

**SCIENCE 9**  
**UNIT 4:REPRODUCTION**  
**WORKSHEET 7 : Sexual Reproduction**



**Reproduction** can be categorized as sexual reproduction and asexual reproduction

**Sexual reproduction** – Requires two parents and produces genetically different offspring. This results in genetic diversity within the species

**Sexual Reproduction versus Asexual Reproduction**

Asexual Reproduction	Sexual Reproduction
1 parent cell	2 parent cells
No gametes: cell divides	2 sex cells unite to form a zygote
Little variation in offspring	Greater variation in offspring
Little energy required	Greater energy required
Less parental care	Greater parental care

**Fertilization** The process during which an egg cell is penetrated by a sperm cell and the haploid genetic information of both male and female gametes are combined. It only occurs during sexual reproduction.

There are two ways of classifying fertilization:

**Internal Fertilization:** the meeting of the sperm and egg within the female body. This type of fertilization is common with birds, mammals, and flowering and cone-forming plants.

Ex: Humans, horses

**External Fertilization** is the meeting of sperm and egg outside the female body. This type of fertilization is common with animals that live in water and with plants that live in moist places.

Ex: Salmon, cod

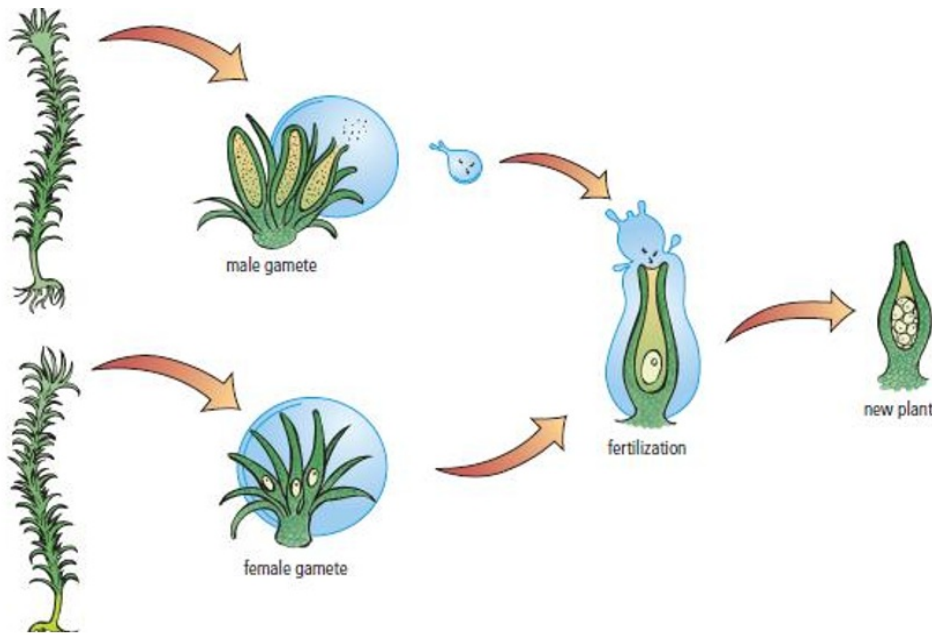
**Internal Reproduction Versus External Reproduction**

Internal Reproduction	External Reproduction
Sperm cells are deposited inside the females body where they meet the egg.	Sperm and Egg cell unite outside of the bodies of the parents
Embryo develops and is nourished inside the mothers body.	If a sperm cell comes in contact with an egg cell of the species, fertilization may occur
Fertilized embryo protected from dangers	Fertilized eggs not protected

Some examples of sexual reproduction:

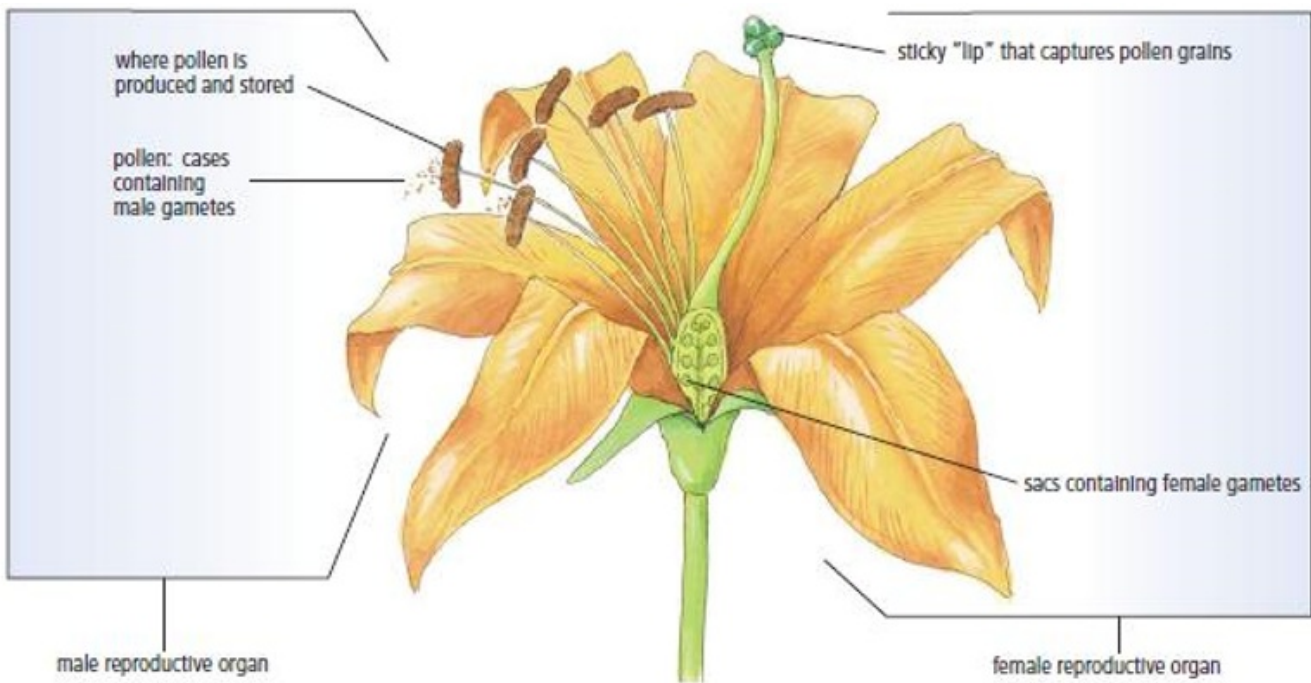
1. Mosses ( External Fertilization)

Water allows the sperm and egg cells to meet



2. Flowering Plants (Internal Reproduction)

Pollination the transfer of male gametes in pollen from the male reproductive part of a plant to the female reproductive part of a plant



How is pollen transported?

- Pollinators such as: Insects (example: bees) Other animals (example: fruit bats)
- Air
- Water

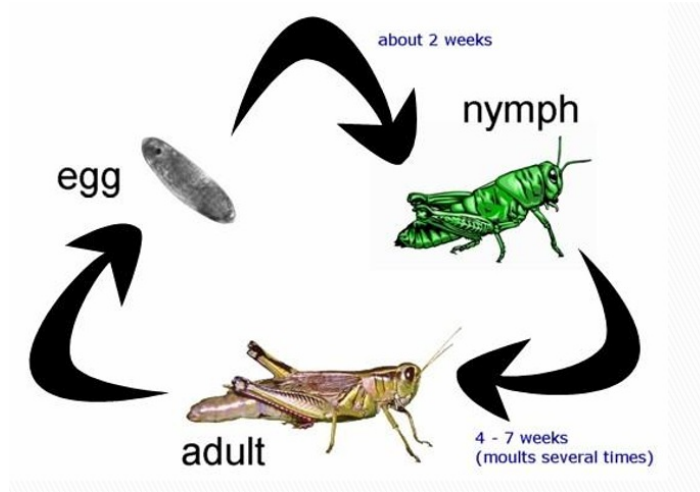
After fertilization seeds are often protected in seeds or cones. Seeds contain the plant embryos!

