

Reproduction In Animals

9



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On this earth on living beings lives for ever. For survival of life on the earth, each living being have to behind one of its own kind. Otherwise the kind or race would die out. The process by which the living things produce young ones of their own kind is called reproduction. Every living beings has the ability to reproduce. These processes are essential for the survival of every living organisms. If one of them were to stop working, the organism would die.

You have already learnt in your previous class about reproduction in plants. In this chapter, we shall learn how reproduction takes place in animals.

REPRODUCTION

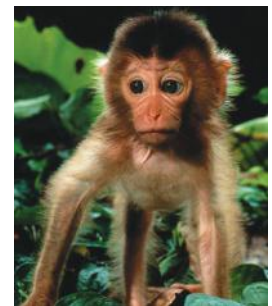
Reproduction means 'to reproduce..... to produce' more of the same kind, to perpetuate to species. The phenomenon of producing new individuals by existing ones to increase the community is called reproduction. Without reproduction a species would ultimately die out.

Reproduction is one biological process by which existing organisms create new individual organisms. Every existing plant, animals or other living organism is the result or reproduction.

Reproduction is one of the most important characteristics of life.

Methods of Reproduction :

"Do all living things reproduce in the same manner ?" "No, but all living things reproduce in one way to the others. So, there are several methods of reproduction in nature.



- Some animals give birth to their young ones.
- Some animals produce eggs. These eggs later are hatched to produce the young ones.
- In Hydra, the offspring grows out of the parent's body.
- An Amoeba simple splits into two.



Eggs

Modes of Reproduction

Human beings give birth to their youngones. By the time these young ones grow and mature, their parents become old and finally die. This cycle goes on. In the same manner animals also reproduce and give birth to their young ones, ensuring that their species continue to exist on the earth. You must have seen the young ones of various animals beings born. Can you tell how chicks and caterpillars are born? How are kittens and puppies born ? Do you think that these young ones looked the same before they were born as they do now ? Let us find out.



New born baby hen



Cat with its kittens



New born baby bird

Just as in plants, there are two modes by which animals reproduce. These are :

- (A) Sexual reproduction
and
(B) Asexual reproduction

	Animals	Youngones
1.	Human	Baby
2.	Cat	Kitten
3.	Dog	Puppy
4.	Butterfly	Caterpillar
5.	Hen	Chick
6.	Cow	Calf
7.	Frog	Tadpole

(A) Sexual Reproduction

Most animals and plants reproduce by sexual reproduction. For sexual reproduction to occur, two parents, one male and the other female are required. Each parent organisms that are involved in this type of reproduction produce a special type of cell called a gamete. The gametes derived from both parents fuse. The process of fusion of two types of gametes is termed as fertilisation. A single cell is formed as a result of fertilisation. This cell is known as a zygote. The zygote has the features of both the parents. It is the zygote which develops into a new individual. This type of reproduction beginning from the fusion of male and female gametes is called Sexual Reproduction.

Sexual Reproduction in Animals

In animals also, males and females have different reproductive parts or organs. Like plants the reproductive parts in animals also produce gametes that fuse to form a zygote. The male parent produces the sperm and the female parent produces the egg of ovum. When the sperm and



frog



Fish

ovum fuse together they form a third cell known as the zygote. This process of fusion of the sperm and ovum is called fertilisation. The zygote is the first cell of the new organism. It changes over a period of time to form the new organism.



Leech



Bird

In animals such as fish, birds, reptiles, frogs and humans an individual carries only one kind of gamete : either sperm (in the male) or then ovum (in the female). However, in some organisms both male and female gametes are present in the same individual. Such organisms are called hermaphrodite. Earthworms and leeches are hermaphrodites. This means that each earthworm or leech is both male and female.



Bitch with puppy

Viviparous and Oviparous Animals

We have learnt that some animals give birth to young ones while some animals lay eggs which later develop into young ones. The animals which give birth to young ones, called viviparous animals cat, dog, cow, man, elephants, monkey, etc., give birth to young ones.

Those animals which lay eggs are called oviparous animals. Insects, frogs snakes, turtles, birds, etc., lay eggs.



Hen with egg



Turtle with eggs



Snake with eggs



Elephant with kid



Cow with calf

The following activities will help you understand better and differentiate between viviparous and oviparous animals.

