) will be inherited
- sexual reproduction (usually) involves two parents
- mutation will only be in one of the parents
- mutation will only be in some of the gametes
- meiosis does not result in genetically identical cells