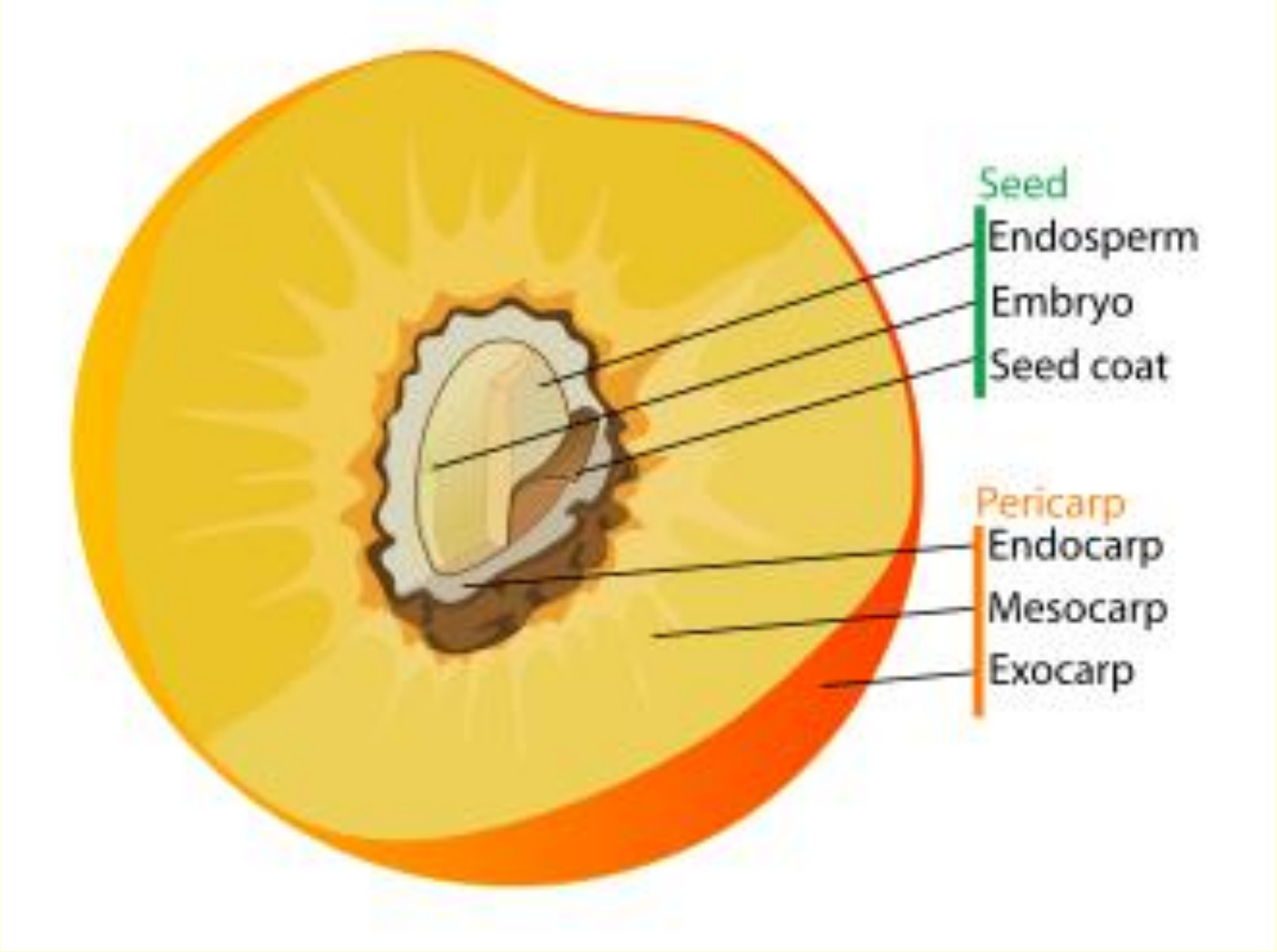
Thematic block: The generative organs of the herbaceous plants.

Lesson 4.2. Morphology of the fruits and seeds.

