Reproduction in Organisms Class 12 Key Points

CBSE Class 12 Biology · NCERT · for boards, NEET and JEE revision

ChapterNotes

Why Organisms Reproduce

Essential for species continuity, NOT for individual survival

Two broad modes: asexual (one parent, no gamete fusion) and sexual (usually two parents, gamete fusion).

- An individual survives fine without reproducing; the species cannot continue without it
- Reproduction links the parental generation to the next
- Sexual reproduction adds variation; asexual simply multiplies life

Definite, Species-Specific Life Span

Life span has NO direct relation to body size

Fruit fly ~2 weeks; dog ~20-25 yr; parrot ~140 yr; tortoise ~100-150 yr; banyan ~250 yr.

- A crow and a parrot are similar in size but very different in life span - proof size doesn't decide it
- All organisms eventually die; reproduction lets the species persist despite this
- 'Definite life span' means a fixed natural limit, not the exact same age for all members

Asexual Reproduction

clone = identical = asexual = mitosis

Rapid; common in simple organisms (algae, fungi, protists) and lower animals.

- Binary fission: Amoeba, Paramecium; fragmentation: Spirogyra, Planaria
- Budding: exogenous in Hydra/yeast, endogenous (gemmule) in Spongilla (sponge)
- Spores: Chlamydomonas → zoospores (motile); Penicillium → conidia (non-motile)

Vegetative Propagules

Eyes → Potato ; Rhizome → Ginger ; Bulbil → Agave

Bryophyllum propagates from adventitious buds on leaf margins; Oxalis from floral bulbils.

- Offset → Water hyacinth (Eichhornia), the 'Terror of Bengal'
- Water hyacinth is the most invasive aquatic weed; it drains oxygen and kills fish
- All vegetative propagules and asexual spores produce clones - never variation

Sexual Reproduction & Life Phases

Juvenile (vegetative) → Reproductive → Senescent

Slower and more elaborate than asexual; occurs only after a certain maturity.

- Found in all higher plants and animals; offspring are not identical to parents
- Bamboo flowers only once, after 50-100 years, then dies
- Strobilanthus kunthiana (Neelakuranji) flowers once every 12 years (famously in 2006)

The Three Phases of Reproduction

Pre-fertilisation → Fertilisation → Post-fertilisation

Keep these event phases separate from the organism's life phases (juvenile/reproductive/senescent).

- Pre-fertilisation = gametogenesis + gamete transfer
- Fertilisation = syngamy → zygote
- Post-fertilisation = zygote → embryo, plus fruit/seed formation

Gametogenesis & Ploidy

Haploid parent → gametes by mitosis ; Diploid parent → gametes by meiosis

Diploid bodies use a meiocyte (gamete mother cell, 2n); human meiocyte = 46, gamete = 23.

- Homogametes/isogametes look alike (Cladophora); heterogametes differ (Fucus, humans)
- Bisexual/homothallic/monoecious = both sexes in one individual
- Unisexual/heterothallic/dioecious = sexes in separate individuals

Bringing Gametes Together

Seed plants: pollination ; Algae/bryophytes/pteridophytes: water medium

In water-dependent transfer many gametes are lost, so they are produced in large numbers.

- Pollen carries the male gamete in seed plants
- Water is the medium for gamete transfer in algae, bryophytes and pteridophytes
- Large gamete numbers compensate for losses during transfer

Fertilisation (Syngamy)

n + n → 2n ; zygote is ALWAYS diploid in sexual reproduction

Parthenogenesis = female gamete develops without fertilisation (rotifers, honeybee drones, some lizards, turkey).

- External fertilisation (algae, fishes, amphibians): in water, many gametes, vulnerable young
- Internal fertilisation (fungi, higher plants & animals): few protected eggs, many motile sperms
- Zygote is the vital link ensuring continuity between generations

After Fertilisation: Seed & Fruit

Ovule → Seed ; Ovary → Fruit ; Ovary wall → Pericarp ; Zygote → Embryo

Embryogenesis = development of the embryo by cell division + differentiation.

- Anchor it: the small ovule (inside) → seed; the larger ovary (outside) → fruit
- Haplontic life cycle: zygote undergoes zygotic meiosis (it is the only diploid cell)
- Diploid organisms: zygote divides by mitosis during embryogenesis

Quick revision

- Asexual: single parent, no gametes, clones (no variation)
- Methods: binary fission, budding, sporulation, fragmentation, vegetative propagation
- Sexual: two parents (usually), gametes, meiosis, genetic variation
- Phases: pre-fertilisation → fertilisation (syngamy) → post-fertilisation
- External fertilisation: aquatic medium (frog, fish); Internal: inside body (mammals)
- Oviparous: eggs (birds); Viviparous: live birth (mammals)
- Parthenogenesis: unfertilised egg → organism (honeybee drones)
- Bryophyllum: vegetative propagation from leaf buds
- Gametes: haploid (n); Zygote: diploid (2n)