### 3. Insects (External Fertilization)

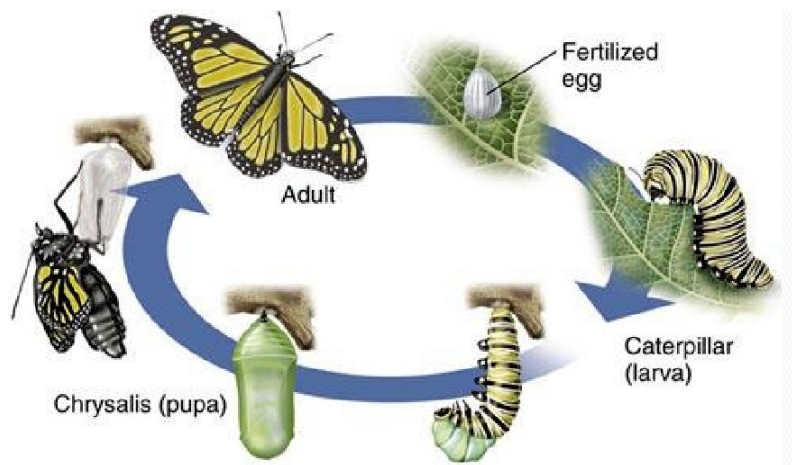
Male usually deposits a package of sperm inside the female. ◦ Insects often change a great deal between hatching and adulthood. This change in form is called

**metamorphosis** refers to the change in an insect as it matures. There are two ways it can be classified:

**Incomplete Metamorphosis:** Subtle changes through three life stages: egg, nymph, and adult. The nymph stage resembles a smaller version of adult.



**Complete Metamorphosis:** Has four life stages: Egg, Larvae, Pupa, Adult



#### Advantages and Disadvantages of Sexual Reproduction

Advantage	Disadvantage
Very little energy required to find a mate	More energy is generally required to find a mate (internal fertilization)
Greater numbers of offspring can repopulate an area after a disaster (external fertilization)	Fewer offspring are produced, so if the number of predators increases a population will decline (internal fertilization)
More protection is given to the embryo and more parental care is given to offspring (internal fertilization)	Gametes, embryos, and offspring are unprotected and are often preyed upon (external fertilization)
Offspring are genetically different from their parents, so they may survive new diseases or other threats that appear in a population	Some beneficial traits may not be passed on from parents to offspring

PART B: Multiple Choice

1. Which of the following requires two parents to produce offspring
  - (A) Asexual Reproduction
  - (B) Binary Fission
  - (C) Fragmentation
  - (D) Sexual Reproduction
  
2. Which of the following will produce offspring with the greatest genetic diversity?
  - (A) Asexual Reproduction
  - (B) Binary Fission
  - (C) Fragmentation
  - (D) Sexual Reproduction
  
3. Which of the following is a characteristic of most organisms living on land but not of most organisms living in water ?
  - (A) external fertilization
  - (B) internal fertilization
  - (C) mobile gametes
  - (D) external development

4. Which of the following is true of how many flowering plants reproduce?

(I)	internal fertilization
(II)	external fertilization
(III)	sperm and egg cell meet inside the female
(IV)	sperm and egg cell meet outside the female

- (A) I and III
  - (B) I and IV
  - (C) II and III
  - (D) II and IV
  
5. Incomplete metamorphosis is different than complete metamorphosis because an insect that goes through incomplete metamorphosis -
  - (A) is always born under water
  - (B) fails to go through the pupa stage
  - (C) will not have wings as an adult
  - (D) does not begin as an egg
  
