



**Diversity of Reproductive Strategies**

# SUMMARY OF PRESENTATION

External and Internal Fertilization

Embryonic Development

Amniotic Egg

Precocial and Altricial Development

Parental Care

Terminology

# FERTILIZATION

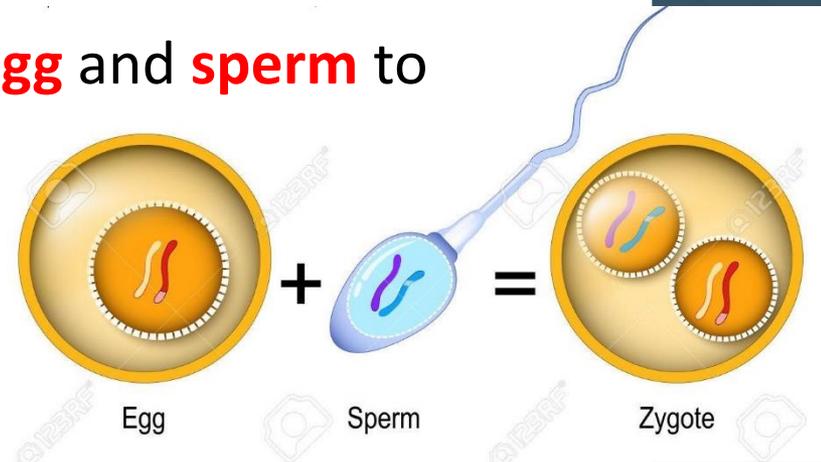
- ❑ **Reproduction** is the process by which an organism **produces others** of its same kind.
- ❑ Purpose: To ensure **species continuity**.

- ❑ **Fertilization** is the **fusion** of the **egg** and **sperm** to **form** a **diploid zygote**.

- ❑ There are 2 types of fertilization.

**External** fertilization

**Internal** fertilization



We shall look at each of these types of fertilization.

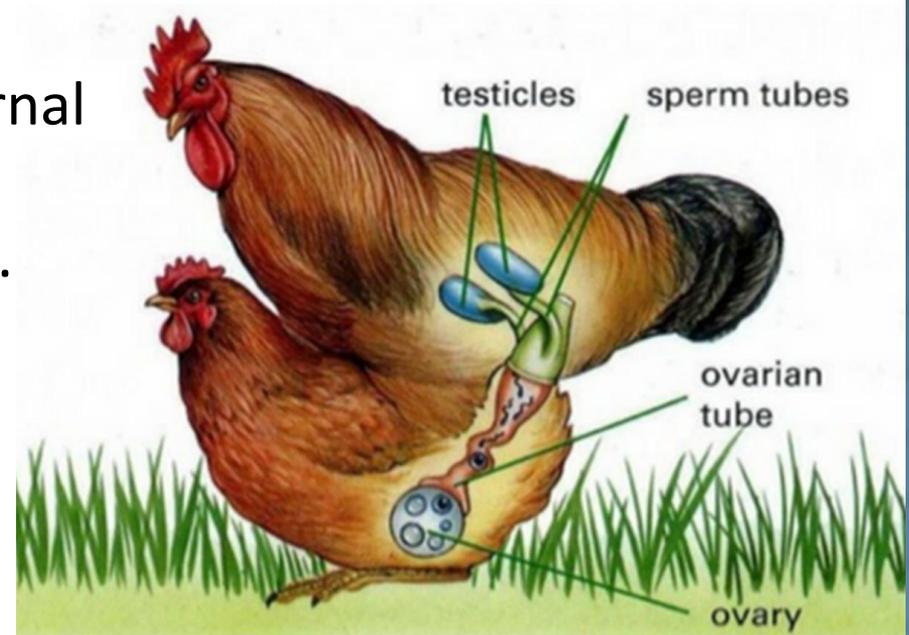
# EXTERNAL FERTILIZATION

- External fertilization occurs **outside** the **female body**.
- The female **lays the eggs into water** and then the **male sperm fertilizes** them.
- Water is needed for external fertilization so the **sperms can swim** towards the egg and to keep **eggs moist**, thus **preventing them from drying out**.
- Examples: **Fish** and **frogs**



