

Sexual reproduction is a process involving fertilization, the fusion of the nuclei of two haploid gametes to form a diploid zygote resulting in the production of genetically varied offspring

A species is a group of organisms that can reproduce to produce fertile offspring

Advantages	Genetic diversity
	Improves adaptability
	Quicker evolution
Disadvantages	Time and energy
	Fewer offspring and slower
	Need to find a mate or be pollinated

B15.2 Sexual reproduction

Core

- Describe sexual reproduction as a process involving the fusion of the nuclei of two gametes to form a diploid zygote resulting in the production of genetically varied offspring
- Describe a species as a group of organisms that can reproduce to produce fertile offspring

Supplement

- State that nuclei of gametes are haploid and that the nucleus of a zygote is diploid
- Discuss the advantages and disadvantages of sexual reproduction to a population of a species in its environment

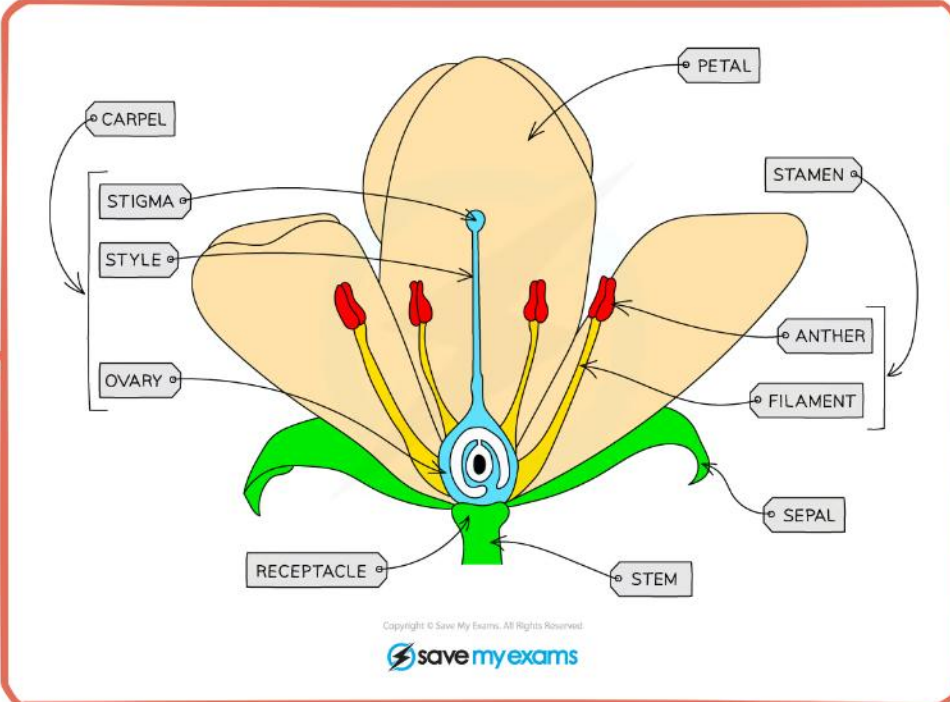
Pollination The transfer of pollen grains from an anther to a stigma

Fertilisation occurs when a pollen nucleus fuses with a nucleus in an ovule

Occurs because the pollen tube brings the nucleus down

Structural adaptations	
Wind-pollinated	Insect-pollinated
No scent	Scented
No nectaries	Nectaries present at the base of the flower produce a sugary liquid
Small or no petal to not obstruct pollen dispersal	Large petals for insects to land on
Green, inconspicuous or no petals	Brightly coloured petals
Stigmas are large and feathery, often hanging outside the flower to trap pollen	Small stigmas that are held inside the flower
Many anthers, often large and hang outside to easily disperse pollen	A few small anthers that are usually held inside the flower

