B6 Quick Revision Questions

H = Higher tier only

SS = Separate science only

Question 1 .... of 50

- Define genome

Answer 1 …. of 50

- The entire genetic material of an organism

Question 2 .... of 50

- What is a gene?

Answer 2 .... of 50

- A short section of DNA that contains instructions for one characteristic of an organism

Question 3 .... of 50

- Name two structures of human cells that contain DNA

Answer 3 .... of 50

- Nucleus
- Mitochondria

Question 4 .... of 50

- Name one condition resulting from a defective single gene

Answer 4 .... of 50

- Cystic fibrosis

Question 5 .... of 50

- Give one factor doctors may be able to do after understanding a person's genome

Answer 5 .... of 50

- Recommend better preventative medicine
- Identify the targets of drugs more effectively
- Tailor healthcare to the individual

Question 6 .... of 50 H

- What % of our genome is made up of genes that code for proteins?

Answer 6 .... of 50

- 1.5%

Question 7 .... of 50

- How is the genographic project different to HGP?

Answer 7 …. of 50

- It doesn’t focus on the whole genome

Question 8 .... of 50

- Why is representative sampling important?

Answer 8 .... of 50

- Little information would be gained if whole populations were excluded from the study

Question 9 .... of 50

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- What is the name given to the structure of the DNA molecule?

Answer 9 .... of 50

SS

- Double helix

Question 10 .... of 50

SS

- What are the four different bases in DNA?

Answer 10 .... of 50

SS

- Adenine
- Thymine
- Cytosine
- Guanine

Question 11 .... of 50 H SS

- How is the structure of a protein determined?

Answer 11 .... of 50

SS

- The sequence of base pairs in a gene

Question 12 .... of 50

SS

- What makes up the genetic code?

Answer 12 .... of 50

SS

- The bases of DNA

Question 13 .... of 50

SS

- Name three types of protein

Answer 13 .... of 50

SS

- Antibody
- Collagen
- Enzyme e.g. amylase
- Hair protein e.g. Keratin
- Muscle protein e.g. Actin
- Hormone e.g. Insulin

Question 14 .... of 50

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- How many different types of amino acids are found in proteins?

Answer 14 .... of 50

SS

- 20 types

Question 15 .... of 50 H SS

- How many base letters code for an amino acid?

Answer 15 .... of 50

SS

- Three

Question 16 .... of 50

SS

- Where are amino acids assembled into proteins?

Answer 16 .... of 50

SS

- Ribosome

Question 17 .... of 50

SS

- Define mutation

Answer 17 .... of 50

SS

Changes to our DNA

Question 18 .... of 50 SS

- Describe how mutations can affect protein function

Answer 18 .... of 50

SS

- Change in bases that code for a protein may lead to a different amino acid being assembled
- Some base triplets may lead to protein termination – short protein produced
- Protein may have different shape
- E.g. if an enzyme, it may lose its active site and no longer function

Question 19 .... of 50

- What occurs during meiosis?

Answer 19 .... of 50

- Four gametes are produced from one parent cell
- Each gamete has half the number of chromosomes of the parent cells

Question 20 .... of 50

- How many replications of DNA and divisions occurs in mitosis and meiosis?

Answer 20 .... of 50

- Mitosis – one replication of DNA and one division
- Meiosis – one replication of DNA and two divisions

Question 21 …. of 50

- When is the normal number of chromosomes restored?

Answer 21 .... of 50

- When the gametes fuse at fertilisation

Question 22 .... of 50

- How does meiosis contribute to genetic variation?

Answer 22 .... of 50

- There is some exchange of genetic material during meiosis

Question 23 .... of 50

- How do the chromosomes males and females have differ?

Answer 23 .... of 50

- Females – XX
- Males - XY

Question 24 .... of 50

- Describe asexual reproduction

Answer 24 .... of 50

- Involves just one parent
- Offspring are identical to the parent (clones)

Question 25 .... of 50

- Give two advantages of a sexual reproduction

Answer 25 .... of 50

- If the chances of meeting with another individual are rare
- Produces a large number of identical offspring quickly when conditions are favourable
- Requires less energy; no need to find a mate

Question 26 .... of 50

- Give two advantages of sexual reproduction

Answer 26 .... of 50

- Genetic material from both parents – variation
- If the environment changes, because of their genetic differences, some offspring are more likely to survive than others – survival advantage
- Can manipulate it to produce new varieties of plants and breeds of animal for food

Question 27 .... of 50

- Where do the asexual and sexual phases of the malarial parasite occur?

