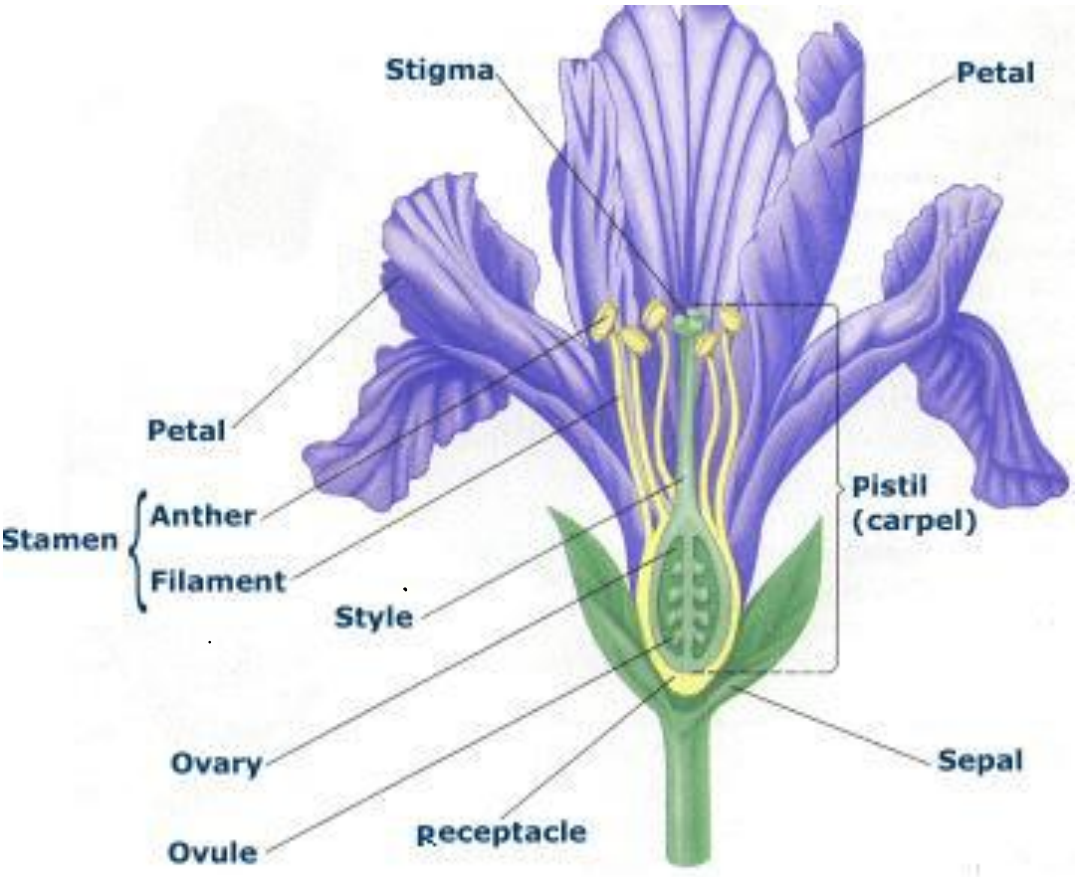
B. Sexual Reproduction

Sexual reproduction is a method of reproduction that typically involves two parents, a male and female such as with humans and other animals, but can occur with species that we wouldn't consider male and female, such as in plants and coral. Sexual reproduction is the combination of two gametes, male and female sex cells, to produce an offspring. Gametes in females are called eggs or ova, whereas sex cells from a male are called sperm. These cells are produced through meiosis. The union of the sperm cell with the egg cell occurs during mating and is called fertilization.

DNA recombines to create offspring with a combination of characteristics from both parents. So offspring are not clones of their parents. Variation helps a species survive by giving it the ability to survive changes in its environment. Although, a major disadvantage or sexual reproduction is that the gametes need to meet. Flowering plants must have wind or attract insects to move pollen to the stigma. Also, the embryo must be protected and nurtured during development. In mammals, the embryo grows within the body of the female parent. Because this takes a large amount of time and energy needed for this development, only a limited number of offspring can be produced.

Flowering Plant Structures



Pollination – is the transfer of pollen grains to the stigma. Pollen transferred to the stigma of the same flower is called self-pollination. If pollen grains are transferred to the stigma of another flower, it is called cross-pollination.

Cross-pollination can be caused by various sources, such as: wind, water, bees, birds, bats or other animals (including humans).

Fertilization – is the process that occurs after pollination. If the pollen grain has landed on a compatible stigma, a pollen tube grows to transport the pollen to the egg. Once the pollen reaches the egg, the two gametes fuse and create a zygote. The zygote then forms into a seed.

Germination – is the process a plant undergoes as the seed grows into a new plant. Once the seed absorbs water, it begins to expand and open as the new plant grows within it.

Sexual Reproduction in Animals

In animals, sexual reproduction uses eggs (female gamete) and sperm (male gamete) as the reproductive cells. After the two gametes fuse, a zygote is formed. Fertilization can occur within and exterior to the animal body depending on the specific animals form of reproduction. Once the zygote has undergone cellular division, it forms an embryo, which is a multi cellular structure. The embryo will begin to form small organs and appendages. Once the organs begin to function, it is called a fetus this occurs at approximately the nine week mark in humans. The fetus is final structure an organism will take before birth.

Hermaphrodites can produce both male and female gametes. Worms and slugs are examples of hermaphrodites. Although hermaphrodites usually mate with other individuals of their species, in time of environmental stress, members of some species can fertilize themselves. Sequential hermaphrodites are species that are born as one sex, but then become the opposite sex. One example is the clownfish. Clownfish travel in packs that consist of a large reproductive female, a smaller reproductive male as well as numerous smaller non-reproductive males. If the female dies or leaves, the large reproductive male becomes a female and the largest of the non-reproductive males becomes the new reproductive male.

Organisms that Reproduce Both Sexually and Asexually

Some species have the ability to reproduce both sexually and asexually. Most plants that produce seeds by sexual reproduction can also reproduce asexually, either from cuttings or by producing structures such as bulbs or runners.

Some plants can use their seeds to reproduce both asexually and sexually. In the asexual method, embryos develop in the seeds without the contribution of sperm cells. These offspring are genetically identical to their parent.

Some animal species can also reproduce both ways. Aphids are small insects that feed on the sap of certain plants. Throughout the growing season, females produce live female young through asexually. Over the summer, several generations are produced. In the fall, when days shorten and the temperature drops, the females produce a generation that includes both males and females. These males and females reproduce sexually and lay eggs that will hatch in the spring to produce new colonies. Sponges can also produce sexually and asexually.

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