Reproduction in Oviparous Animals

All egg laying animals are called oviparous animals. Insects, frogs, snakes, turtles, birds, worms, fish, are oviparous animals.

We have already learnt about the life cycle in some of the animals. We may recapitulate the life cycle of the butterfly.

Some other insects like the housefly and silkworm, butterfly have four stages in their life cycle. In butterfly male and female are separate. The female lays the eggs. Before laying, these eggs are fertilised within the body of the mother (female) with the sperms from father (male), and the eggs laid are actually zygotes.

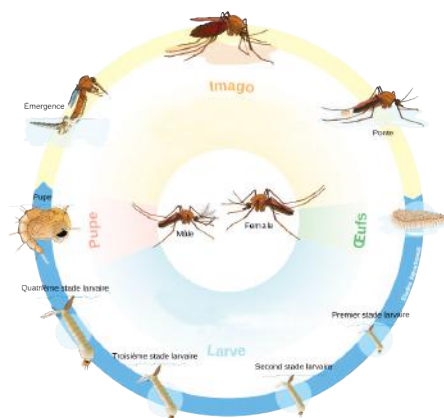


Fertilisation in Insects is Internal

The fertilised eggs give rise to larvae (also called caterpillar), pupa and then adult. Eggs → Larva → Pupa → Adult

Reproduction and life cycle in a butterfly and mosquito is the same. Study the stages in the life cycle of a mosquito in the picture given below :

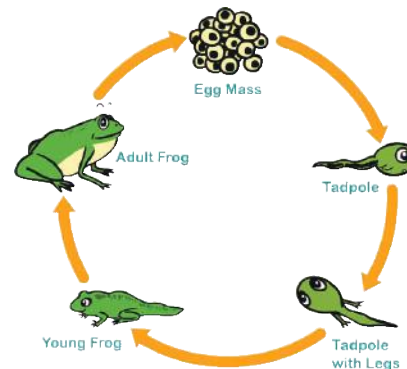
In mosquito, when the eggs hatch, a worm like larva comes out of each egg. In about two weeks, it changes into an encased form called pupa which has the shape of a comma (,). The pupa changes into a mosquito inside the case and in about a week the mosquito wriggles out of the case.



Development in mosquito

Reproduction in Toads and Frogs

Toads and frogs are commonly found near a pond during early rains. In the rainy seasons or the beginning of winter male frogs climb on the back of a big and fat female. The female is fat with her belly full of eggs. Both, male and female frogs swim around in a pond for sometimes and then they come near the shore where the female starts laying eggs (ova). As the big mass of eggs emerge from the body of the female, the male sheds sperm over them. Sperms swim to the eggs. One sperm fuses with one egg (ovum). Fusion of a sperm with an egg is called fertilisation. Product of fertilisation is called zygote.



Life cycle of frog

Fertilisation in frog takes place in water. The fertilised eggs from frog are enclosed in thick jelly. The whole mass of zygote in a jelly is called spawn. Observe the different stages of frog starting from the egg to the adult stage. We find that these are three distinct stages. These stages are : eggs (zygote) → larva (tadpole) → adult

The tadpole stage in frog is an intermediate stage from aquatic to land habitat. Tadpole has gills for breathing under water and finned tail to swim in water. Adult frog has lungs for breathing under water and finned tail to swim in water. Adult frog has lungs for breathing in air.

Young Ones to Adults : Metamorphosis

From the life cycles of a silk worm moth, butterfly, mosquito and frog, we learn that the young ones coming out of the egg (zygote). Can you imagine that these tadpoles would some day become frogs ? Similarly, the caterpillar or the pupa of silkworm looks very different from the adult moth. The features that are present in the adult are not found in these young ones. Then what happens to the tadpoles or caterpillars there after.

You must have seen beautifully moth emerging out of the cocoon. In the case of tadpoles, they transform into adults capable of jumping and swimming. The through drastic changes is called metamorphosis.

Reproduction in Birds

Birds reproduce by laying eggs. They lay eggs in the nests and sit on them to keep them warm. So the young bird may develop and grow inside the eggs. After some days the eggs hatch and baby birds come out.

Development of Fertilised Eggs in Hen

Hen is an oviparous animal. It lays eggs. The eggs are fertilised internally before laying. In case cocks (male hen) are not around the eggs laid by a hen are not fertilised.