6. How many distinct life stages are there in incomplete metamorphosis?
  - (A) five
  - (B) four
  - (C) three
  - (D) two
  
7. A new species of insect is discovered. What observation could be made to determine if this new insect undergoes complete or incomplete metamorphosis? You could observe - the insects as they grow to determine if they have a pupal stage
  - (A) the insects as they grow to determine if they have a pupal stage
  - (B) the newly hatched offspring to determine if they look like the adults
  - (C) the adult insects to determine if they have fully developed wings
  - (D) the insects' eating habits to see if they eat both plants and animals

8. All of these represent life stages of an insect with incomplete metamorphosis EXCEPT –
- (A) adult
  - (B) egg
  - (C) pupa
  - (D) nymph
9. Which of the following correctly lists the life stages of an insect with a complete metamorphosis?
- (A) Egg, larva, nymph, adult
  - (B) Egg, nymph, pupa, adult
  - (C) Egg, pupa, cocoon, adult
  - (D) Egg, larva, pupa, adult
10. Which of the following organisms goes through a complete metamorphosis?
- (A) A rosebush
  - (B) A rhinoceros
  - (C) A butterfly
  - (D) An alligator
11. How many distinct stages are there in the complete metamorphosis of an insect?
- (A) three
  - (B) four
  - (C) one
  - (D) two
12. What is metamorphosis?
- (A) Something that happens to all animals
  - (B) A change in shape or form
  - (C) change in the state of matter from solid to liquid
  - (D) A brief power surge
13. Which response identifies a true statement regarding complete and incomplete metamorphosis?
- (A) Incomplete metamorphosis contains two adult stages
  - (B) Incomplete metamorphosis has no larva stage
  - (C) Complete metamorphosis contains no pupa stage
  - (D) Complete metamorphosis contains a nymph stage

PART B: FILL IN THE BLANKS

birds            fish            gametes            internal            mating            external

Use the terms in the vocabulary box to fill in the blanks. Use each term only once. You will not need to use every term.

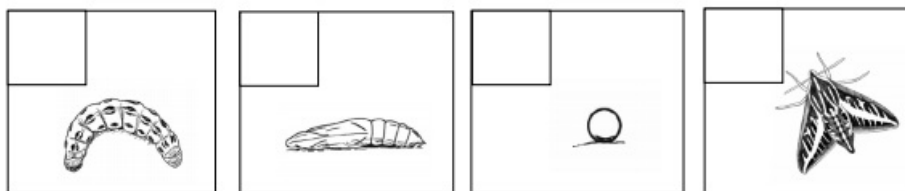
1. \_\_\_\_\_ is how gametes meet in the same place at the same time.
2. When sperm and egg cells join outside of the bodies of the parents, the joining is called \_\_\_\_\_ fertilization. This type of fertilization is common with \_\_\_\_\_.
3. When sperm and egg cells join inside the body of the female parent, the joining is called \_\_\_\_\_ fertilization. This type of fertilization is common with \_\_\_\_\_.

PART C:

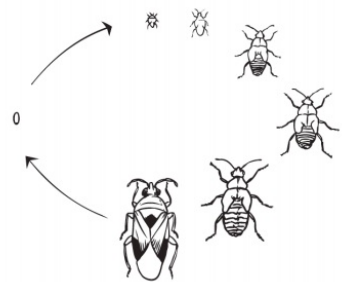
1. Types of sexual reproduction Complete the following table to compare external fertilization with internal fertilization.

	External Fertilization	Internal Fertilization
Definition		
Draw and label two examples of organisms that use each type of fertilization	1.	1.
	2.	2.

2. Write the numbers 1–4 in the small boxes to put the stages of the life cycle in order. Then label the name of the stage of the life cycle below the drawing.



3. Look at the life cycle below. Does this life cycle include complete or incomplete metamorphosis? Explain how you know.



4. List two difference between sexual reproduction and asexual reproduction?

5. List an advantage and disadvantage of sexual reproduction?