Answer 27 .... of 50

- Asexual – in the human host
- Sexual – in the mosquito

Question 28 .... of 50

- Where is the gene linked to cystic fibrosis and what protein does it code for?

Answer 28 .... of 50

- Chromosome 7
- Codes for CFTR

Question 29 …. of 50

- What are the different forms of a gene called?

Answer 29 .... of 50

- Alleles

Question 30 .... of 50

- Define phenotype

Answer 30 .... of 50

- How a gene/s is expressed (the appearance or characteristics of an organism)

Question 31 .... of 50

- Define homozygous and heterozygous

Answer 31 .... of 50

- Homozygous – two alleles the same
- Heterozygous – two different alleles

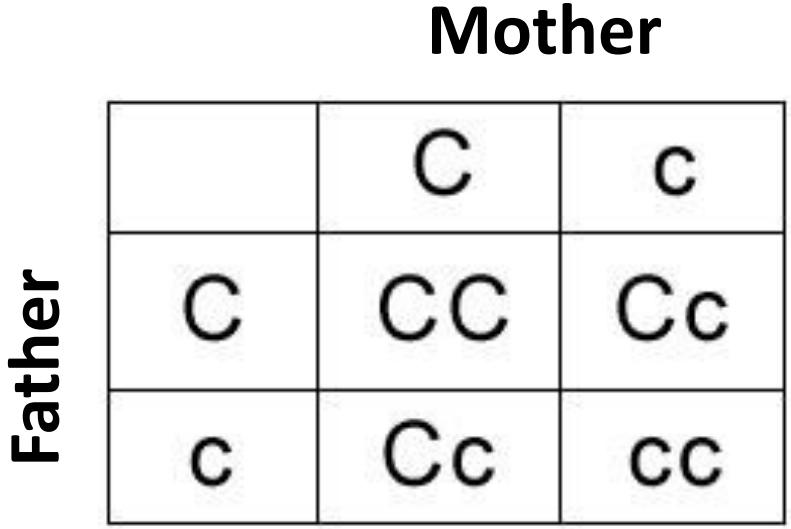
Question 32 .... of 50

- What is the genotype of a person who is homozygous dominant for a gene, B?

Answer 32 .... of 50

- BB

Question 33 .... of 50



- What is the probability of the couple having a child with cystic fibrosis?

c = cystic fibrosis allele

Answer 33 .... of 50

- 1/4

Question 34 .... of 50

- For an eye colour gene in parrots, the brown allele is dominant to red.
- Draw a Punnett square showing the genotypes and phenotypes of a mating between two heterozygous parents

Answer 34 .... of 50

		Mother	
		B	**r**
Father	**B**	**BB**	**Br**
	r	**Br**	**rr**

Question 35 .... of 50

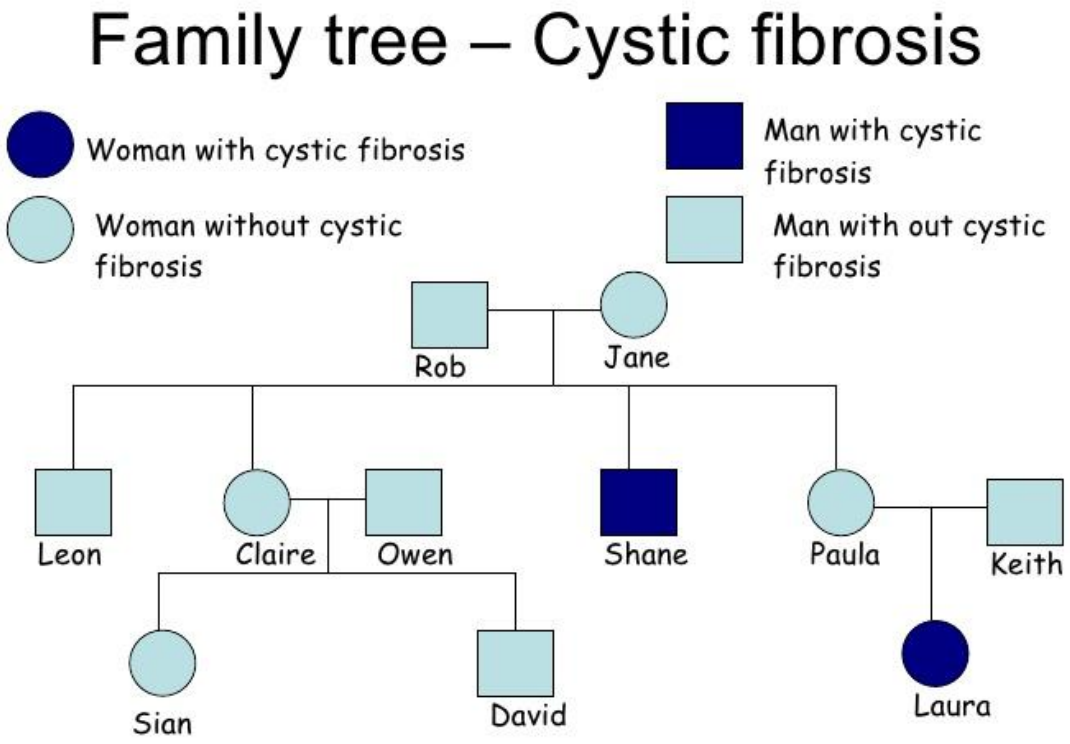
- How can we use a family tree in genetics?