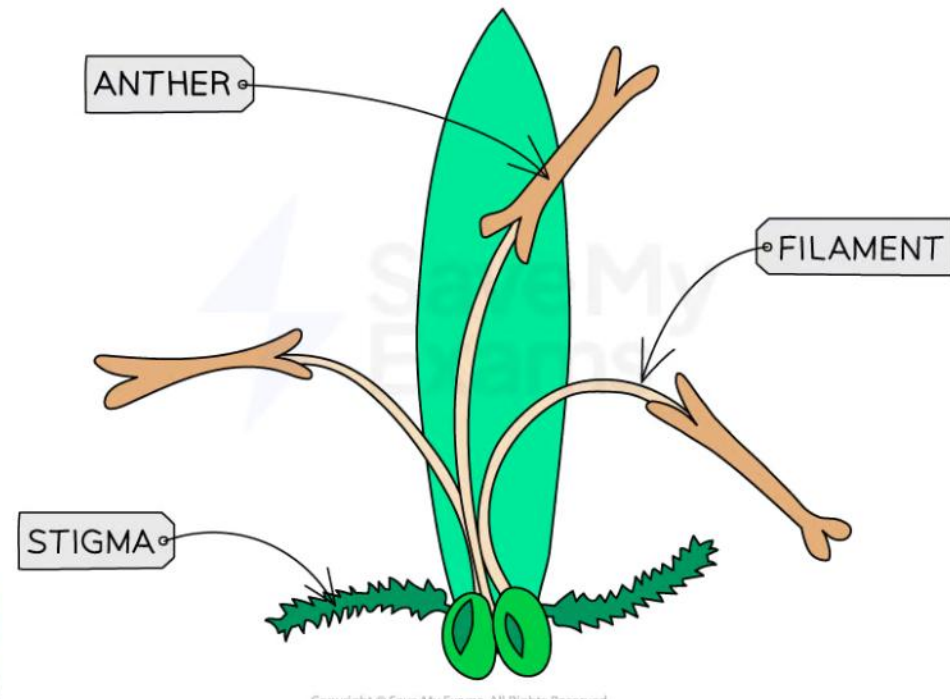
To attract pollinators



Parts of a flower

Sepals	Protect the unopened flower bud
Petals	May be brightly coloured and scented to attract insects
Stamen	The male parts of a flower containing the anther help up on the filament
Filament	Holds up the anther, male part
Anthers	Produces male gametes in pollen grains
Carpels	Produce egg cells / female gametes, including style, ovary and ovule
Style	A tube that connects the stigma and ovary
Stigma	The top of the female part of the flower, produces female gametes in ovules
Ovary	The bottom of the female part of the flower, produces female gametes in ovules
Ovules	Structures inside the ovary that contain the female gametes

Wind-pollinated plants



Environmental conditions affecting germination of seeds

- Need water from the soil, allowing the embryo to swell up and start cell division
- Needs warmth. The chemical reactions for growth (respiration) are enzyme controlled therefore do not occur when too cold
- Need oxygen for respiration, which provides energy for germination
- Respiration is very slow in seeds especially when frozen so seeds can be dormant for many years
- After germination plants continue growing by making energy via photosynthesis

B15.3 Sexual reproduction in plants

Core

- Identify on diagrams and images and draw the following parts of an insect-pollinated flower: sepals, petals, stamens, filaments, anthers, carpels, style, stigma, ovary and ovules. State the functions of the structures listed in B15.1
- Describe pollination as the transfer of pollen grains from an anther to a stigma
- State that fertilisation occurs when a pollen nucleus fuses with a nucleus in an ovule
- Describe the structural adaptations of insect-pollinated and wind-pollinated flowers
- Investigate and describe the environmental conditions that affect germination of seeds, limited to the requirement for water, oxygen and a suitable temperature

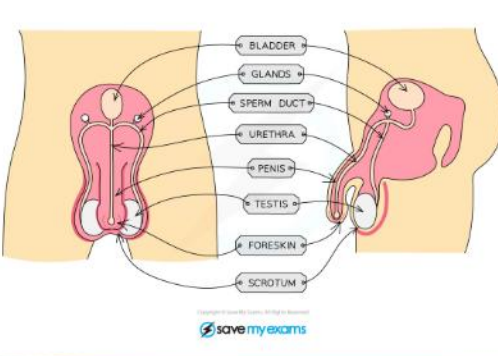
Supplement

- Identify on diagrams and images and describe the anthers and stigmas of a wind-pollinated flower