# INTERNAL FERTILIZATION

- ⦿ The **egg** is fertilized by **sperm inside** the **female's body**.
- ⦿ **Fusion of the gametes** occur in the **female reproductive organs** and the **zygote** is **formed** inside the **female body**.
- ⦿ **No water** is **required** for internal fertilization. This makes it an **adaptation for terrestrial life**.
- ⦿ **Examples:** Mammals, birds, reptiles, insects, spiders



# EMBRYO DEVELOPMENT : OVIPARY

- ⦿ Eggs are **laid** and **development** of these eggs occur **outside** the **mother's body**. The young will obtain **nutrients** from the **yolk** of the **egg** .
- ⦿ The young **will hatch** into a young animal.
- ⦿ Some examples are **frogs, insects, reptiles** and **birds**.

## Disadvantages of Ovipary:

- ⦿ Eggs may be **eaten by predators**. This can be avoided if the **eggs are protected** by the parents.



# EMBRYO DEVELOPMENT: OVOVIVIPARY

- Fertilized **eggs develop within** the mother's **body**.
- The **young** get their **nutrition from** the **egg** and not from the mother.
- When they ready to hatch, they **hatch within** the **mother's body** and then young are **born alive**.

## Advantages of Ovovivipary:

- The **young** are **well developed** when born therefore their **chances of survival increases** because they will be able to **evade their predators**.
- **Examples:** Some fish, retiles and invertebrates.

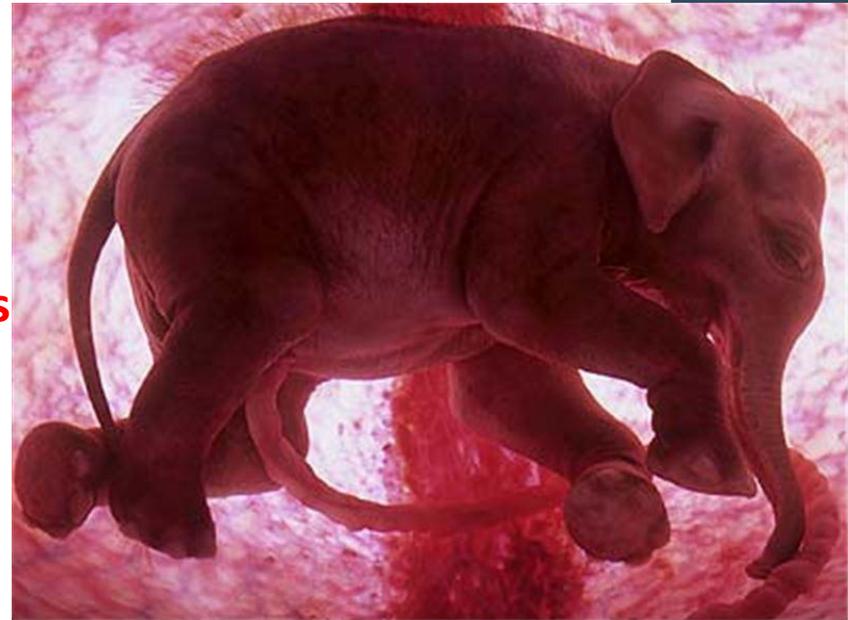


# EMBRYO DEVELOPMENT: VIVIPARY

- ◉ The young **develops inside** the **mother's uterus** after internal fertilization.
- ◉ During development the young **receive nutrients** from the mother's blood via the **placenta**.
- ◉ The young are **born alive**.

