

## Int 2 Biology - Unit 2 Environmental Biology & Genetics

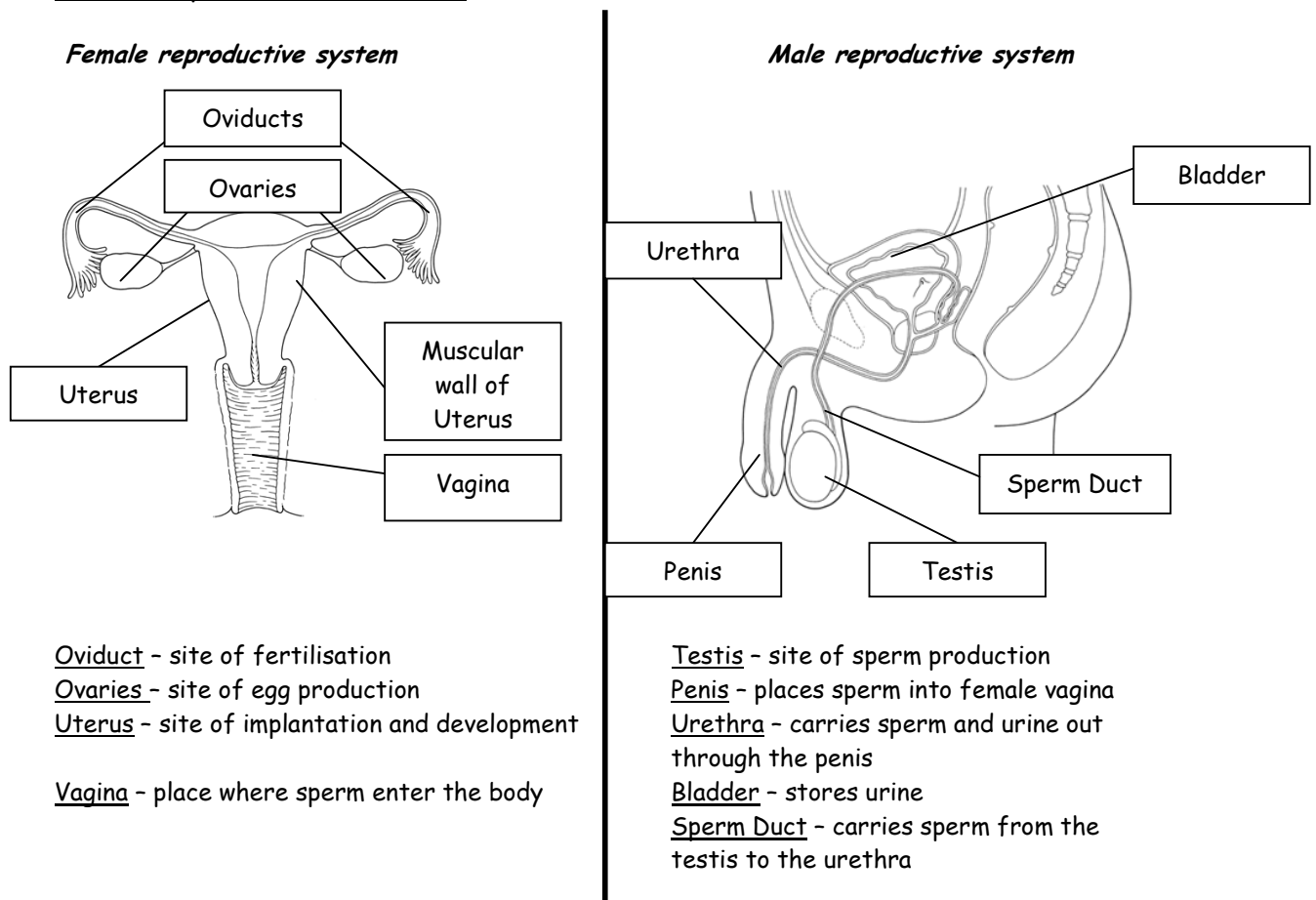
### Revision Notes for Chapter 8 - Variety within a Species

#### Variation

Although members of a species look similar they are not identical. The differences between individuals are called variations.

Variations can be split into two categories - continuous and discontinuous. Continuous variations are measured on a scale using numbers (e.g. height in centimeters, head circumference in inches). Discontinuous variations fall into categories or groups (e.g. eye colour - blue/green/brown, blood group - A, AB, B, O).

