1. **Explain the link between reproduction and heredity.**

1) Key vocabulary- Definitions of each will help you better understand what a questions is asking you:

Gamete:

Sex Cells ( egg or sperm)

 Zygote:

A fertilized egg

 Clone:

An identical copy

 Allele:

One of two forms of a gene (dominant or recessive)

 Dominant:

An allele of a gene which will always display if an individual carries that allele (Ex. Brown hair is dominant, so the brown hair gene will be displayed even if the individual carries a blonde hair gene as well)

 Recessive:

An allele which will only show if there is no dominant allele present

 Discrete variation:

A variation in which there are limited expressions (hitchhikers thumb, widow’s peak)

Continuous variation:

A variation in which there are multiple forms of expression (height, weight, skin colour)

1. **Describe the role of genetic material and biotechnology.**

Key vocabulary:

Chromosomes:

The form in which DNA is packed into a cell. Humans have 23 pairs

 DNA:

Deoxyribonucleic acid. A double helix molecule with alternating sugar and phosphate backbone containing rungs of nitrogen base pairs

 Genes:

A section of DNA which codes for a specific protein to be produced

 Mitosis:

Cell division in somatic cells where identical copies of the parent cell are created. Used for maintenance, repair, and growth

 Meiosis:

Cell division used to create gametes. Creates 4 new individual cells

3) Create a Punnett square for the following scenario:

Mom carries a brown haired allele and a blonde hair allele.

Dad carries two blonde hair alleles. Brown hair allele is dominant (B) while blonde hair allele is recessive (b)

Give the percentage of children that would have blonde hair.

B b

|  |  |
| --- | --- |
| Bb | bb |
| Bb | bb |

 b

 b

2 / 4 = 50%

 4) What are the 4 DNA bases and how do they pair?

Adenine – Thymine, Cytosine - Guanine

5) What is artificial selection?

Artificial selection is the process in which humans breed organisms with favourable traits to have a higher chance of producing offspring with those traits

6) Are dog breeds an example of artificial selection or natural selection? Why?

Dog breeds are artificial selection because dog breeds occur when humans breed generations of dog with specific traits with each other until a specialized individual is produced

7) What are some advantages and disadvantages of artificial selection compared with natural selection?

Natural selection allows us to create organisms with the specific traits that we want very quickly. It can create genetic issues in the organisms or decrease the genetic diversity of a population

8) Explain how we could use artificial selection to create a new plant that grows

very quickly

By breeding plants that already grow quickly with each other, the offspring are more likely to have that trait.

9) Why do gametes and somatic cells have different numbers of chromosomes?

Gametes have half the number of chromosomes as somatic cells so that when egg and sperm cells meet they create a zygote with the correct number of chromosomes.

10) Timothy’s parents have black hair and brown eyes, yet he is born with red hair and green eyes. How is this possible?

Timothy’s parents must have both had recessive genes for eye colour and hair colour, while also having the dominant genes. His parents donated the recessive genes to Timothy while only expressing the dominant gene themselves.