In birds all the developmental stages are completed within the egg and the young ones coming out of an egg has all the body parts, though immature.



New born baby bird



Development of hen

Sexual Reproduction in Flowering Plants

In flowering plants, the flower is the reproductive organ. Flowers of most plants are hermaphrodites. They have stamen and pistil. Stamen flower are the male sex organs and pistil or pollens in a flower is the female reproductive organ. Each stamen bears fine dirty pollens or microspores in their anthers, pollens are transferred to stigma of the carpel by the process of pollination. Carpel bears one or many ovules. Each ovule bears an egg cell or the female gamete. Pollen on reaching the stigma germinates producing a pollen tube and two male gametes. The pollen tube grows towards the ovule to enter it. One of the two male gametes from the pollen tube enters the ovule to unite with the female gamete, the egg cell. The union of the male gamete with the egg cell (female gamete) is called fertilisation.



Rose



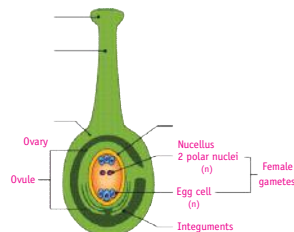
Marigold



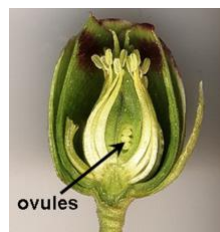
Pea fruit



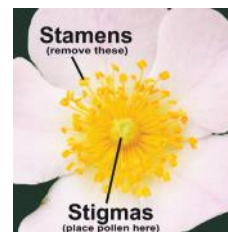
A stamen



Carpel



Ovule



Ovule forming seed

The product of fusion of male and female gamete (fertilisation) is called oospore or zygote. The zygote develops into an embryo (the baby plant) which remains within the seed. On germination the baby plant from the seed grows out to form, and adult plant.

Thus, ensuring that their species continue to exist on the earth. In the other words, the induction of new members by reproduction ensures that continuity of species is maintained.

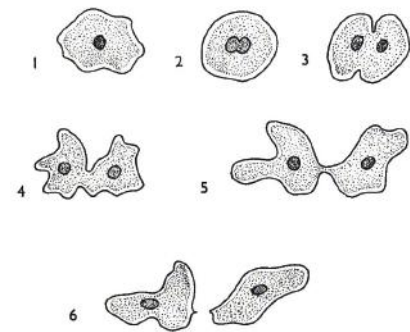
In the process of sexual reproduction sex cells (gametes) are formed, which generally come from two parents, one male and the other female. Male and female gametes unite on fertilisation forming zygote. Zygote develops into an embryo growing into a baby.

(B) Asexual Reproduction

We have learnt about reproduction in some familiar animals. But what about very small animals like hydra and amoeba. Do you know how they reproduce ? Let us find out.

In each hydra, there may be one or more bulges. These bulges are the developing new individuals and they are called buds. In hydra too the new individuals develop as out growths from a single parent. This type of reproduction in which only a single parent is involved is called asexual reproduction. Since new individuals develop from the buds in hydra, this type of asexual reproduction is called budding.

We have already learnt about the structure of amoeba. We will recall that amoeba is a single celled organism. It begins the process of reproduction by the division of its nucleus into two nuclei. This is followed by division of its body into two parts, each part receiving a nucleus. Finally two amoebae are produced from one parent amoeba. This type of asexual reproduction in which an animal reproduction by dividing in two individuals is called binary fission.



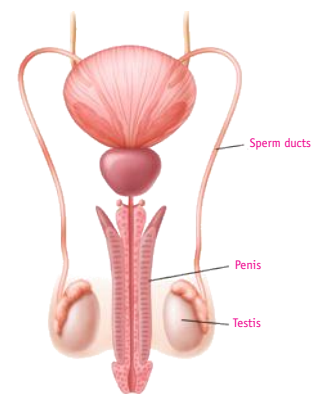
Binary fission in Amoeba

Reproduction In Humans

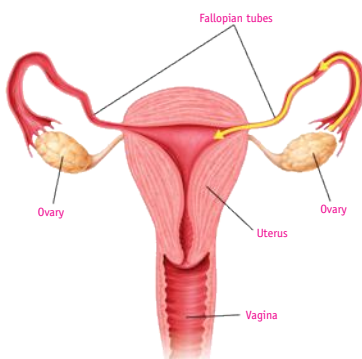
Human reproduction involves two sexes : Male and Female. Each sex has a different reproduction system. Let us find out the production parts in human and study the process of reproduction in them.