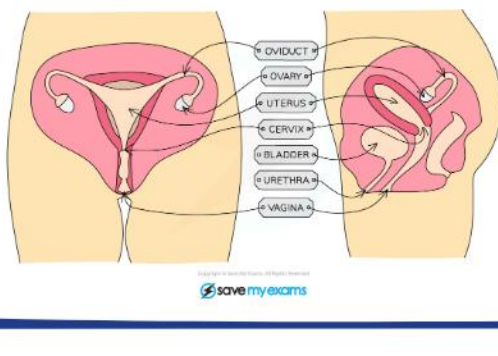
B15 Sexual Reproduction

In plants

In humans



Functions	
Testes	Where male gametes (sperm) are made. They are outside the body in a sack called the scrotum
Scrotum	Sack containing the male gametes
Sperm ducts	When sperm are released from the testes they travel through these.
Prostate gland	Add fluids to provide the sperm with energy and liquid to swim through to get to the egg. This mixture of sperm and fluids is semen.
Urethra	This is the tube inside the penis that semen and urine travel through to exit the body (but never at the same time)
Penis	The male organ that is inserted into the vagina of the female during intercourse



Functions	
Ovaries	Contain undeveloped eggs (ova). 1 egg matures each month and is released.
Oviducts	Also called fallopian tube. These connect the ovaries with the uterus and are lined with hairs called cilia to sweep the egg into the uterus
Uterus	Where the baby develops if an egg is fertilised. Has strong muscular walls and a soft lining.
Cervix	A ring of muscle at the base of the uterus. It holds the baby in place during pregnancy.
Vagina	This is at the base of the cervix and where the penis is inserted during intercourse.

B15.4 Sexual reproduction in humans

Core

- Identify on diagrams and state the functions of the following parts of the male reproductive system: testes, scrotum, sperm ducts, prostate gland, urethra and penis
- Identify on diagrams and state the functions of the following parts of the female reproductive system: ovaries, oviducts, uterus, cervix and vagina
- Describe fertilisation as the fusion of the nuclei from a male gamete (sperm) and a female gamete (egg cell)
- Describe the role of testosterone and oestrogen in the development and regulation of secondary sexual characteristics during puberty
- Describe the menstrual cycle in terms of changes to the ovaries and in the lining of the uterus (knowledge of sex hormones is not required)

Supplement

- Explain the adaptive features of sperm, testes, vas deferens, vasectomy and the presence of a vasectomy in the vasectomy
- Explain the adaptive features of egg cells, uterus, cervix, vagina and the role of the cervix in childbirth
- Compare male and female gametes in terms of size, structure, motility and numbers

Adaptions and comparison		
Adaptions	Sperm	Egg cells
	Flagellum - to help swim to egg and propel it	Energy stores - for feeding the baby if it develops
	Mitochondria - to provide energy for swimming	Jelly coat that changes at fertilisation - to ensure only one sperm fertilises the egg
	Enzymes in acrosome - to help penetrate/ digest a route the egg for fusion (acrosin)	
Comparison	Much smaller (10 000x)	Biggest cell produced by humans
	Produced everyday in huge amounts	Only one released each month
	Motility - capable of locomotion	Not capable of locomotion
	Structure - head region, flagellum, many structural adaptations	Structure - round cell with few structural adaptations, covered in a jelly coating

Menstrual cycle	Stage 1: Menstruation	If the egg is not fertilised, the uterus lining is not needed for the baby and is shed
	Days 1-6	
	Stage 2: Lining regrows	The lining starts to regrow to prepare for pregnancy. An egg has matured in the ovary
	Days 6-10	
	Stage 3: Ovulation	The egg is ready to be released from ovary, awaiting fertilisation. Lining keeps thickening
	Days 10-14	
	Stage 4: Lining thickens	Maximum lining thickness, ready for potential pregnancy. Fertile window a few days after egg released
	Days 15-28	

A sexually transmitted infection is a disease that is transmitted through sexual contact

STIs

Human immunodeficiency virus (HIV) is a pathogen that causes an STI

HIV infection may lead to AIDS

Spread by bodily fluids

- Sex
- Blood
- Sharing of needles/ syringes
- Mother to baby through the placenta or breast milk

Abstinence

Control of spread of STIs

Using a condom or femidom during sexual activity

- Prevents transmission of fluids
- Only protects the skin it covers, sores/warts not covered so can still be spread through contact

Regular check ups and contact tracing

Many infections are asymptomatic

B15.5 Sexually transmitted infections

Core

- Describe a sexually transmitted infection (STI) as an infection that is transmitted through sexual contact
- State that human immunodeficiency virus (HIV) is a pathogen that causes an STI
- State that HIV infection may lead to AIDS
- Describe the methods of transmission of HIV
- Explain how the spread of STIs is controlled