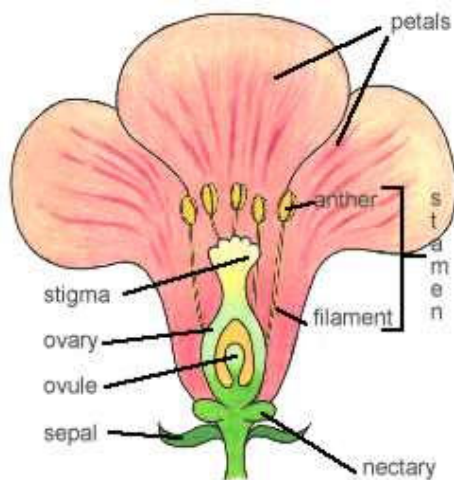
#### Sexual Reproduction - humans



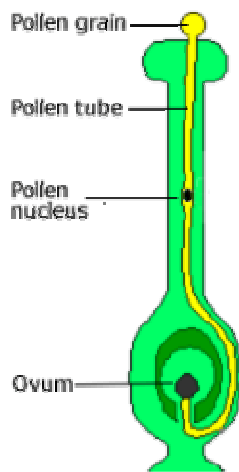
After the sperm have been released into the female vagina they swim up through the uterus and then into one of the oviducts. In the oviduct the sperm may fertilise an egg.

No two individuals look the same as the fusing of an egg and a sperm in fertilisation is random. Remember - **FERTILISATION IS A RANDOM PROCESS.**

## Sexual Reproduction - flowering plants



- |             |   |
|-------------|---|
| Sepals -    | protect the unopened flower bud   |
| Petals -    | brightly coloured to attract insects                                    |
| Anther -    | produces male sex cells (pollen grains)                                 |
| Stigma -    | female part of the flower which is sticky to help collect pollen grains |
| Ovary -     | produces the female sex cells (ovules)                                  |
| Nectaries - | produce nectar to attract insects                                       |



A grain of pollen from the anther of one flower may land on the stigma of another flower. This process is called **pollination**.

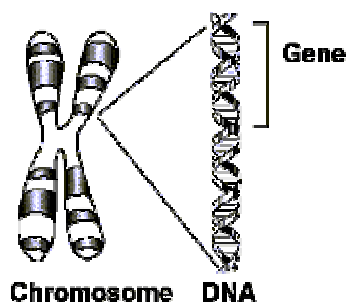
After pollination a pollen tube starts to grow from the stigma down into the ovary.

The pollen grain then bursts open releasing the male sex cell (pollen nucleus) which travels down the pollen tube to the ovary where it fuses with an ovule (female sex cell).

## Sexual Reproduction - general

Reproduction is the process by which members of a species produce offspring. During reproduction the male and female **gametes** (sex cells) will fuse together. The fusing together of the gametes is called **fertilisation**. The cell formed as a result of fertilisation is called a **zygote**.

## Chromosomes, Genes and DNA



- Chromosomes are X-shaped structures found in the nuclei of cells.
- Chromosomes are banded. Each band represents a single gene (a unit which controls one characteristic).
- Genes are made from a molecule called DNA.
- DNA consists of a sequence of four possible bases which determine the sequence of amino acids in a protein.
- The sequence of amino acids in a protein determines the protein's structure and the function.

## Chromosome Complement

The chromosome complement is the number of chromosomes in a cell. Body cells have two sets of chromosomes. Gametes have 1 set of chromosomes. One exception is red blood cells. Red blood cells have no nucleus and therefore have NO chromosomes.

Normal human body cells have 46 chromosomes - 2 sets of 23.  
Human gamete cells (sperm and eggs) contain 23 chromosomes - 1 set of 23.

Our sex is determined by the sex chromosomes.  
Females are XX. Males are XY.

## Meiosis

Meiosis is a type of cell division which results in production of gametes (sex cells), such as sperm, eggs, pollen and ovules. Here are some important points about meiosis.

- Body cells have two matching sets of chromosomes.
- Gametes produced during meiosis have one set of chromosomes (**half the number of a normal body cell**).
- Matching chromosomes pair and separate during the production of gametes
- The **random assortment** of chromosomes during meiosis leads to variety in offspring.
- During random assortment chromosomes line up at the equator in a random order and are then separated into the four gametes produced during meiosis.