Answer 35 .... of 50

- To show how a condition is passed down through a family

Question 36 .... of 50

- Which people are <u>certain</u> to be carriers?



Answer 36 .... of 50

- Rob
- Jane
- Shane
- Laura

Question 37 .... of 50

- What is embryo screening?

Answer 37 .... of 50

- The removal of a few cells from an embryo and their testing for a defective allele

Question 38 .... of 50

- Give two reasons why Gregor Mendel selected the pea for his research into genetics?

Answer 38 .... of 50

- Wide range of varieties available
- For each trait chosen, differences are sharply defined, with no intermediate forms
- Fertilisation is easily controlled – pea plants can fertilise themselves or be cross fertilised
- Easy to cultivate
- They grow and flower and seed can be collected for sowing the following growing season

Question 39 .... of 50

- What is red-green colour blindness and where is the gene for it located?

Answer 39 .... of 50

- Confusion of colours that have some red and green in them because cones don't function properly
- Caused by a defective allele on the X-chromosome

Question 40 .... of 50

- Give two examples of a single gene disorder

Answer 40 .... of 50

- Cystic fibrosis
- Sickle cell disease
- Huntington disease
- Muscular dystrophy

Question 41 .... of 50

- Give two examples of a disease linked to multiple genes

Answer 41 .... of 50

- Heart disease
- Diabetes
- Cancer

Question 42 .... of 50

- How has MRSA arisen?

Answer 42 .... of 50

- Bacterial evolution
- Antibiotic resistance

Question 43 .... of 50

- In a cross between a heterozygous and a homozygous recessive individual for a recessive disorder, what fraction of the offspring would be expected to have the condition?

Answer 43 .... of 50

	A	**a**
a	**Aa**	**aa**
a	**Aa**	**aa**

½ of the offspring would be expected to have the condition

Question 44 .... of 50

- The allele for a Huntington's disease is dominant to the allele for normal. What ratio of offspring would you expect if a heterozygous couple had a family?

Answer 44 .... of 50

	A	**a**
A	**AA**	**Aa**
a	**Aa**	**aa**

3:1 offspring would have Huntington's

Question 45 .... of 50

- In a species of mouse, black coat colour is dominant to white. Two black mice mate
- Complete the Punnett square to show the phenotypes and genotypes of the offspring:

		Female (Bb) gametes	
Male (Bb) gametes			

Answer 45 .... of 50

		Female (Bb) gametes	
		B	**b**
Male (Bb) gametes	**B**	**BB Black**	**Bb Black**
	b	**Bb Black**	**bb White**

Question 46 .... of 50

- The chromosome containing the genes for coat colour was found to have 220 million base pairs
  - Write this number in standard form

Answer 46 .... of 50

- 220 million
- 220000000
- 2.2×10^8

Question 47 .... of 50

SS

- What word is used to describe the base sequences on two opposite stands of DNA?

Answer 47 .... of 50

SS

- Complementary

Question 48 .... of 50

SS

- The base sequence of a stand of DNA is:
  - CTCGGCCCTAC
- What is the complementary strand's base sequence?

Answer 48 .... of 50

SS

- GAGCCGGGATG

Question 49 .... of 50

- A bacterial cell divides using binary fission and produces 128 cells in 175 minutes
- Calculate the time between each division

Answer 49 .... of 50

- 7 divisions (1 → 2 → 4 → 8 → 16 → 32 → 64 → 128)
- 175/7 = 25 minutes between each division

Question 50 .... of 50

- How many chromosomes does a gamete have?

Answer 50 .... of 50

- 23 chromosomes