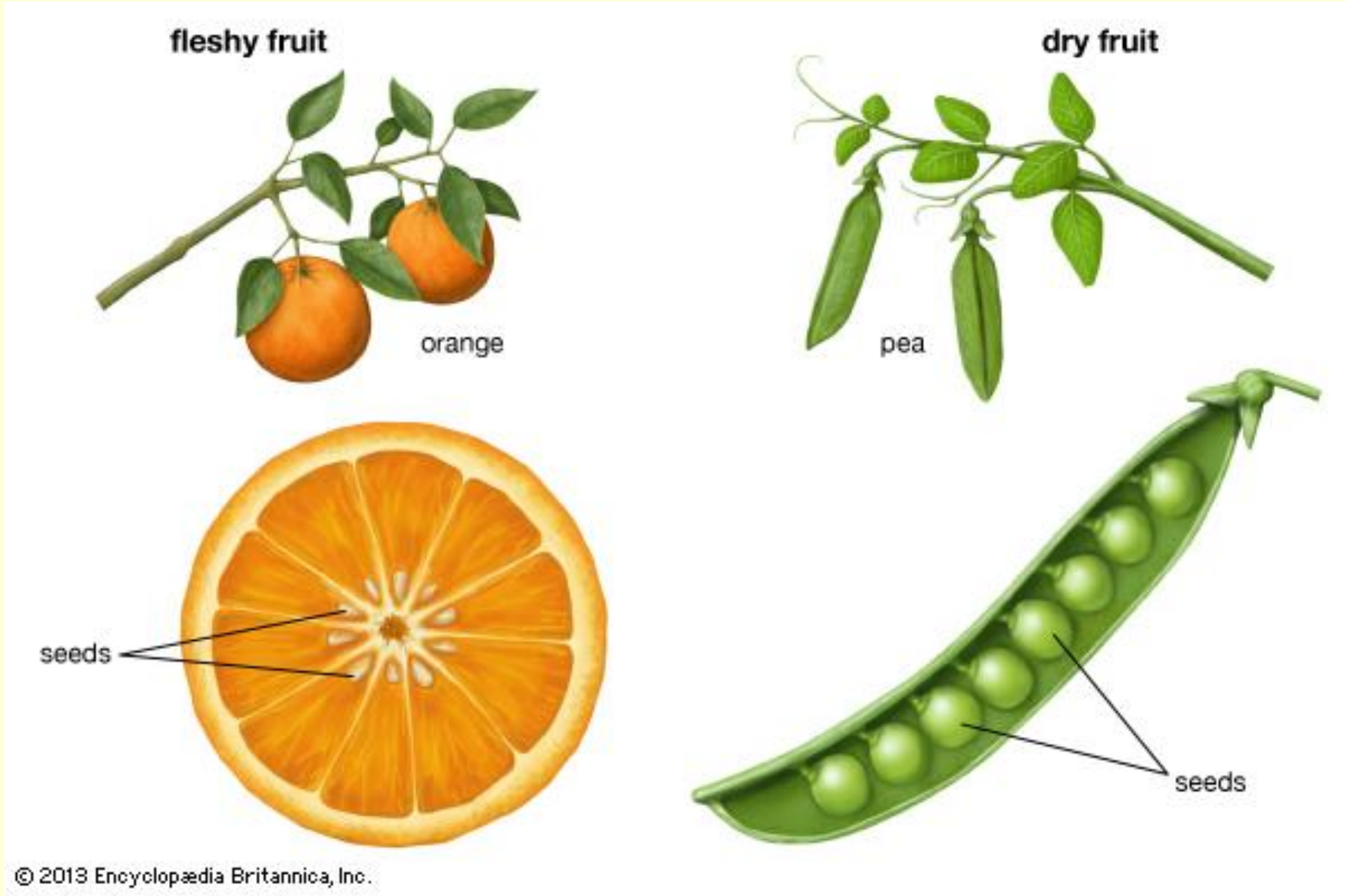

Seed
Endosperm
Embryo
Seed coat
Pericarp
Endocarp
Mesocarp
Exocarp

Fruits with one seed

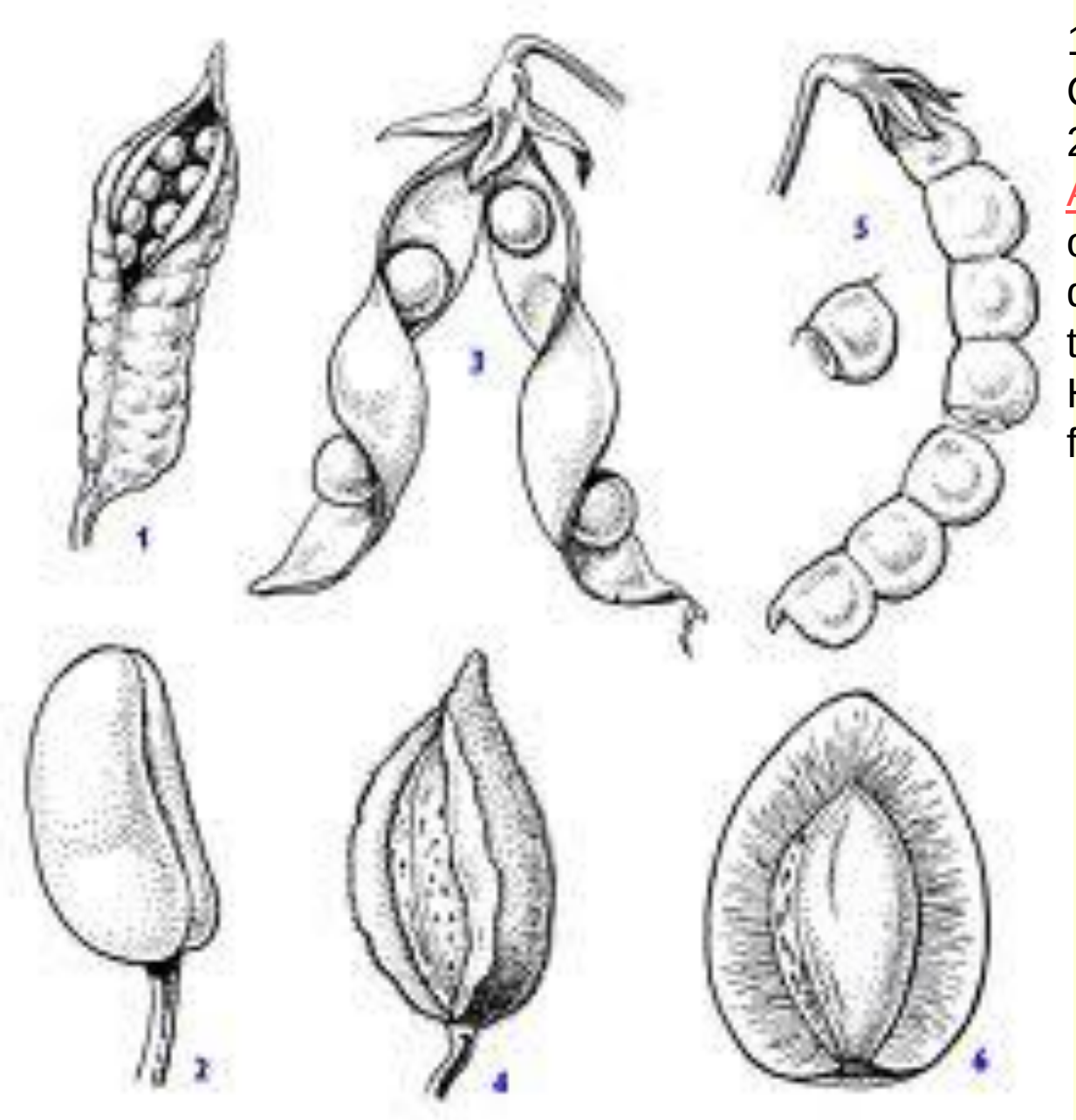



Fruits with many seeds

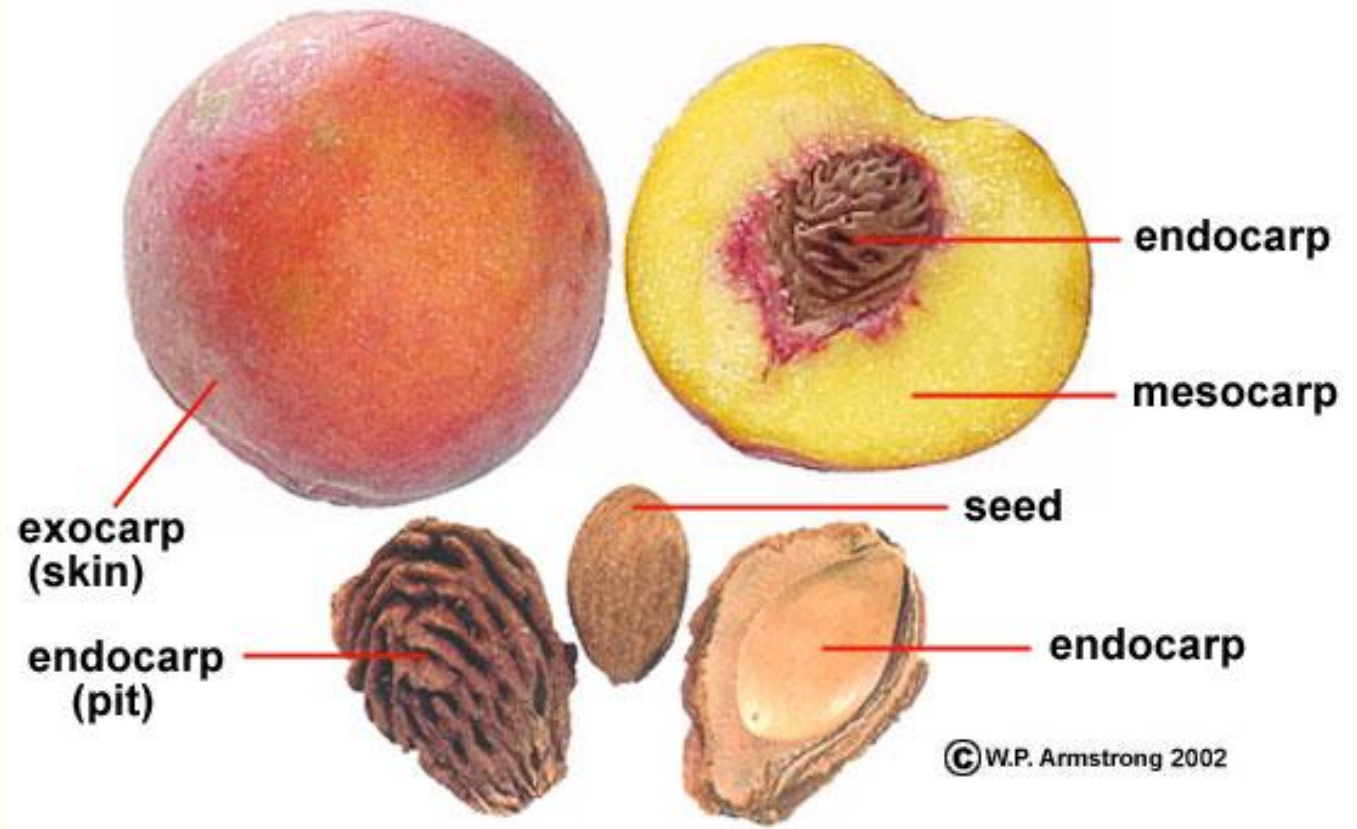


Dry dehiscent fruits	Dry indehiscent fruits
1. These fruits open at the time of maturity to disperse their seeds.	1. These fruits do not open at the time of maturity to disperse their seeds.
2. These fruits split at the built-in line and release its contents along with the seeds.	2. These fruits do not split up; therefore, their seeds are dispersed by the predators or decomposers.
3. These fruits burst up when they become dry.	3. These fruits can only be opened by deterioration or when consumed by the animals.
4. Examples are silique, follicle, and legume.	4. Examples are nut, samara, and achene.

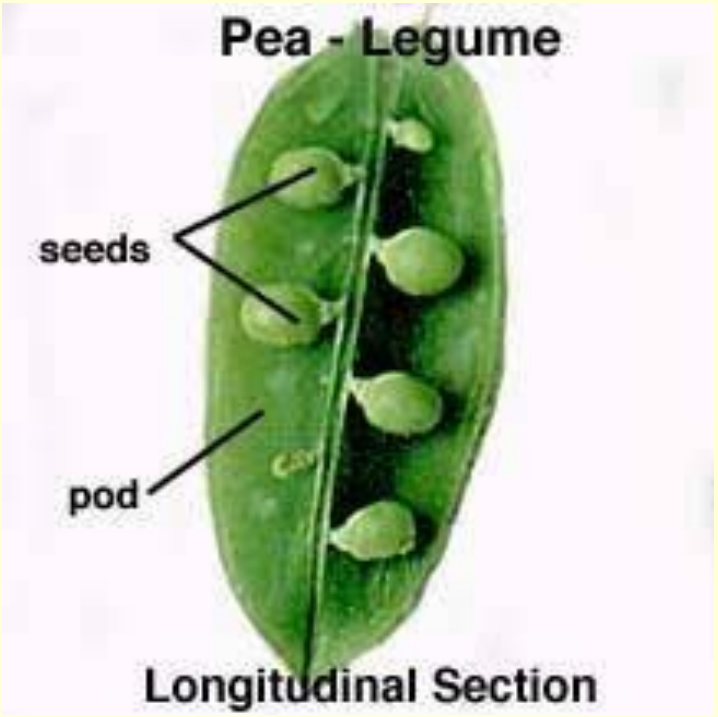


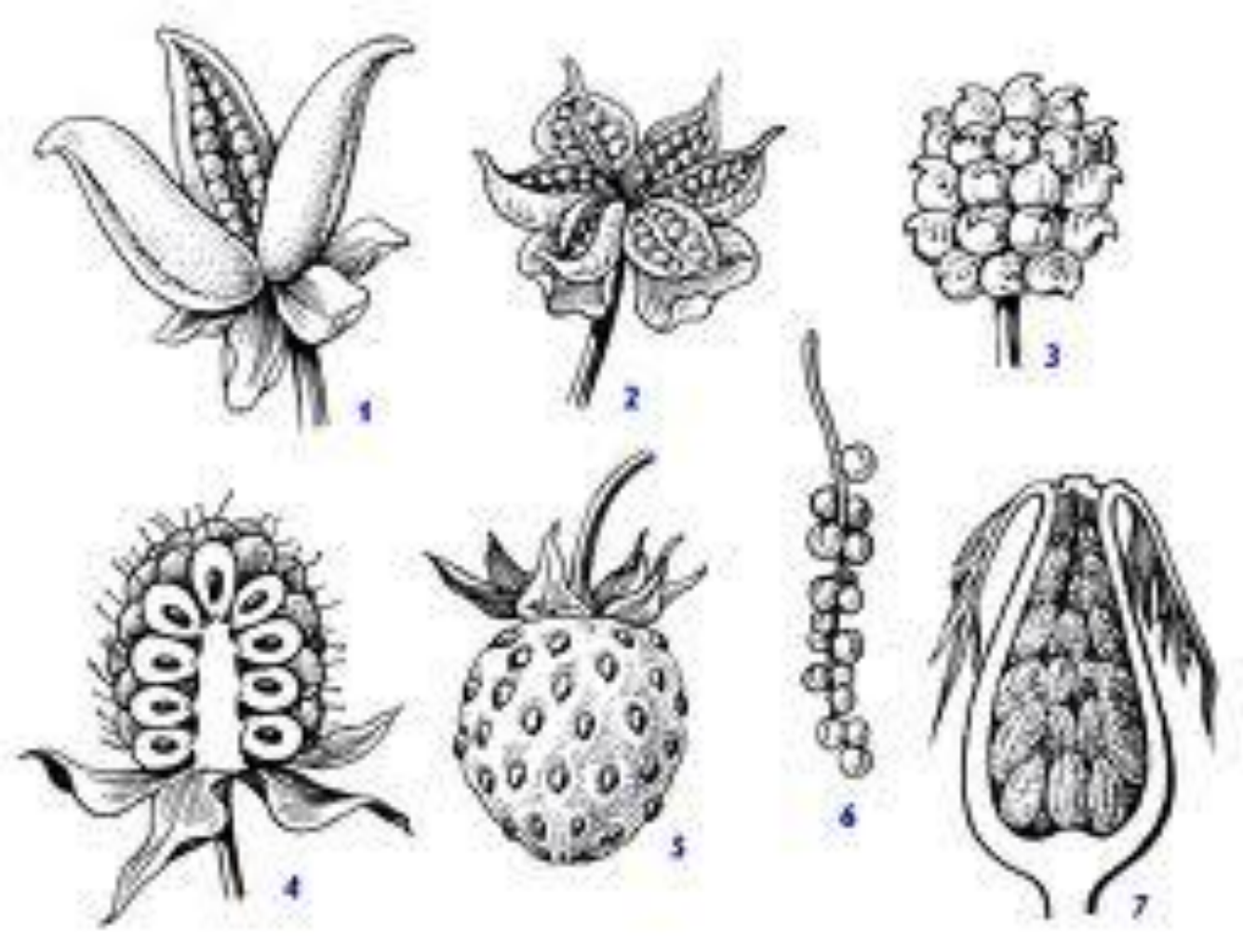
1 - The dry follicle of Consolida,
2 - The fleshy follicle of Actaea , 3 - The legume of Vicea , 4 – the dry drupe of Amygdalus , 5 – the legume of Hedysarum , 6 – the fleshy drupe of Prunus



Drupe (fleshy fruit with a stony endocarp)

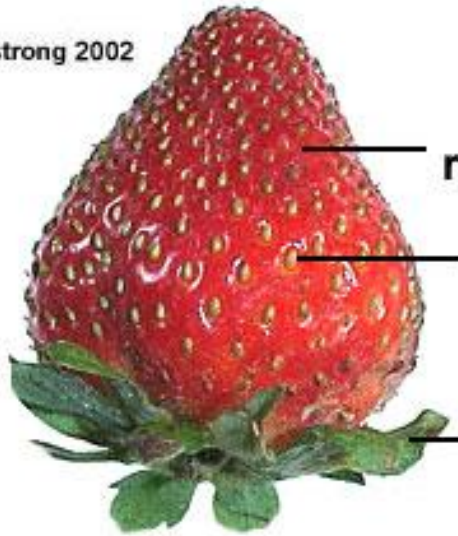
the dry drupe of Amygdalus





1 – A dry etaerio follicles of Paeonia , 2 - A dry etaerio follicles of Caltha , 3 - An etaerio of achenes of Anemone and Ranunculus, 4 - An etaerio of drupelets of Rubus ,5 - Utricle of Fragaria ,6 - A flashy etaerio follicles of Schisandra ,
7 - cynarrhodium of Rosa .

Strawberry Flower

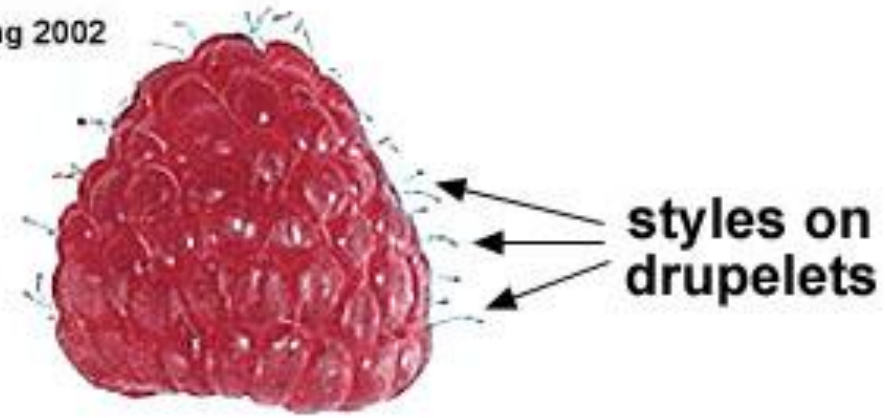


Aggregate Fruit

Many one-seeded achenes produced by a single flower.