Male Reproductive Organs

The male reproductive organs include a pair of testis (singular testis), two sperm ducts and a penis. They are located outside the abdominal cavity in a sac called the scrotal sac. The testis produce the male gametes called sperms in huge numbers. Though sperms are very small in size, each has a head, a middle piece and a tail. Indeed, each sperm is a single cell with all the usual cell components.



Male reproductive organs in humans

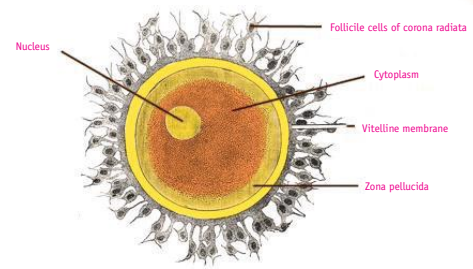


Female reproductive organs in human

Female Reproduction Organs

The female reproduction organs are a pair of ovaries, oviducts (fallopian tubes) and the uterus. Ovaries are oval shaped structures situated

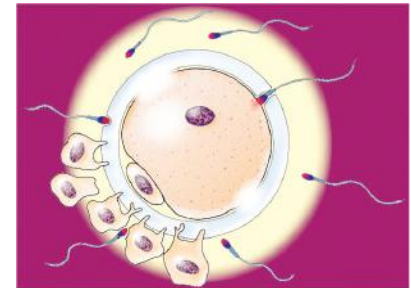
between the kidneys. They produce female gametes called ovum (eggs). Every month one ovary releases an egg into the oviduct. The hormones secreted by ovaries are oestrogen and progesterone. Uterus is the part where development of the baby takes place. Like the sperm, an egg is also a single cell.



Human ovum

FERTILISATION

The responsibility of the female for successful reproduction is considerably greater than that of the male. Females have to manufacture eggs and receive sperm, create an environment suitable for fertilisation and implantation. She has to nourish the developing baby not only before birth but for months afterwards. Formation of zygote takes place as a result of fertilisation. The first step in the process of reproduction is the fusion of a sperm and ovum. When



Fertilisation



Zygote

sperms are come in contact with an egg. One of the sperms may fuse with the egg. Such fusion of the egg and the sperm is called fertilisation. During the fertilisation, the nuclei of the sperm and the egg fuse to form a single nucleus. This results in the formation of a fertilised egg or zygote. The fertilised egg or zygote then travels down the oviduct and gets attached to the wall of the uterus. The uterus is a muscular organ. The zygote divides over and over again, forming more and more cells. This mass of cells is called an embryo. The embryo remains in the uterus where it grows and develops into a baby.

If the ovum is not fertilised by a sperm, it is expelled from the uterus along with some uterine muscles and blood. This is known as menstruation.

Do you think fertilisation takes place in the same manner in all organisms? Look at your brother or sister. See if you can recognise some characters in them similar to those of your mother or your father. Fertilisation does not happen in the same manner in all organisms. It is of two types.

(1) Internal Fertilisation

When fertilisation occurs inside the body of a female organism, it is called internal fertilisation. In other words, internal fertilisation takes place when the fusion of male and female gametes takes place inside the body of the female organism, e.g., birds, snakes, lizards, humans, cows, dogs and hens. In human beings the zygote grows and develops into a baby inside the mother's body. After the baby is fully developed within the mother's body, she gives birth to the baby.

Like human beings, other animals also give birth to their young ones, but the process is somewhat different in most of them.

Egg laying animals such as birds sit on the fertilised eggs for a long time to provide warmth to the eggs. The zygote within each egg grows and develops into a young bird during this period of warmth. So the young bird may develop and grow inside the eggs. After some days the eggs hatch and baby birds come out. The number of eggs produced at a time is different for different mammals.

(2) External Fertilisation

Fertilisation that occurs outside the body of the female organism is called external fertilisation. In the other words, fusion of gametes takes place outside the body. A good example of this would be frogs and fish.



