**Reproductive strategies in vertebrates**

**WHAT IS A REPRODUCTIVE STRATEGY?**

Animals have a variety of behaviour and ways of to ensure that they are successful in reproducing in different environments, which makes them successful in the habitat in which they live.

**Reproduction** is the production of a new generation of organisms from an existing generation. It involves firstly the production of young, and then the growth and development of the young into mature adults. Reproduction is a life process that ensures the continued survival of a population.

 **DEFINITIONS AND IMPORTANT TERMS AND CONCEPTS**

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| **Biological term** | **Description** |
| **Allantois** | The structure in the amniotic egg that stores wastes |
| **Altricial development** | The reproductive strategy when hatchlings of birds are not able to move and feed themselves |
| **Amniotic egg** | A type of egg where the embryo develops inside a fluid-filled sac which is surrounded by a shell |
| **External fertilisation** | A type of fertilisation in which the nucleus of a sperm fuses with the nucleus of an ovum outside the body of the female |
| **Internal fertilisation** | A type of fertilisation in which the nucleus of a sperm fuses with the nucleus of an ovum inside the reproductive system of the female |
| **Ovipary** | The reproductive strategy involving the laying of eggs |
| **Ovovivipary**  | Producing young by means of eggs which are hatched within the body of the parent |
| **Precocial development** | The reproductive strategy when hatchlings of birds are able to move and feed themselves |
| **Vivipary** | A type of reproduction in humans where the foetus develops inside the uterus |
| **Zygote** | The diploid cell formed by the process of fertilisation |

**EXTERNAL FERTILIZATION**

* The sperm cell fuses with the egg cell outside the body of the female.
* The sperm cells are discharged (released) directly into water.
* Examples are aquatic animals like frogs, sponges, jellyfish, worms and fish
* A mass of amphibian eggs, appearing as small black spots, is contained within a gelatinous mass

 while they incubate in a freshwater pond.

* Eggs deposited in this fashion receive little or no parental protection and will soon hatch into

 small, wriggling tadpoles.

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| **ADVANTAGES** | **DISADVANTAGES** |
| * No additional energy is needed for parental care or formation of a protective layer.
* No need for a male to have a special organ to insert the sperm into the female’s body.
* Chances of fertilisation are enhanced by courtship display by fish.
* Does not use much energy
 | * Chances are very slim for a sperm cell to meet the ova of same species.
* Predators eat the sperm and ova before fertilization can occur
* Strong currents carry sperm cells away before fertilization can occur
* Reproduction must take place in water otherwise gametes or fertilized eggs will dehydrate
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**INTERNAL FERTILIZATION**

* The sperm cell from the male is transferred into the female by copulation (sexual intercourse).
* The sperm cell then fuses with the ovum inside the body of the female.
* **Examples:** terrestrial mammals, birds, and insects.
* Terrestrial vertebrates clasp each other tightly during copulation
* the male deposits his sperm into the female’s reproductive tract.
* For the giant Galápagos tortoises mating may take hours and is initiated by the male, who bangs

his shell against that of the female to get her attention.

* These animals mate in the spring.

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| **ADVANTAGES** | **DISADVANTAGES** |
| * Ensures that the sperm cell comes into contact with the ovum
* Developing embryo is protected from predators
* and removed from harsh environments
 | * Fewer eggs are produced.
* The animal must have a copulatory organ to insert the sperm cells into the female body.
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**TYPES OF REPRODUCTION**

**OVIPARY**

* Refers to egg laying animals
* Eggs are protected by a hard shell, while others are protected by a jelly like layer after fertilisation.
* Development does not occur inside the body
* The development of an organism is completed inside the egg after it has been laid
* Examples: frogs, insects, birds, and marine animals

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| **ADVANTAGES** | **DISADVANTAGES** |
| * Eggs and sperm cells are produced in large numbers to increase chances of survival to adulthood.
* Much energy is invested for parental care.
* Parental care ensures survival to adulthood.
 | * Mortality rate is high.
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**OVOVIVIPARY**

* Animals that do not lay eggs but keep them in their bodies until they hatch.
* The body temperature is necessary for them to hatch.
* There is no connection between the embryo and the mother.
* Examples : sharks , lizards, cockroaches and some snakes
* Advantages :
* The young one is protected from cold and predators to ensure survival
* The young one can develop to a fairly large size before birth
* Among some snake species, females bear live young
* This method of reproduction may be beneficial to snakes that live in cold climates, because the pregnant female can bask in the sun to keep her developing offspring warm.

**VIVIPARY**

* Refers to animals that give birth to live young ones.
* There is a connection between the developing foetus and the mother.
* Examples : most mammals like human beings, whales and kangaroos.

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| **ADVANTAGES** | **DISADVANTAGES** |
| * The temperature is regulated by the mother
* The mother provides nutrition for the young one
* Mortality rate is lower
* Parental care ensures survival to adulthood.
 | * Number of off springs produced is few.
* More energy is used to provide parental care.
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**AMNIOTIC EGG**

* This is the egg laid by reptiles, birds and some mammals.
* The embryo develops inside the amnion and is protected by many membranes and hard shell.
* Amniotic fluid protects the embryo from drying out.
* It feeds from the yolk.
* The allantois removes metabolic wastes.
* The chorion supplies oxygen, food and water.
* Advantages :
* They are resistant to dryness
* Oviparous animals can move into VARIOUS environments
* Is protected by a number of membranes.
* This complicated structure can allow animals to evolve into bigger forms, and better protect

themselves.



**EVOLUTIONARY ADVANTAGE**

* A critical evolutionary development for terrestrial animals is the reptilian amniotic egg, now also characteristic of birds and some mammals.
* The developing embryo, protected from drying out, can survive out of water and in a variety of habitats.
* The yolk provides it with food, and the albumen supplies water and nutrients.
* Wastes are released to the allantois, an extension of the embryonic gut.
* Oxygen diffuses easily through the thin outer shell of the egg; its passage to the embryo is regulated by the chorion.

**PRECOCIAL DEVELOPMENT**

* Young ones are relatively mature and are able to move around after they are born or hatch.
* Their eyes are open, and have good eyesight
* They can go out to search food for themselves.
* Have strong skeleton, and their body is either covered by feathers (birds) or hair(mammals).
* Birds need their parents to keep them warm, but this lasts for a short period.
* Mammals can regulate their body temperature.
* Examples : birds, cattle, sheep, antelopes, buffalo, elephants, hippos and giraffe.

**ALTRICIAL DEVELOPMENT**

* Young ones are unable to move after birth and are helpless.
* They do not have feathers (birds) and blind.
* They need to be fed and kept warm.

**PARENTAL CARE**

* Refers to looking after young ones through feeding, keeping them warm, protecting them from the predators.
* Such animals give rise to few offspring.