Hybrid Strawberry (*Fragaria ananassa*)

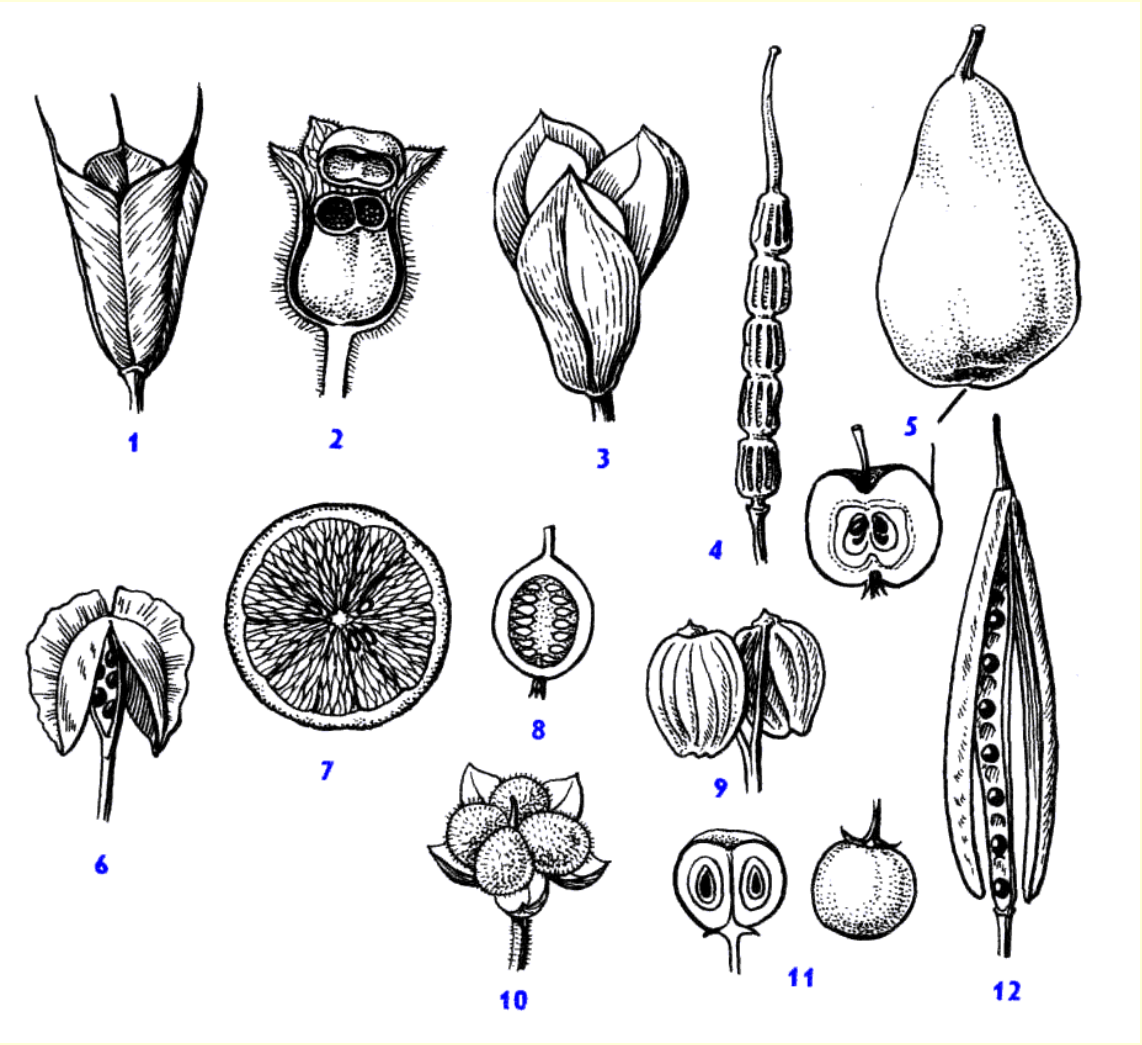
Thimbleberry Flower



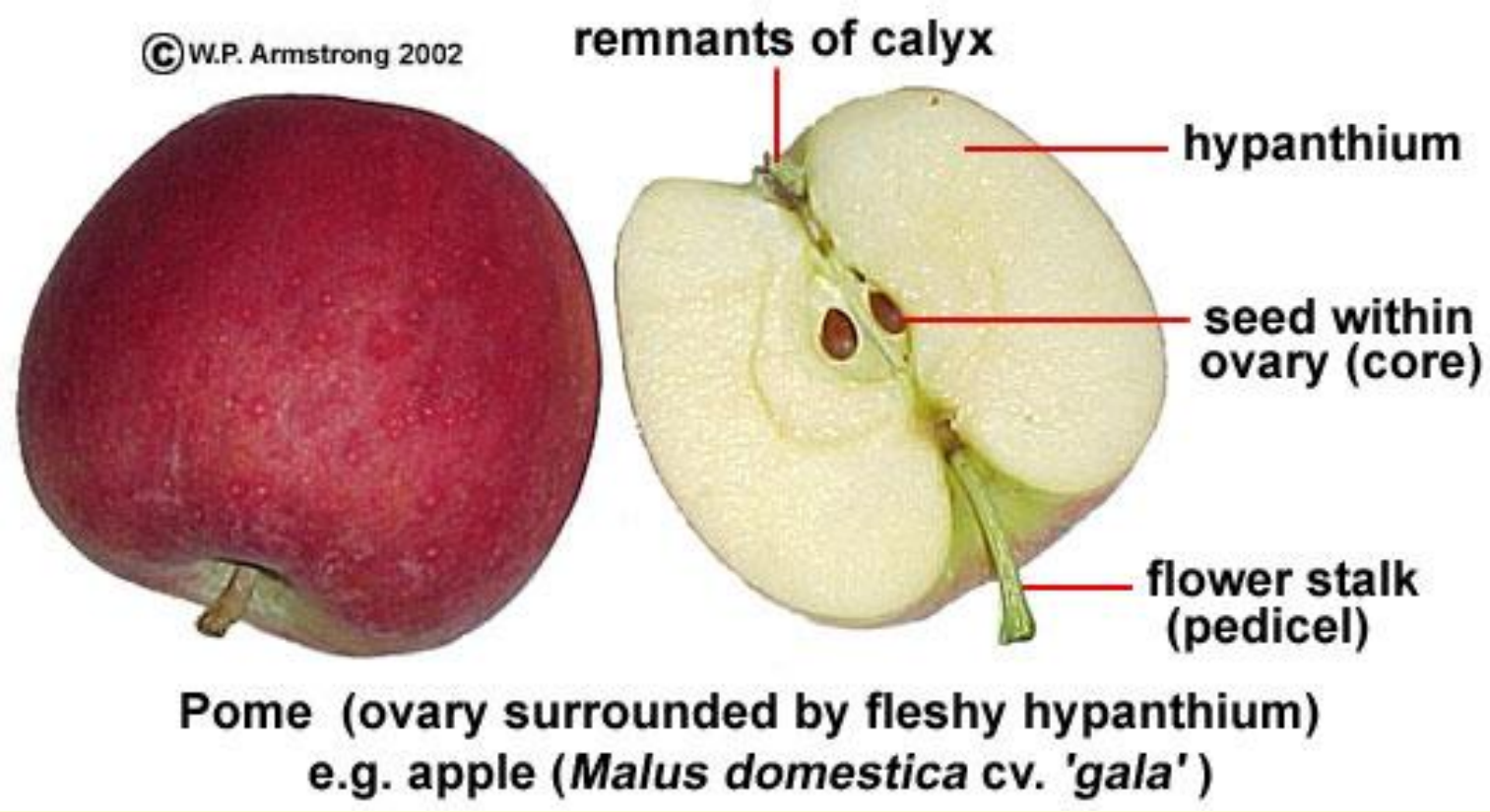
Aggregate Fruit

Many one-seeded drupelets
produced by a single flower.

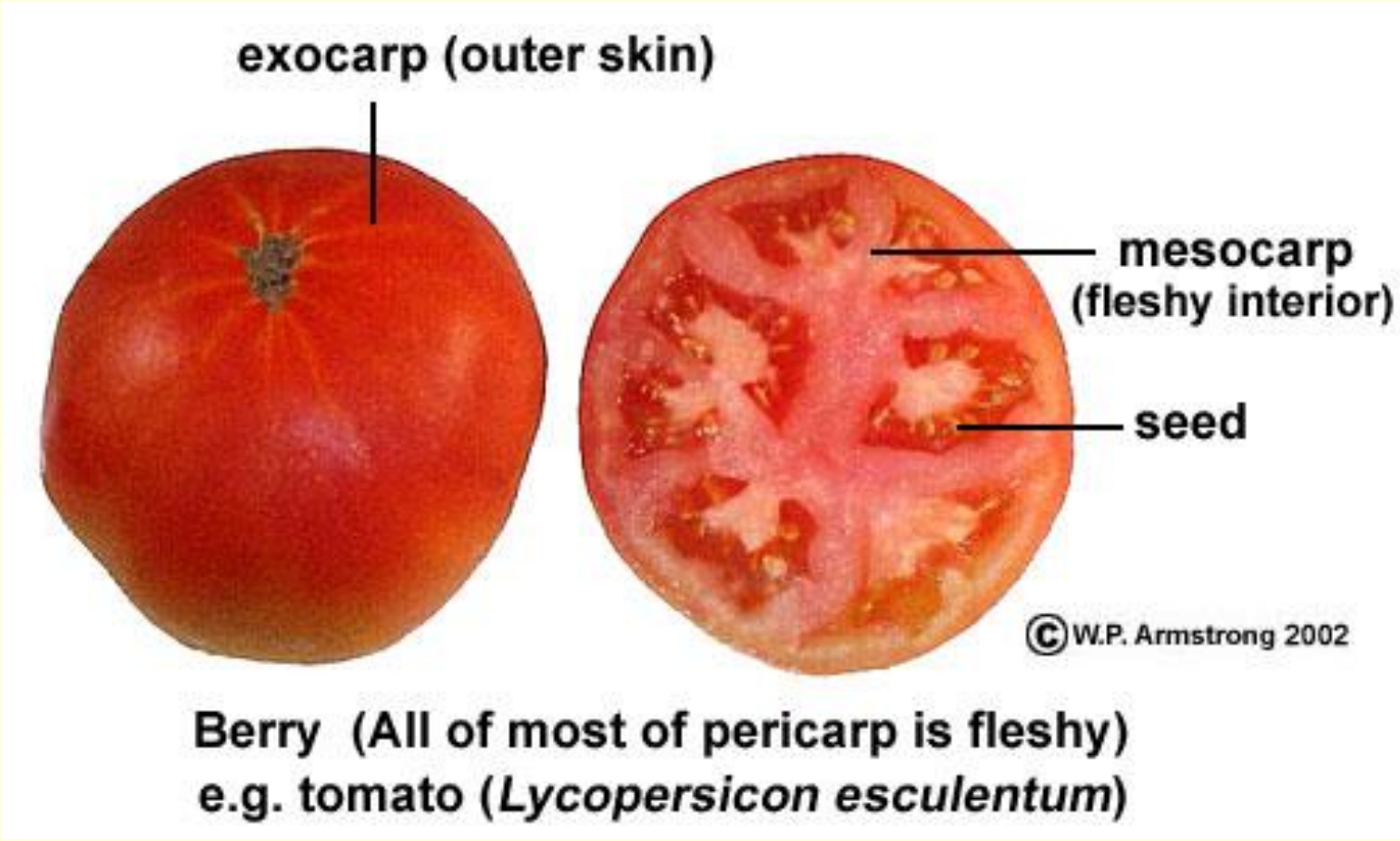
Thimbleberry (*Rubus parviflorus*)