Eggs of frog

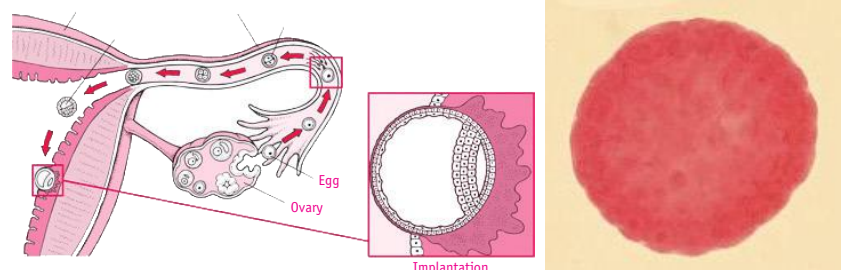
During spring or rainy seasons, frogs move to ponds and slow flowing streams. When the male and female come together in water, the female lays hundreds of eggs. A layer of jelly holds the eggs together and provides protection to the eggs. As the eggs are laid, the male deposits sperm over them. Each sperm swims randomly in water with the help of its long tail. The sperms come in contact with the eggs. This results in fertilisation.

Why do fish and frogs lay eggs in hundreds whereas a hen lays only one egg at a time ?

Fish and frogs lay eggs in hundreds and release millions of sperms, all the eggs do not get fertilised and develop into new individuals. This is because the eggs and sperms get exposed to water movement, wind and rainfall. Also, there are other animals in the pond which may feed on eggs. Thus, production of large number of eggs and sperms is necessary to ensure fertilisation of at least a few of them.

Development of Embryo

Formation of zygote takes place as result of fertilisation. In humans, fertilisation takes place in the fallopian tube. The zygote divides a number of times and forms a hollow ball made of hundreds of cells. The cells then begin to form groups that develop into different tissues and organs of the body. This developing structure is termed as embryo. The embryo moves down to the uterus, which has soft and thick lining.



Zygote formation and development of (embryo from the zygote)

Ball of cells (enlarged)

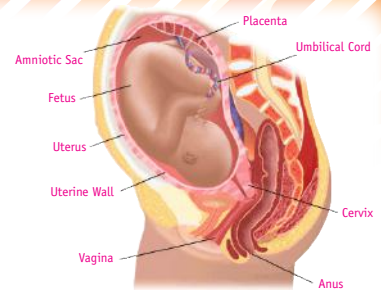
The embryo continues to develop in the uterus. It gradually develops body parts such as hands, legs, head, eyes, ears, etc. At this stage, the embryo is known as a foetus when the development

of the foetus is complete, the mother gives birth to the baby. The period from fertilisation upto the birth of the baby is called gestation or pregnancy.

Internal fertilisation takes place in hens also. But do hens give birth to babies like human beings and cows ? No, they do not. Then how are chicks born ? Let us find out.

After the hard shell is formed around the developing embryo the hen finally lays the egg. The embryo takes about 3 weeks to develop into a chick. You must see the hen sitting on the eggs to provide sufficient warmth. The development of the chick takes place inside the egg shell during this period. After the chick is completely developed it bursts open the egg shell.

In animals which undergo external fertilisation, development of the embryo takes place outside the female body. They continue to grow within their egg covering. After the embryos develop, the eggs hatch. You must have seen numerous tadpoles swimming in ponds and streams.



foetus in the uterus



New born baby hen

Story of Dolly, The Clone

Cloning of an exact copy of a cell, any other living part, or a complete organism. Cloning of animals was successfully performed for the first time by Ian Wilmut and his colleagues at the Roslin Institute in Edinburgh, Scotland. They successfully cloned a sheep named Dolly. Dolly was born on 5th July, 1996 and was the first mammal to be cloned.



Finn Dorsett sheep



Scottish black face ewe



Dolly

In the process of cloning Dolly, a cell was collected from the mammary gland of a female Finn Dorsett sheep. Simultaneously, an egg was obtained from a Scottish black face ewe. The nucleus was removed from the egg. Then, the nucleus of the mammary gland cell from the Finn Dorsett sheep was inserted into the egg of the Scottish black face ewe whose nucleus had been removed. The egg thus produced was implanted into the Scottish black face ewe. Development of this egg followed normally and finally Dolly was born. It was found to be absolutely identical to the Finn Dorsett sheep from which the nucleus was taken. Since the nucleus from the egg of the Scottish black face ewe was removed, Dolly did not show any character of the Scottish black face ewe. Dolly was a healthy clone of the Finn Dorsett sheep and produced several off-spring of her own through normal sexual means. Unfortunately Dolly died on 14th February 2003 due to a certain lung disease. Dolly lived a normal life and produced babies of her own through normal sexual means.