## Advantage of Vivipary Development.

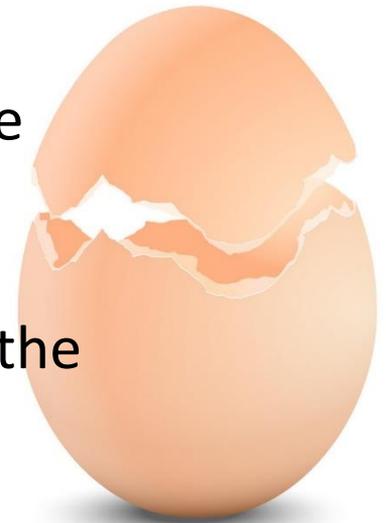
- ◉ Development occurs **within the mother's** body ensuring **protection** of the developing young.
- ◉ The young are **born well developed** and are therefore **less prone to being attacked**.
- ◉ **Parental care** increases the chances of survival of the young.



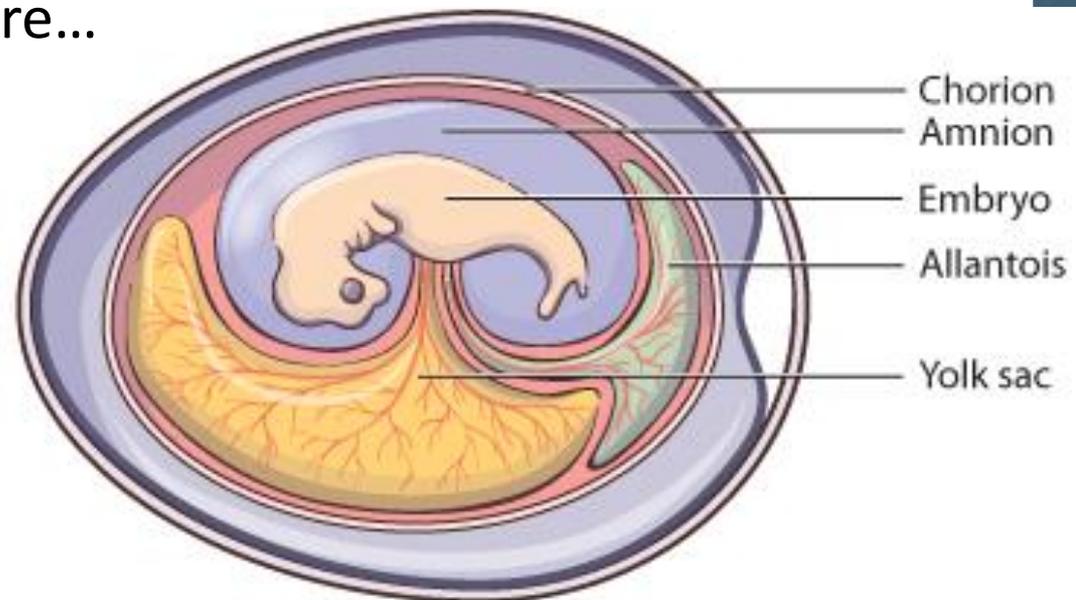
- ◉ **Examples:** Mammals

# AMNIOTIC EGG

- ⦿ Amniotic eggs are covered by a **shell**, which can be calcareous or leathery.
- ⦿ An amniotic egg has **4 membranes** that surround the embryo.
- ⦿ These membranes are called **extra-embryonic membranes**. They are...