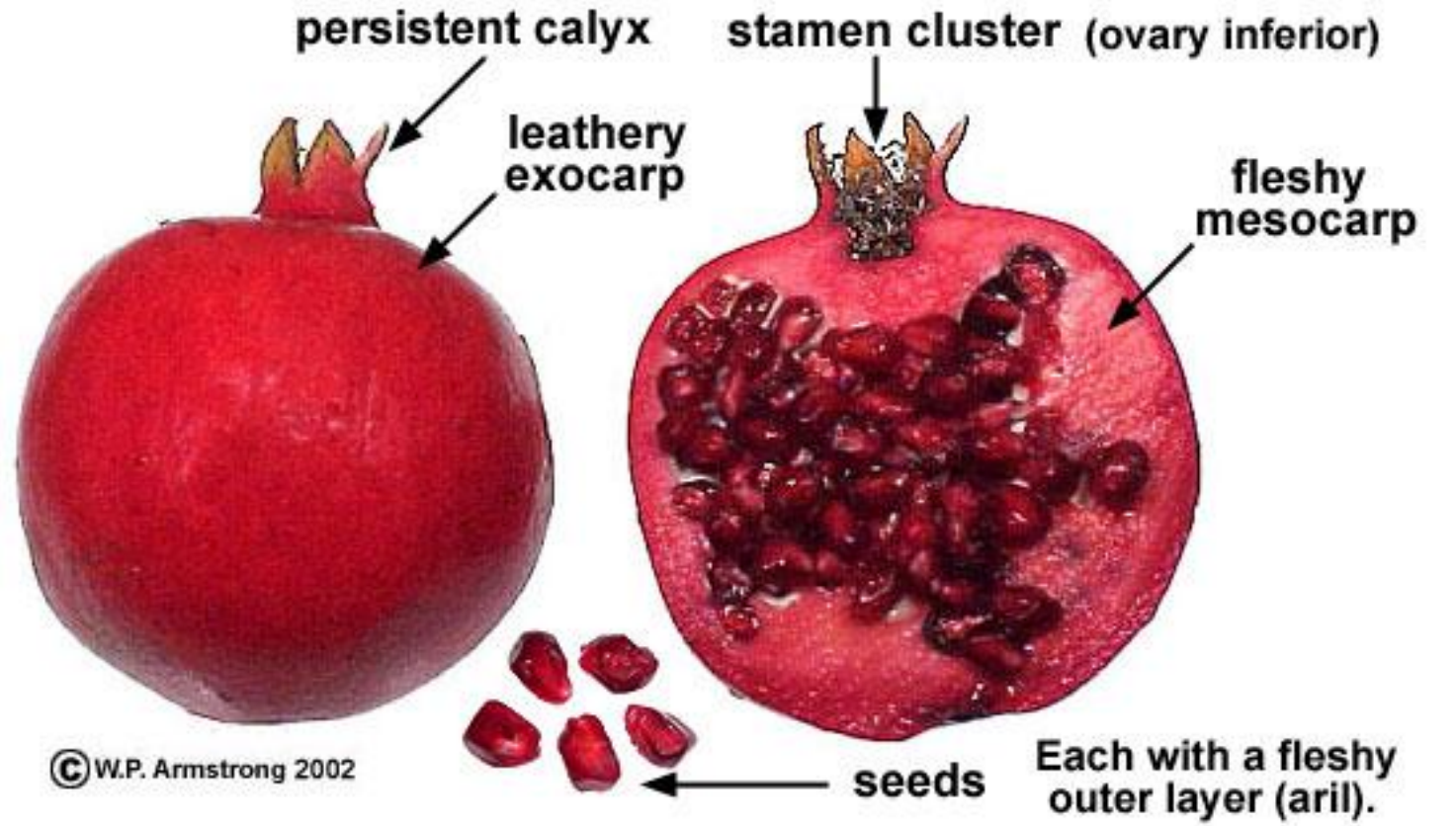
1. An etaerio follicles of Aquifegia ; 2 - loculicidal capsule of Hyoscyamus ; 3 - The septicidal capsule of Tulipa; 4 - lomentaceous silique (pod) of Raphanus ; 5 - pome; 6 - silicle ; 7 - Hesperidium of citrus ; 8 - berry, 9 – Schizocarp of Apiaceae 10 - Coenobium, 11 – berry of Arctostaphylos ; 12 - silique (pod) of Brassicaceae.



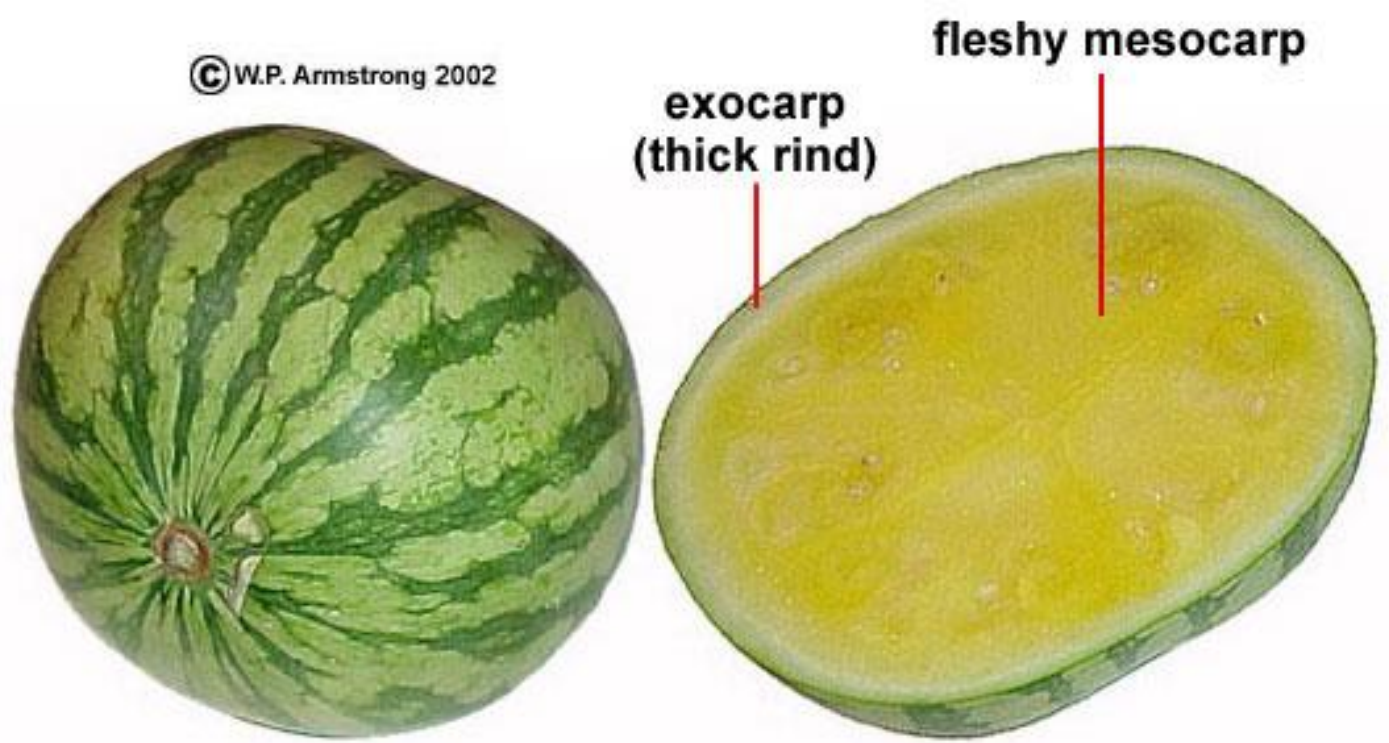
Pome (ovary surrounded by fleshy hypanthium)
e.g. apple (*Malus domestica* cv. *'gala'*)



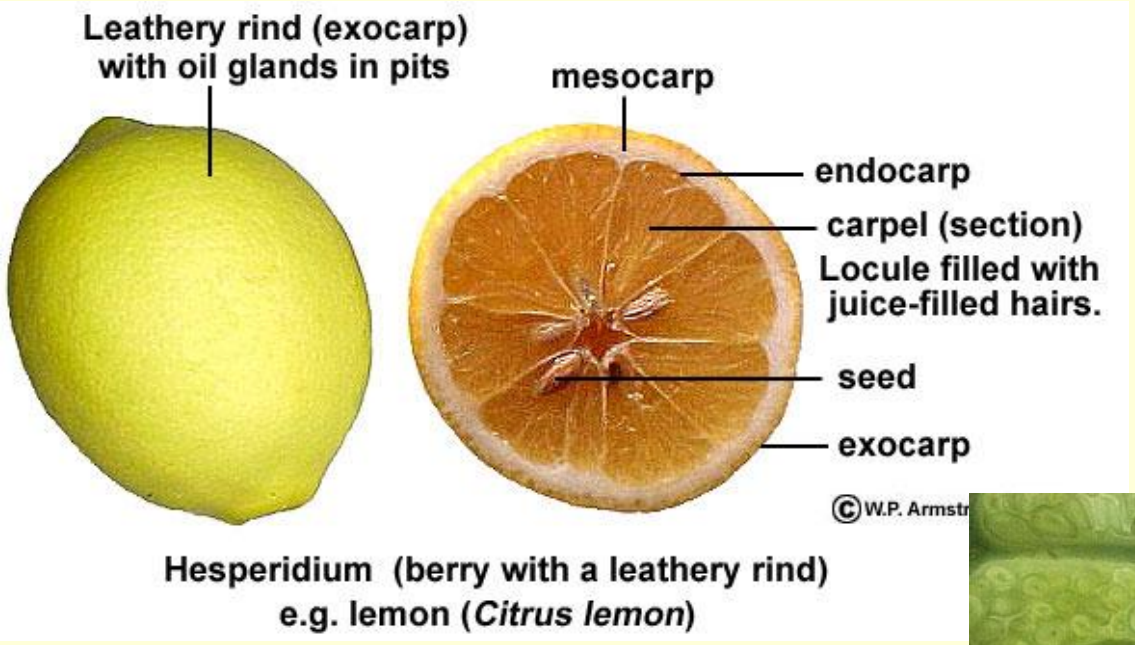
Berry (All of most of pericarp is fleshy)
e.g. tomato (*Lycopersicon esculentum*)



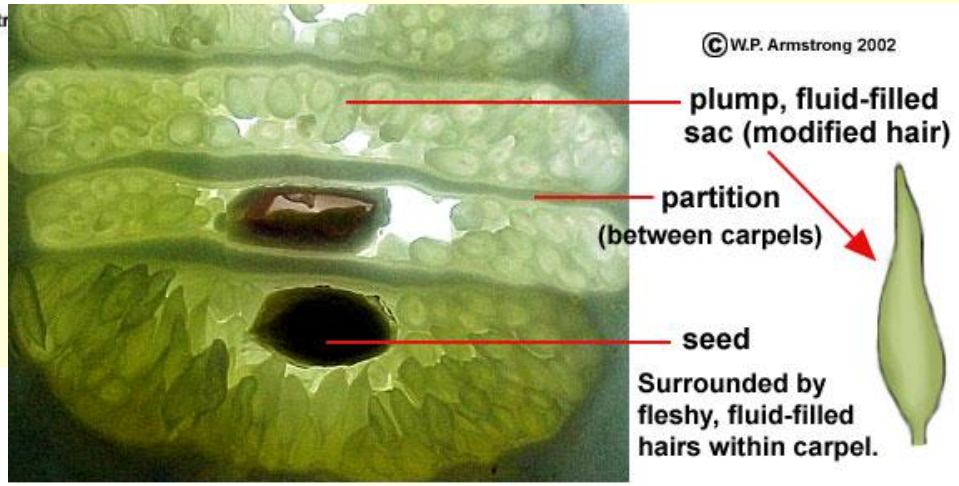
Pomegranate (*Punica granatum*): A many-seeded berry.