Know the Keywords :

Asexual Reproduction : Not involving the fusion of gametes.

Budding : Being to grow or develop.

Egg : The female gamete or the ovum.

Embryo : Zygote divides and redivides to form an embryo.

Fertilisation : Cause (an egg, female animals or plant) to develop or gestate by mating.

Foetus : Development of a baby from an egg while within the body of the mother.

Metamorphosis : An embryo developing through different stages from egg to adult.

Oviparous animals : Egg laying animals.

Sperms : The male gamete.

Viviparous animals : Give birth to youngones.

Zygote : Cell formed by the union of two gametes.



Point to Remember

- Reproduction is one biological process by which existing organisms create new individual organisms.
- Most animals and plants reproduce by sexual reproduction.
- The zygote is the first cell of the new organism.
- The animals which give birth to youngones called viviparous.
- Those animals which lay eggs are called oviparous animals.

EXERCISE TIME

A. Answer the following questions :

1. What do you understand by reproduction ?
2. Why is reproduction important ?
3. How is sexual reproduction different from asexual reproduction ?
4. Differentiate between internal fertilisation and external fertilisation.
5. Give two differences between a zygote and a foetus.
6. Why is it that hen always produce several chicks whereas human beings usually produce only one child at a time ?
7. What are the two modes of reproduction ?
8. How may parents take part in asexual mode of reproduction ?
9. What is the product of fertilisation called ?
10. What are oviparous animals ?

11. What are viviparous animals ?
12. What is metamorphosis ?

B. Fill in the blanks :

1. The fusion product of sperm and ovum is known as _____.
2. Organisms in which male and female gametes are present in the same organism are called _____.
3. In _____ the offspring grows out of the parents body.
4. The animals which give birth to young ones are called _____.
5. All egg laying animals are called _____ animals.
6. The testis produce the male gametes are called _____.
7. The zygote divides repeatedly to give rise to an _____.
8. The period from fertilisation up to the birth of the baby is called _____.
9. The stage of the embryo in which all the body parts are identifiable is called _____.
10. Fusion of sperm and the egg is called _____.

C. Write 'T' for true and 'F' for false statement :

1. Sexual reproduction completes with a single parent of one sex only.
2. Oviparous animals give birth to youngones.
3. All animls lay eggs.
4. Hen is an oviparous animals.
5. External fertilisation takes place in frog.
6. Egg-laying animals sit on the fertilised eggs to protect them.
7. Sperms are responsible for determining sex.
8. An embryo is made up of a single cell.
9. A zygote is formed as a result of fertilisation.
10. Amoeba reproduces by budding.

D. Tick (✓) the correct option :

1. Internal fertilisation occurs :

(i) in female body

(ii) in male body

(iii) outside female body

(iv) outside male body

2. Which of these is the male reproductive organ in humans ?

(i) ovaries

(ii) testis

(iii) ovum

(iv) sperm

3. Which of the following do not have internal fertilisation ?

(i) hen

(ii) frog

(iii) fish

(iv) none of these

4. In humans, fertilisation occurs in :

(i) ovum

(ii) ovary

(iii) uterus

(iv) oviduct

5. The number of nuclei present in a zygote is :

(i) four

(ii) two

(iii) one

(iv) one

6. A tadpole develops into an adult frog by the process of :

(i) budding

(ii) embedding

(iii) fertilisation

(iv) metamorphosis



Creative Work

- **Find out information about how different animals reproduce and give birth to their youngones in natural environment and nurse them. Prepare a report with interesting picture to make your study more relevant.**
- **Visit a poultry farm. Talk to the manager of the farm and try to find out the answers to the following.**
 - (a) What are layers and broilers in a poultry farm ?
 - (b) Do hens lay on fertilised eggs ?
 - (c) How can you obtain fertilised and unfertilised eggs ?
 - (d) Are the eggs that we get in the stores fertilised or unfertilised ?
 - (e) Can you consume fertilised eggs ?
- **Look for the eggs from a butterfly or other insect on the back of the leaves on plants in your garden, specially before spring. You may also come across crawling larvae coming out of these eggs.**