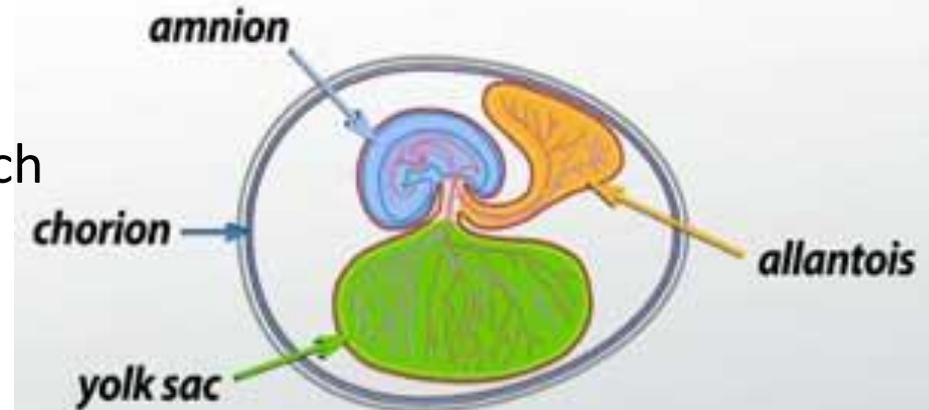


1. Amnion
2. Chorion
3. Allantois
4. The yolk sac



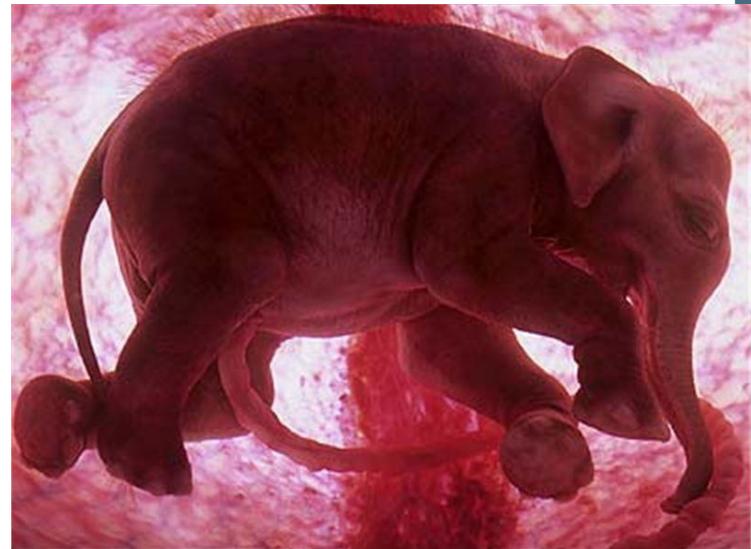
# AMNIOTIC EGG

1. **Amnion:** The **outer most membrane** that forms a cavity called the amniotic cavity. **Amniotic fluid** found in the **amniotic cavity** provides **cushioning against mechanical shock**.
2. **Chorion:** This membrane plays an important role in **gaseous exchange**. Both oxygen and carbon dioxide enter and leave through the shell.
3. **Allantois:** Plays a role in **gaseous exchange** and **stores wastes** made by the **embryo**.
4. **Yolk sac:** Contains the yolk, which is a **source of food** for the **embryo**.



# ADVANTAGE OF THE EGG SHELL

- The **egg shells** are important because they **reduce dehydration**.
- This **enables** these animals to live in a wide range of **terrestrial habitats**, when compared to amphibians.
- Mammal's **eggs do not have egg shells** as the embryo's develop within the mother's body.
- Therefore **dehydration is avoided**.



# METHODS OF DEVELOPMENT

Young birds undergo 2 different methods of development.

1. **Precocial** development
2. **Altricial** development

The type of development that bird occurs in species depends on...

1. The **availability of food**
2. **Predators** in the environment

Now lets look at each type of development.



**Precocial**



**Altricial**

# PRECOCIAL DEVELOPMENT

- Young are **highly developed** and able to move about and feed themselves, “**miniature adults**”
- The **eggs** contain a **greater amount of yolk (food)** which allows for **more time** and **energy** to ensure **greater development** within the egg.
- The **hatchlings** that hatch from these eggs are **well developed**.



# PRECOCIAL DEVELOPMENT

They show the following characteristics...

1. When they hatch their **eyes are open**.
2. Their bodies are covered with **soft feathers** called down.
3. They are able to **move soon after they hatch**.
4. They are able to **feed themselves**.
5. They are **independent** of their parents.
6. They are able to **leave the nest soon** after hatching.
7. They are also able to **avoid their predators** to a certain extent.



# ALTRICIAL DEVELOPMENT

- ⦿ Young can be **immature** and need a lot of **parental care** to survive
- ⦿ The **eggs** contain a **less amount of yolk (food)** which means **less time** and **energy** leading to **less development** within the egg.
- ⦿ The **hatchlings** that hatch from these eggs are **poorly developed**.