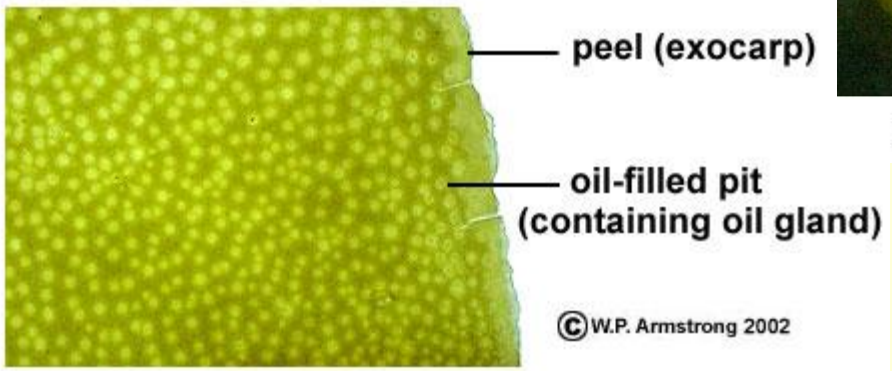
Pepo (a berry with a hard, thick rind)
e.g. watermelon (*Citrullus lanatus* var. *lanatus*)



Hesperidium (berry with a leathery rind)
e.g. lemon (*Citrus lemon*)



Magnified View Of The Sections (Carpels) Of An Orange

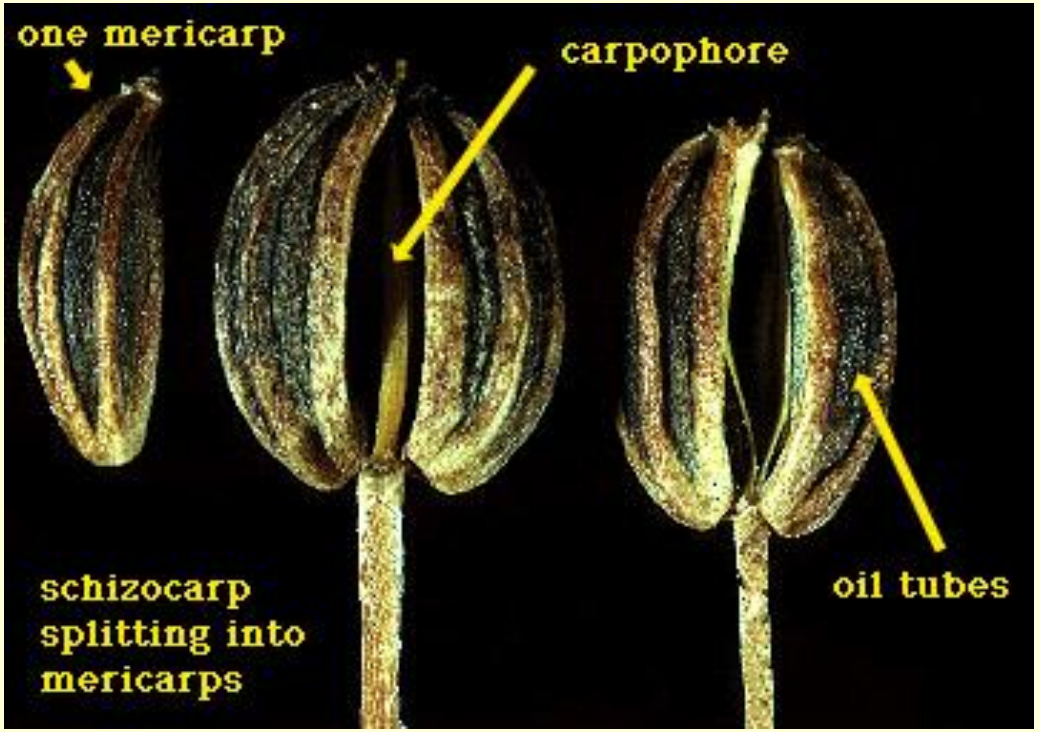


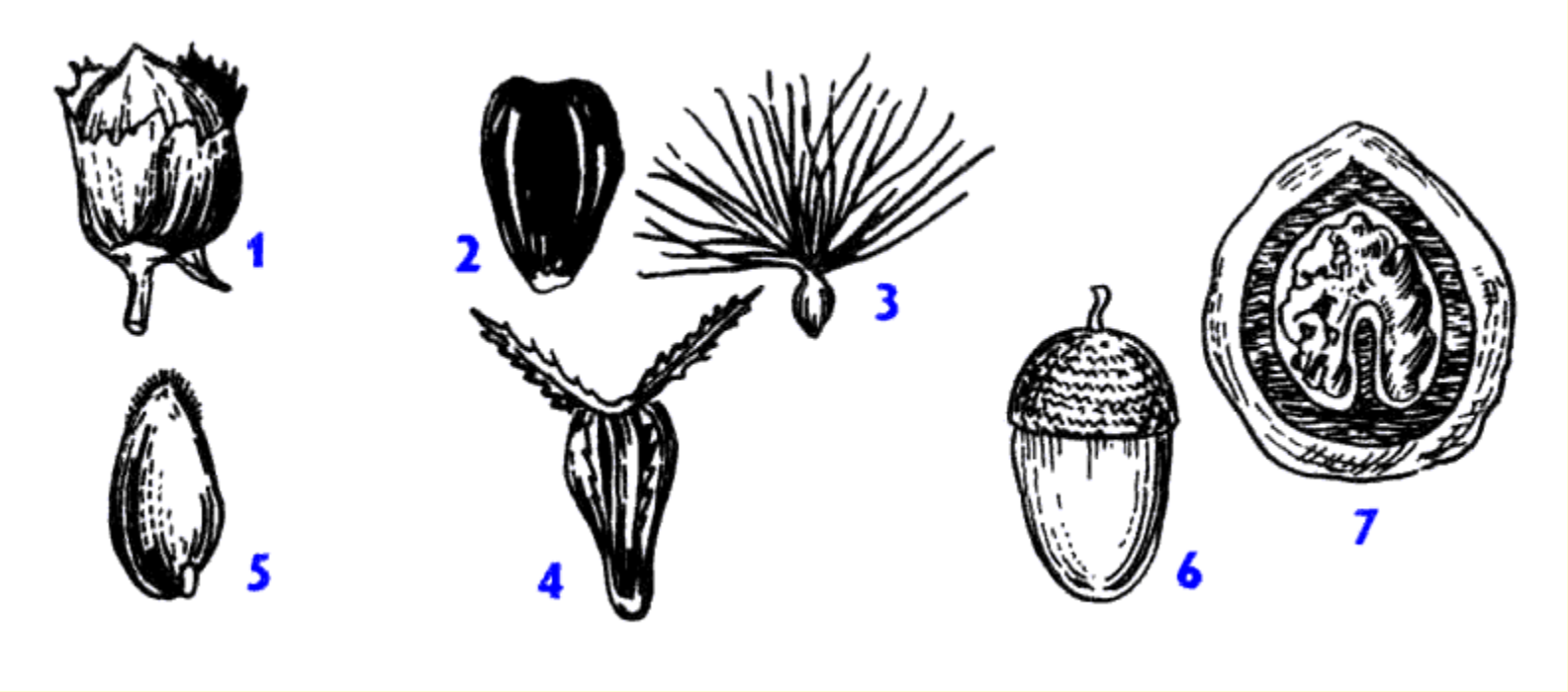
Magnified View Of The Surface Of A Lemon Peel

