

Introduction to Animal Reproduction

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Key concepts, terminology, and major patterns

1. Why Study Reproduction?

Reason	Explanation
Continuity of species	Produces offspring that carry genetic information forward.
Population dynamics	Birth rates vs. death rates determine growth, decline, or stability.
Evolutionary insight	Reproductive strategies shape natural selection and adaptation.
Applied importance	Agriculture, conservation, medicine, and biotechnology rely on reproductive knowledge.

2. Basic Terminology

Term	Definition
Reproduction	The biological process by which new individual organisms are produced.
Sexual reproduction	Fusion of male and female gametes (sperm + egg) → genetically diverse offspring.
Asexual reproduction	Offspring arise from a single parent without gamete fusion → clones.
Gamete	Haploid reproductive cell (sperm = male; egg = female).
Fertilization	Union of sperm and egg to form a diploid zygote.
Zygote	The first cell of a new organism; contains a full set of chromosomes.
Embryogenesis	Series of developmental events from zygote to hatchling/larva.
Viviparity	Live birth; embryos develop inside the mother's body.
Oviparity	Egg laying; embryos develop outside the mother in eggs.
Ovoviviparity	Eggs develop inside the mother and hatch internally or immediately after laying.

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3. Major Reproductive Strategies

Strategy	Typical Groups	Key Features
External fertilization	Many fish, amphibians, most invertebrates	• Gametes released into water • Synchronous spawning increases success
Internal fertilization	Reptiles, birds, mammals, many insects	• Copulation or specialized structures (e.g., intromittent organ) • Greater protection of gametes • Development of embryos from unfertilized eggs
Asexual (parthenogenesis)	Some reptiles, insects, cnidarians	• Rapid population increase when mates are scarce
Hermaphroditism	Many gastropods, earthworms, some fish	• Individuals possess both male and female reproductive organs • Can self-fertilize or cross-fertilize
Sexual dimorphism	Mammals, birds, many insects	• Distinct male/female morphology linked to reproductive roles (e.g., antlers, plumage).

4. Anatomy of the Reproductive System (Typical Vertebrate)

4.1 Male System

1. **Testes** – Produce sperm and testosterone.
2. **Epididymis** – Sperm maturation and storage.
3. **Vas deferens** – Transport sperm to the urethra.
4. **Accessory glands** (e.g., seminal vesicles, prostate) – Add fluids for sperm viability.
5. **Penis (or cloacal intromittent organ)** – Delivers sperm to the female.

4.2 Female System

1. **Ovaries** – Produce eggs (oocytes) and estrogen/progesterone.
2. **Oviduct (Fallopian tube)** – Site of fertilization and early embryo transport.
3. **Uterus** – Provides environment for embryo implantation and development (in vivipar