# ALTRICIAL DEVELOPMENT

These birds show the following characteristics...

1. Their **eyes are closed** when they hatch.
2. Their bodies do **not have down feathers**.
3. They are **not able to move** soon after they hatch.
4. They are **not able to feed themselves** when they are newly hatched.
5. Therefore they will have to spend more time in their nests until they are able to fly, walk or swim.
6. They **depend on their parents**. The **parents have to protect** and hide their nests, to prevent their entire brood from **being eaten by predators**.



# PARENTAL CARE

Parental care refers to the ways in which parents **increase the chances of survival of their offspring.**

Here are some examples of parental care

1. **Building** of Nests and Burrows
2. **Caring** for the **eggs**
3. **Providing food** for unborn or unhatched young
4. Providing food after hatching or birth
5. **Protecting** the young from predators
6. **Providing social assistance** to mature offspring



# PARENTAL CARE

## 1. Building of Nests and Burrows

Most invertebrates and vertebrates build nests and burrows for breeding.

For example **male weaver birds build nests** and the female examines the nest if it is not up to her standards then she breaks the nest and he starts over and this continues until the nest is safe and strong for the eggs.



## 2. Caring for the eggs

Some reptiles like lizards and snakes guard their eggs after they hatch. Some snakes and birds incubate their eggs.



# PARENTAL CARE

## 3. Providing food for unborn or unhatched young

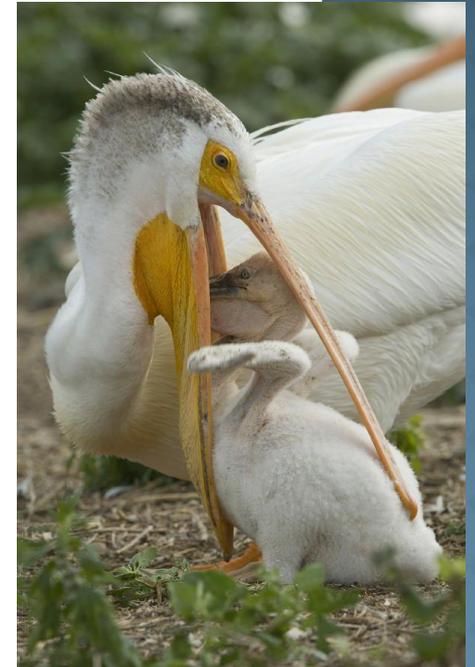
Dung beetles collect food and roll them into small balls so when eggs hatch they have food.



## 4. Providing food after hatching or birth

In some birds the young are fed on similar food as the adult.

In other insects and birds the young are fed with partially digested food that is regurgitated by the parents.



# PARENTAL CARE

## 5. Protecting the young from predators

Some invertebrate larva the young take shelter in some part of the parents body or beneath one parent. This protects the young from predators or parasites.

The young of geese and swans stay with their parents for at least 6 months for protection



## 6. Providing social assistance to mature offspring

Many offspring stay close to the mother. The young learn from their mother's on how to interact with the other members of the group.



# TERMINOLOGY

**Fertilization:** process during which the sperm fuses with the egg to produce a diploid zygote.

**External fertilization:** process during which the sperm fuses with the egg outside the female's body.

**Internal fertilization:** process during the sperm fuses with the egg inside the female's reproductive organs.

**Ovipary:** a method of reproduction in which eggs are laid and development of these eggs occur outside the mother's body.

**Vivipary:** the type of reproduction in which the young develops inside the mother's uterus after internal fertilization.

**Ovovivipary:** refers to a type of reproduction in which eggs develop within the mother's body and hatch inside the mothers body before being born.

# TERMINOLOGY

**Precocial development:** refers to birds that are hatched with eyes open, covered with down, and leave the nest within two days.

**Altricial Development:** refers to birds that are hatched with eyes closed, with little or no down, incapable of departing from the nest, and fed by the parents.

**Parental care:** It refers to the ways in which parents increase the chances of survival of their offspring.