Coenobium of Cynoglossum

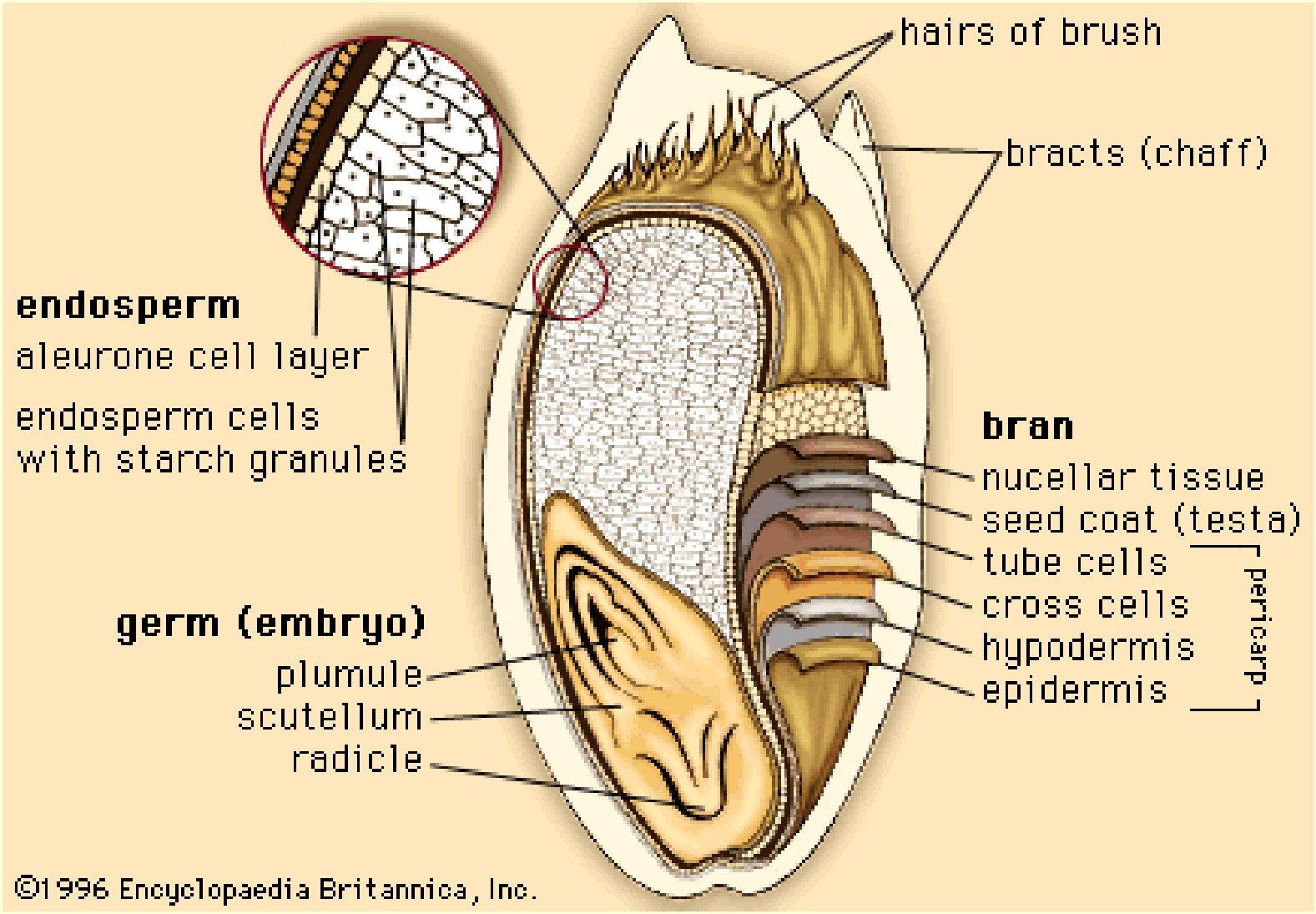
Schizocarp of Malvaceae

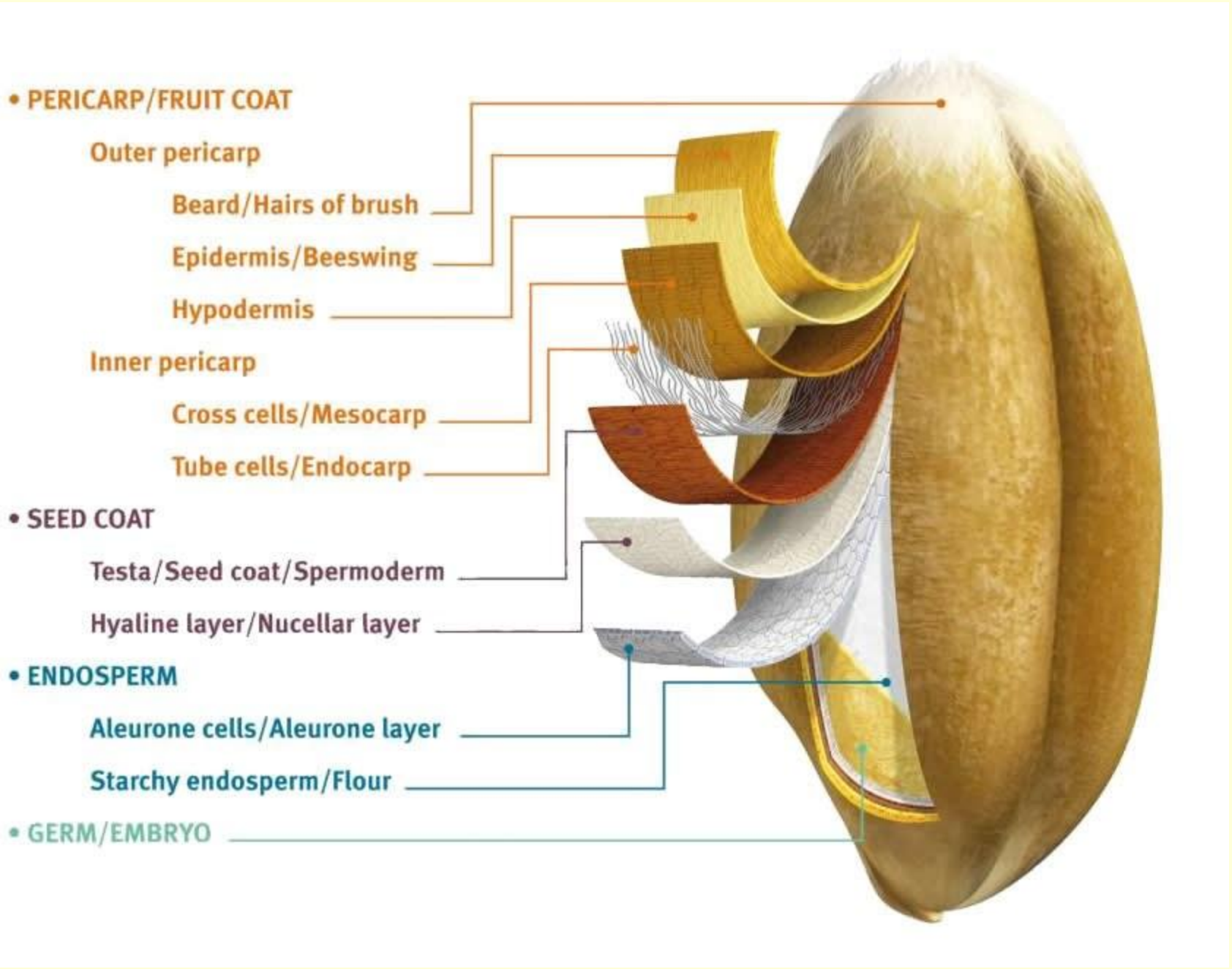
Schizocarp of Apiaceae

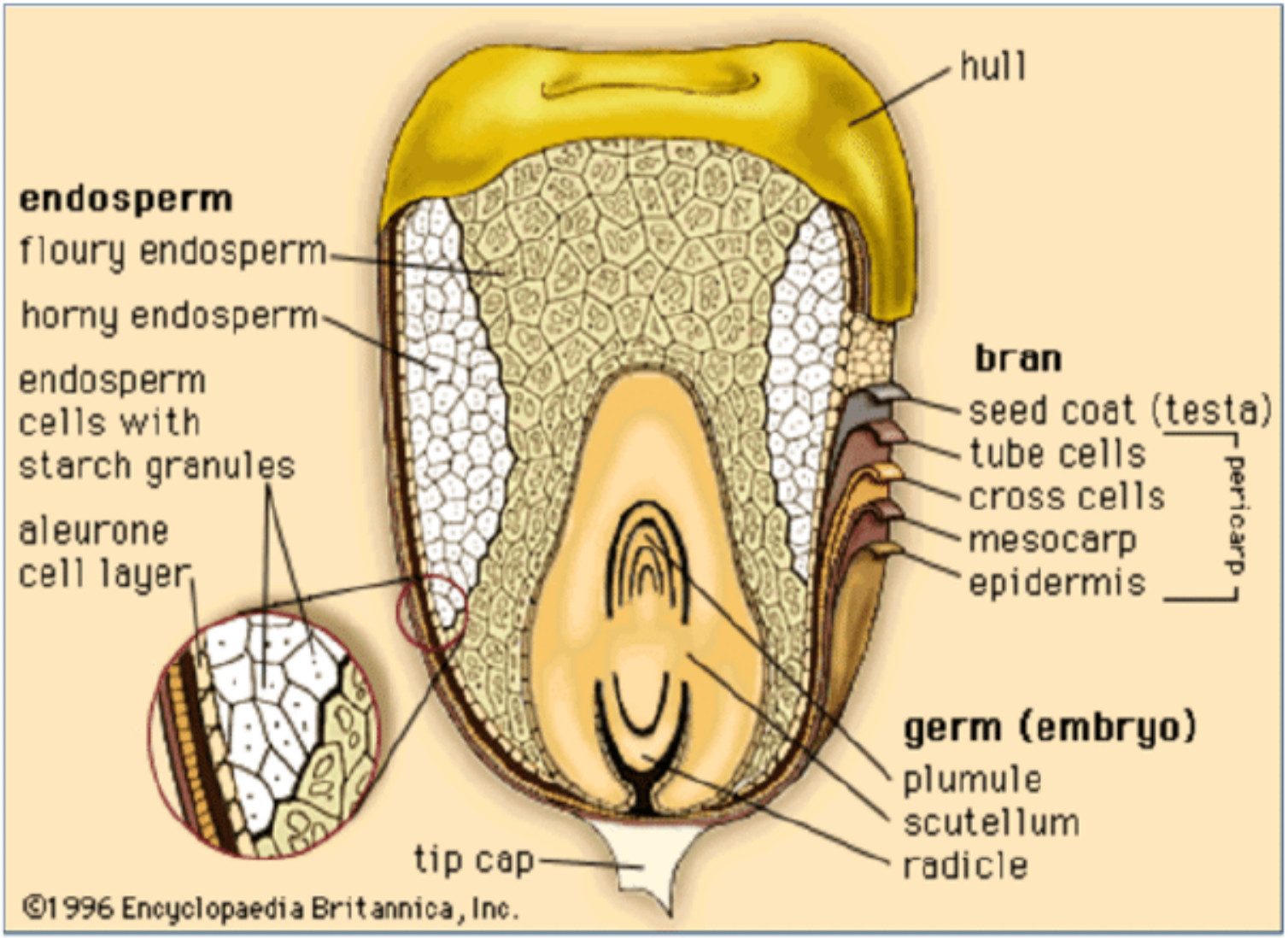




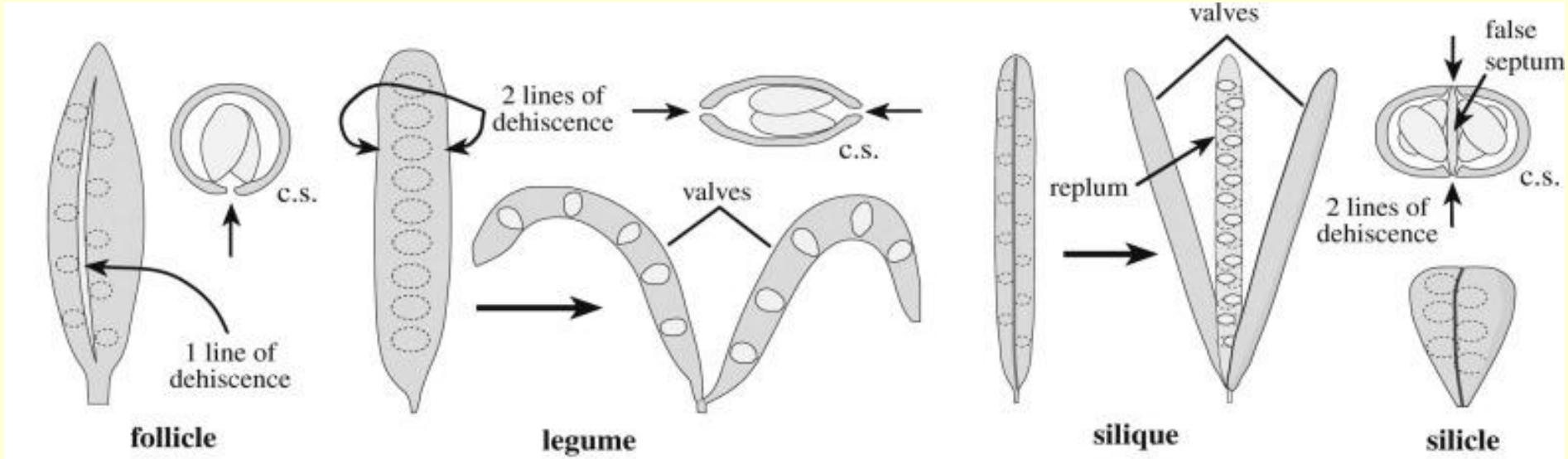
1 - nut of Corylus, 2-4 - achenes of various types in representatives of compound flowers , 5 - grain nodules , 6 - acorn in beech , 7 - pseudomonocarp drupe in walnut - Juglans


hairs of brush
bracts (chaff)
endosperm
aleurone cell layer
endosperm cells
with starch granules
bran
nucellar tissue
seed coat (testa)
tube cells
cross cells
hypodermis
epidermis
pericarp
germ (embryo)
plumule
scutellum
radicle
©1996 Encyclopaedia Britannica, Inc.

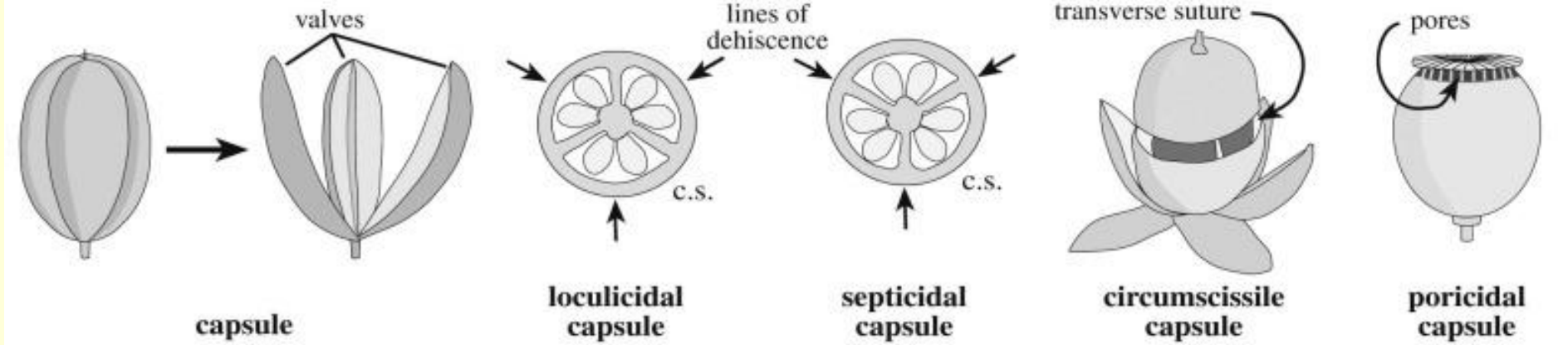

• PERICARP/FRUIT COAT
Outer pericarp
Beard/Hairs of brush
Epidermis/Beeswing
Hypodermis
Inner pericarp
Cross cells/Mesocarp
Tube cells/Endocarp
• SEED COAT
Testa/Seed coat/Spermoderm
Hyaline layer/Nucellar layer
• ENDOSPERM
Aleurone cells/Aleurone layer
Starchy endosperm/Flour
• GERM/EMBRYO


hull
endosperm
floury endosperm
horny endosperm
endosperm cells with starch granules
aleurone cell layer
bran
seed coat (testa)
tube cells
cross cells
mesocarp
epidermis
pericarp
germ (embryo)
plumule
scutellum
radicle
tip cap
©1996 Encyclopaedia Britannica, Inc.

