Sex Determination

1. The sex of birds, mammals and some insects is determined by **sex chromosomes**
2. In most mammals, the **SRY gene on the Y chromosome** determines male characteristics
3. Males are **heterogametic**—XY and females are **homogametic**—XX
4. The Y chromosome lacks homologous alleles present on the X chromosome.
5. This results in males being more likely to develop sex linked conditions such as colour blindness. They only need 1 recessive allele to have the condition whereas females would need two. Their recessive allele could be masked by a dominant allele.
6. This can result in sex linked patterns of inheritance as seen with carrier females (X^BX^b) and affected males (X^bY)
7. In females, one of the two X chromosomes is randomly inactivated at an early stage of development— this is **X chromosome inactivation**
8. This **prevents a double dose of gene products**, which could be harmful to cells
9. Carriers are less likely to be affected by deleterious mutations on these X chromosomes
10. The X chromosome inactivated in each cell is **random**— half the cells in any tissue will have a working copy of the gene in question.
11. **Hermaphrodites** have functioning male and female reproductive organs in each individual
12. They produce male & female gametes & usually have a partner to exchange gametes with
13. If encountering a partner is uncommon, there's no requirement for the partner to be of the opposite sex
14. **Environmental factors** can determine sex and sex ratio (eg: sex of reptiles is controlled by environmental temperature of egg incubation)
15. Sex can change within individuals of some species as a result of size, competition or parasitic infection
16. Sometimes, sex ratio of offspring can be adjusted in response to resource availability.