Fruits: are the mature ovaries or pistils of flowering plants plus any associated accessory parts.

**Accessory parts:** are organs attached to a fruit but not derived directly from the ovary, including the bracts, axes, receptacle.

**Pericarp:** is the fruit wall, derived from the mature ovary, sometimes pericarp divided into layers:

1. **endocarp**
2. **mesocarp**
3. **exocarp**

**Fruit types:** are based first on fruit developed:

1. **Simple fruit:** derived from a single pistil of one flower.
2. **Aggregate fruit:** derived from multiple pistil of a single flowers, thus having an apocarpous gynoecium.
3. **Multiple fruit:** derived from many coalescent flowers.

**Simple fruits:**

1. **Achene:** is a one-seeded, dry, indehiscent fruit with seed attached to the pericarp at one point only as in sunflower.
2. **Grain (or caryopsis):** is a one-seeded, dry, indehiscent fruit with the seed coat adnate to pericarp wall as in poaceae family.(like wheat).
3. **Nut:** is a one seeded, dry, indehiscent fruit with a hard pericarp.
4. **Samara:** is a winged, dry, usually indehiscent fruit as in *Acer.*
5- **Urticle**: is a small, bladdery or inflated, one-seeded, dry fruit, utricles are essentially achenes in which the pericarp is significantly larger than the mature seed as in *Atriplex* (salt bush).

6- **Capsules**: are generally dry, dehiscent fruits derived from compound ovaries, several types of capsule can be recognized based on the type or location of dehiscence:-

   **A/** Loculicidal capsules: have longitudinal lines of dehiscence radially aligned with the locules or between the placenta if septa are absent it splits into valves.

   **B/** Septicidal capsules: have longitudinal lines of dehiscence radially aligned with the ovary septa (or with placenta if septa are absent). Its splits into valves.

   **Valves**: apportion of the pericarp wall that splits off, but does not enclose the seed, valves may remain attached to the fruit or may fall off.

   **C/** Circumscissile capsules: (also called a pyxis) has a transvers (as opposed to longitudinal) line of dehiscence, typically forming a terminal lid as in *Plantago*.

   **D/** Septifragal or valvular capsules: is one in which the valves break off from the septa, as in *Ipomoea* (morning glory).

   **E/** Poricidal capsules: have dehiscence occurring by means of pores as in *Papaver*.

7- **Follicle**: is a dry, dehiscent fruit derived from one carpel that splits along one suture, such as in unit fruit of *Magnolia*.

8- **Legume**: is a dry, dehiscent fruit derived from one carpel that splits along two longitudinal sutures as in fabaceae.

11- **Silicles and siliques**: are dry, dehiscent fruits derived from a two carpeled ovary that dehisces along two sutures but that has an outer rim.
12- **Scizocarp**: is a dry, dehiscent fruit type derived from a two or more loculed compound ovary in which the locules separate at maturity.

13- **Berry**: is the unspecialized term for a fruit with asucculent pericarp as in *Vitis* (grape).

14- **Drupe**: is a fruit with a hard, stony endocarp and a fleshy mesocarp, as in *Prunus*.

15- **Hesperidium**: is a septate fleshy fruit with a thick – skinned, leathery outer pericarp wall and fleshy modified trichomes (juice sacs)arising from the inner walls, as in *Citrus* (orange, lemon, etc.).

16- **Pepo**: is a non –septate fleshy fruit with parietal placentation and leathery exocarp derived from an inferior ovary, as in cucurbitaceae.
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- **Berry:** A simple, fleshy fruit in which the fruit wall is soft throughout.
  - *Tomato* (*Lycopersicon esculentum*)
  - *Peach* (*Prunus persica*)
  - *Fruit-coat*—A simple, dry fruit that splits open along one suture to release its seeds.
  - *Milltorus* (*Anacardium occidentale*)
  - *Legume*—A simple, dry fruit that splits open along two sutures to release its seeds.
  - *Green bean* (*Phaseolus vulgaris*)

- **Fused fruit wall and seed coat**—A fruit in which the fruit wall is fused to the seed coat.
  - *Wheat* (*Triticum sp.*)
  - *Achene*—A simple, dry fruit in which the fruit wall is separate from the seed coat.
  - *Sunflower* (*Helianthus annuus*)
  - *Nut*—A simple, dry fruit that has a stony wall, is usually large, and does not split open at maturity.
  - *Oak* (*Quercus sp.*)
  - *Aggregate fruit*—A fruit that develops from a single flower with several to many pistils (i.e., carpels are not fused into a single pistil).
  - *Blackberry* (*Rubus sp.*)
  - *Multiple fruit*—A fruit that develops from the ovaries of a group of flowers.
  - *Mulberry* (*Morus sp.*)
  - *Accessory fruit*—A fruit composed primarily of tissue (such as the receptacle) other than ovary tissue.
  - *Apple* (*Malus sylvestris*)
***Aggregate fruits:*** is one derived from two or more pistils (ovaries) of one flower:-

**A/ Achenecetum:** is an aggregate fruit of achenes. A common example is *Fragaria* (strawberry), in which the achenes are on the surface of accessory tissue, an enlarged, fleshy receptacle.

**B/ Drupecetum:** is an aggregate fruit is an aggregate fruit of follicles as in *Magnolia*.

**C/ Syncarp:** is an aggregate fruit, typically of berries, in which the fruits fuse together, as in *Annona* (note that syncarps may form at the floral stage or later during fruit development, if the latter, the fruit is sometimes called a *pseudosyncarp*).

*****Multiple fruits:*** is one derived from two or more flowers that coalesce. Types of multiple fruits:-

**1- Sorosis:** is a multiple fruit in which the unit fruits are fleshy berries and are laterally fused along a central axis as in *Ananas* (pineapple).

**2- Syconium:** is a multiple fruit in which the unit fruits are small achenes covering the surface of a fleshy, inverted composed receptacle (derived from a hypanthodium) as in *Ficus*. 
Aspects of seed morphology can be important systematic characters used in plant classification and identification. Parts of seed is:

1- **Seed coat**: the outer protective covering of seed derived from the integument. Seed coat consist of two fused layers: **a/ testa** and **b/ tegmen**

***sarcotesta**: a seed coat that is fleshy at maturity.

2- **Hilum**: the scar of attachment of the funiculus on the seed coat.

3- **Raphe**: a ridge on the seed coat formed from an adnate funiculus.

**Embryo**: is the immature sporophyte, it consist of:

**A/ Epicotyl**: the immature shoot.

**B/ Radical**: the immature root.
C/ Hypocotyl: the transition region between the root and epicotyl.

D/ Cotyledon: the first leaf/leaves of the embryo, often functioning in storage of food reserves.