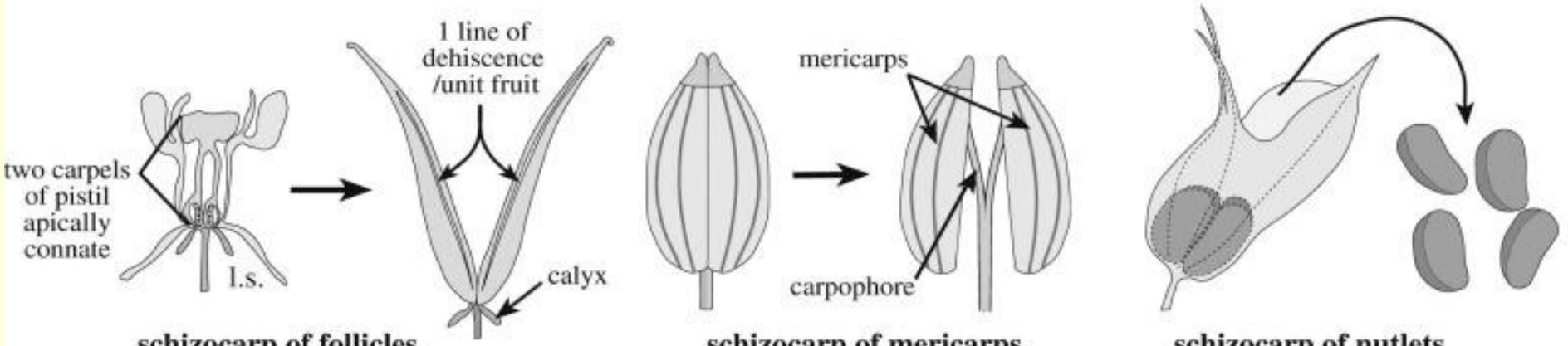
Cypsela of sunflower



follicle **legume** **silique** **silicle**

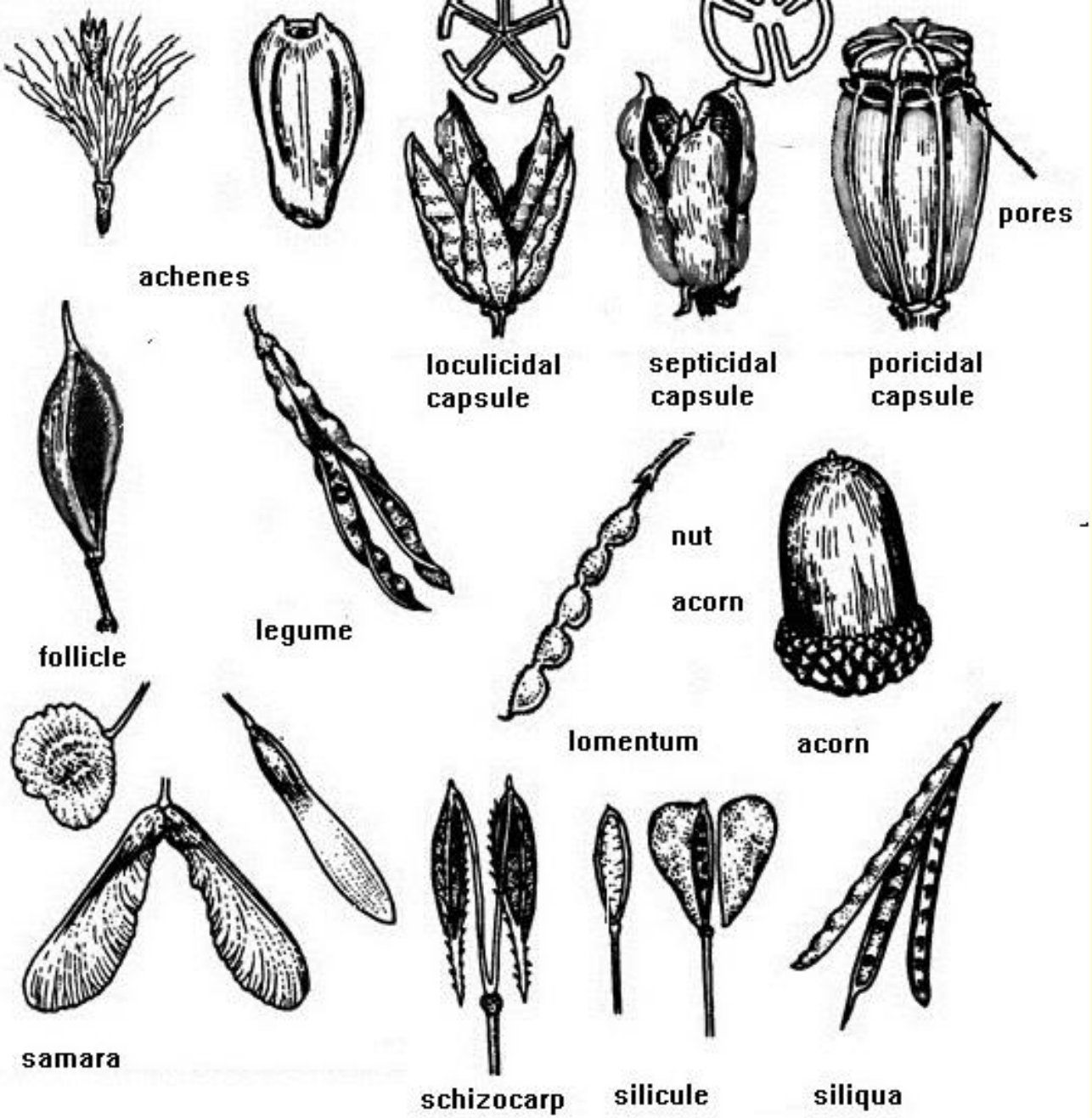


capsule **loculicidal capsule** **septicidal capsule** **circumscissile capsule** **poricidal capsule**



schizocarp of follicles **schizocarp of mericarps** **schizocarp of nutlets**

9.5.2 Fruit types
Dry fruits



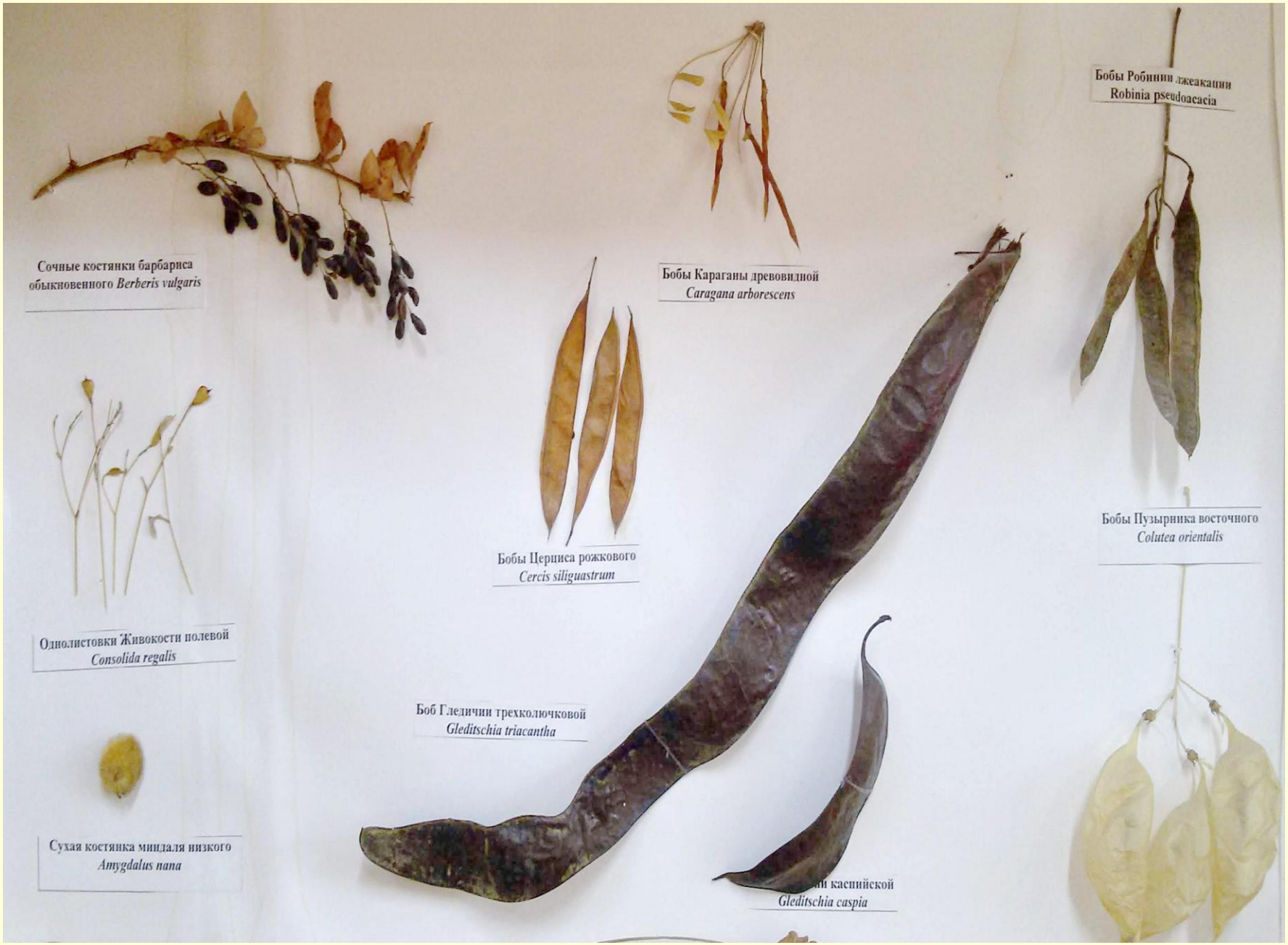
Task 1. Fruit morphology. Identify the types of fruits suggested according to the structure of the gynaecium.

Describe the fruits given in the handout according to the following plan:

Fruit description plan

1. Type of fruit according to the type of gynoecium.
2. Dry or juicy.
3. Character of the surface of the fruit.
4. Openness of the fruit (whether it opens naturally or not).
5. Number of seeds in the fruit (one or many).
6. Extent to which the seeds are fused to the pericarpous (fused all over or not). Sketch the proposed fruits in a workbook (general view and section). Write down the names of the fruits and the plants for which these fruits are characteristic.

Monocarpous fruits

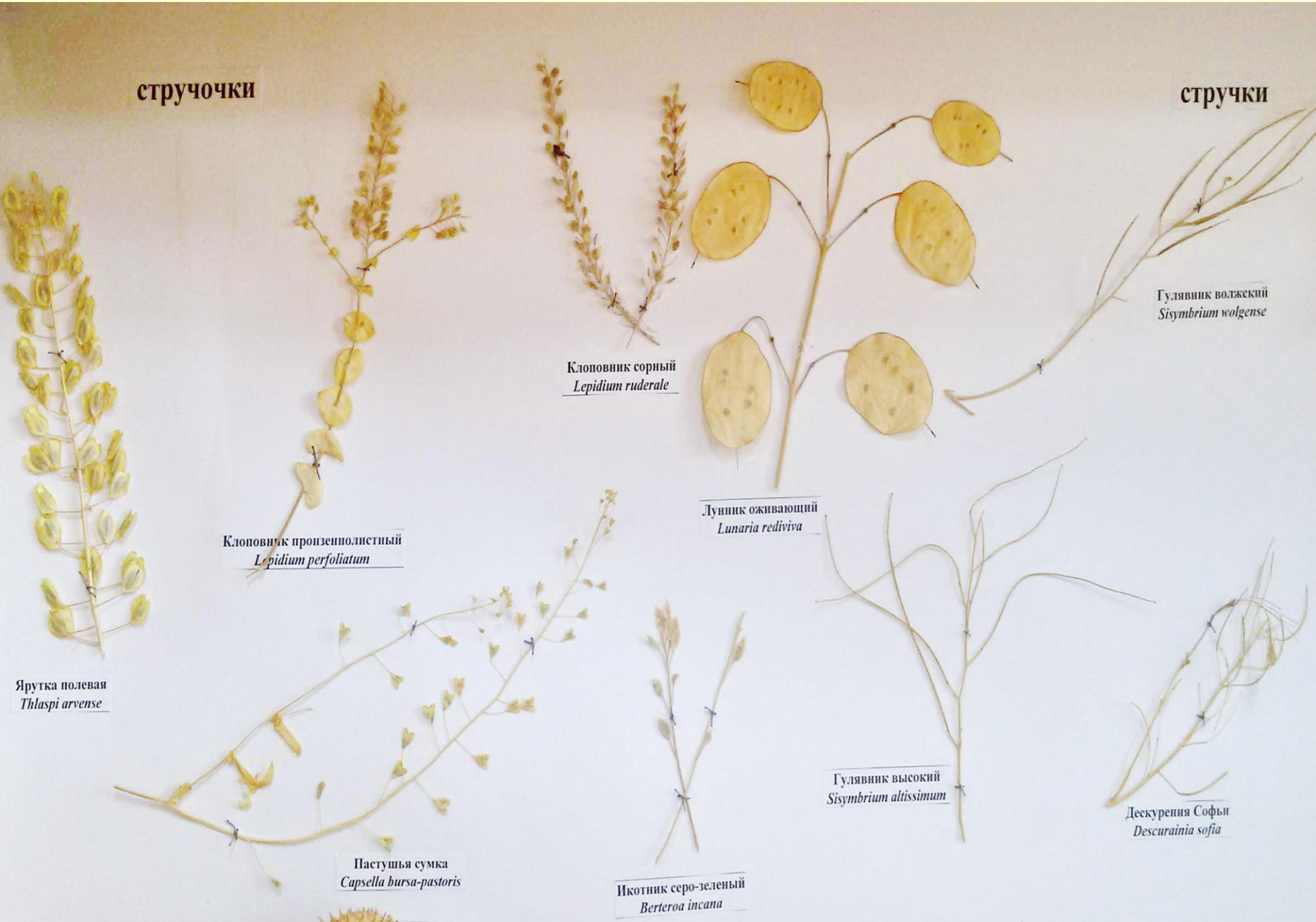


Apocarpous fruits

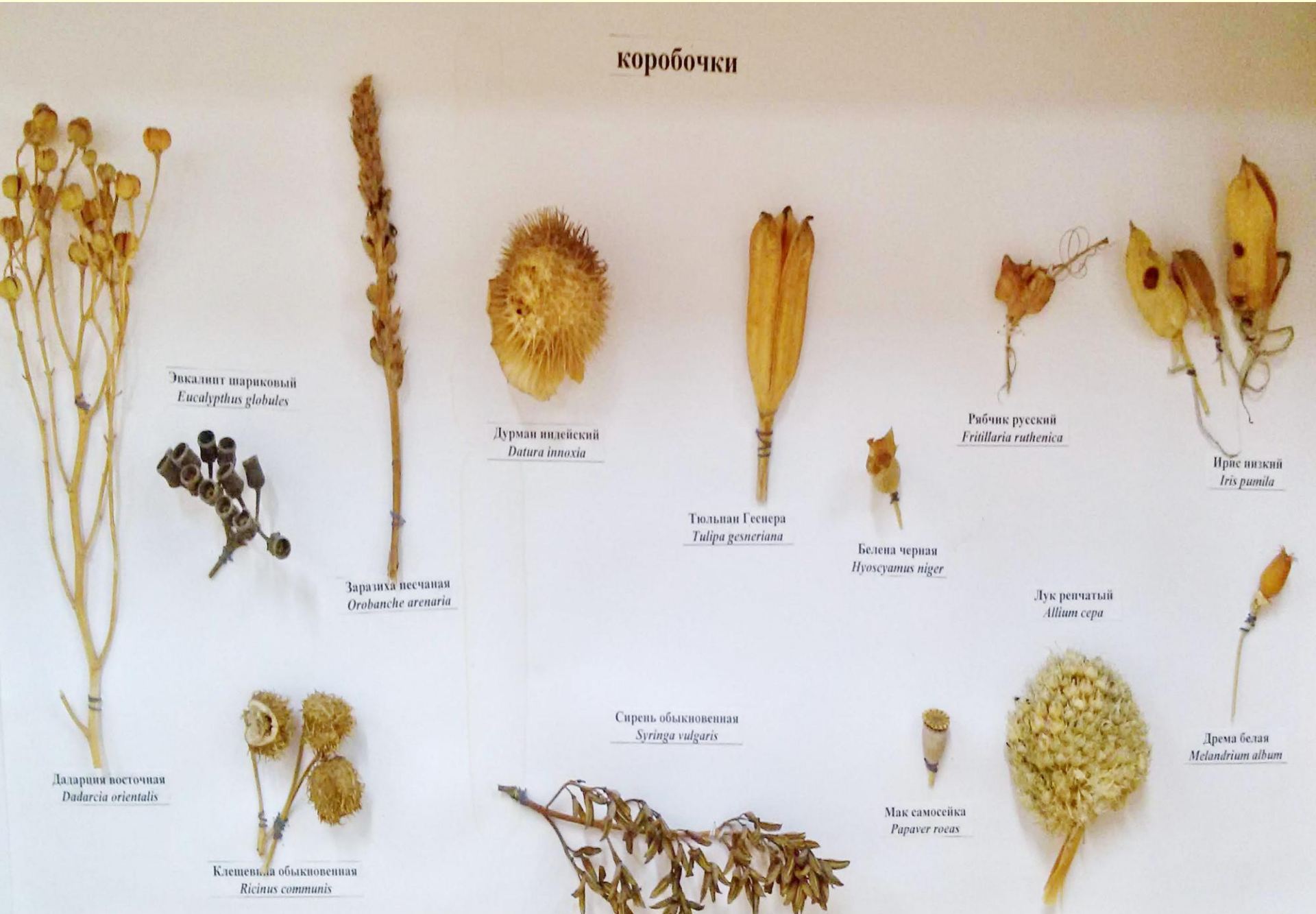
Apocarpous fruits

Etaerio of achenes of Nelumbo

Syncarpous fruits



Syncarpous fruits



Syncarpous fruits

Syncarpous fruits

Coriandrum

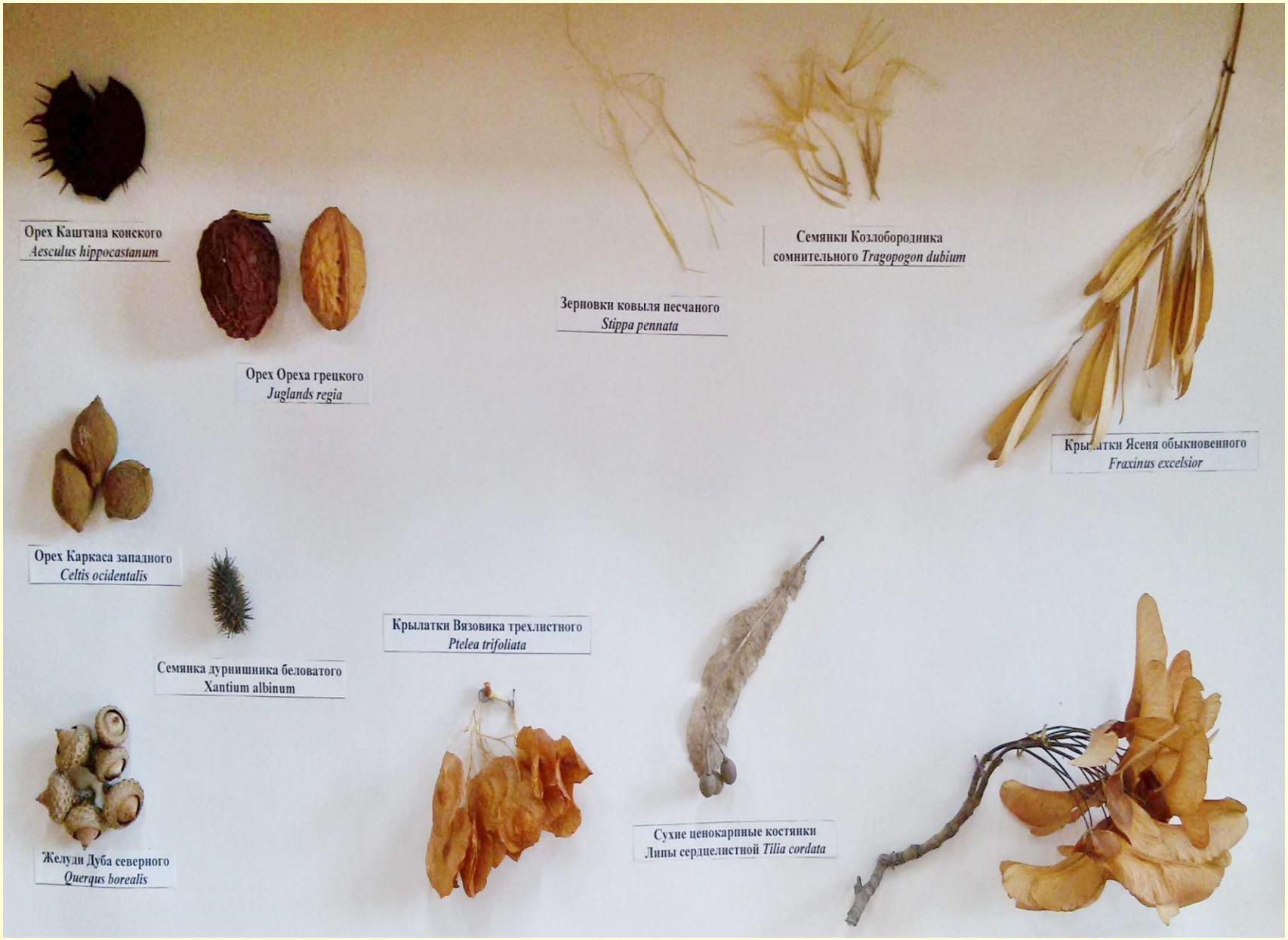
Schizocarp of Apiaceae

Capsule of Datura

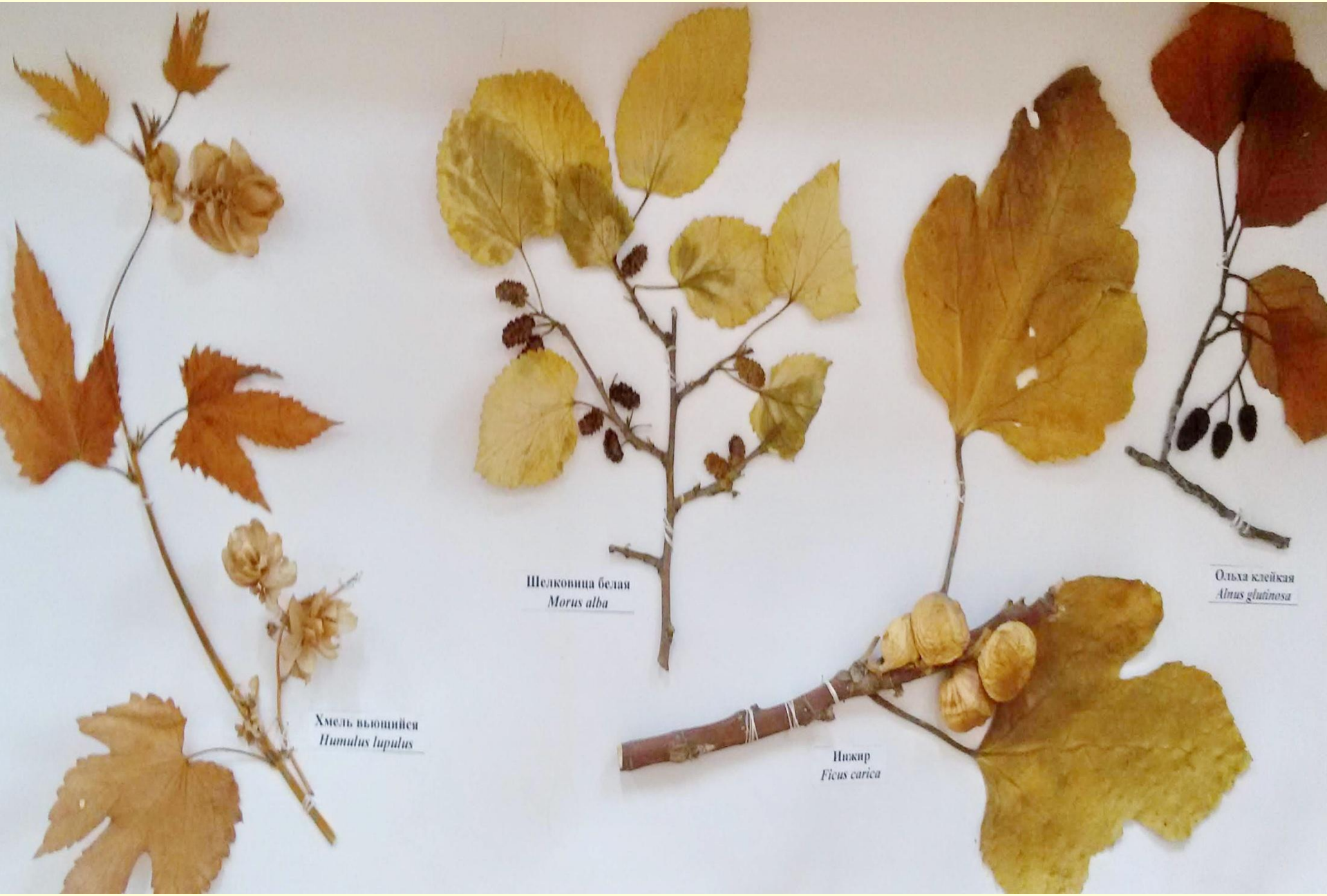
Carum

Syncarpous fruits

Pseudomonocarpous fruits

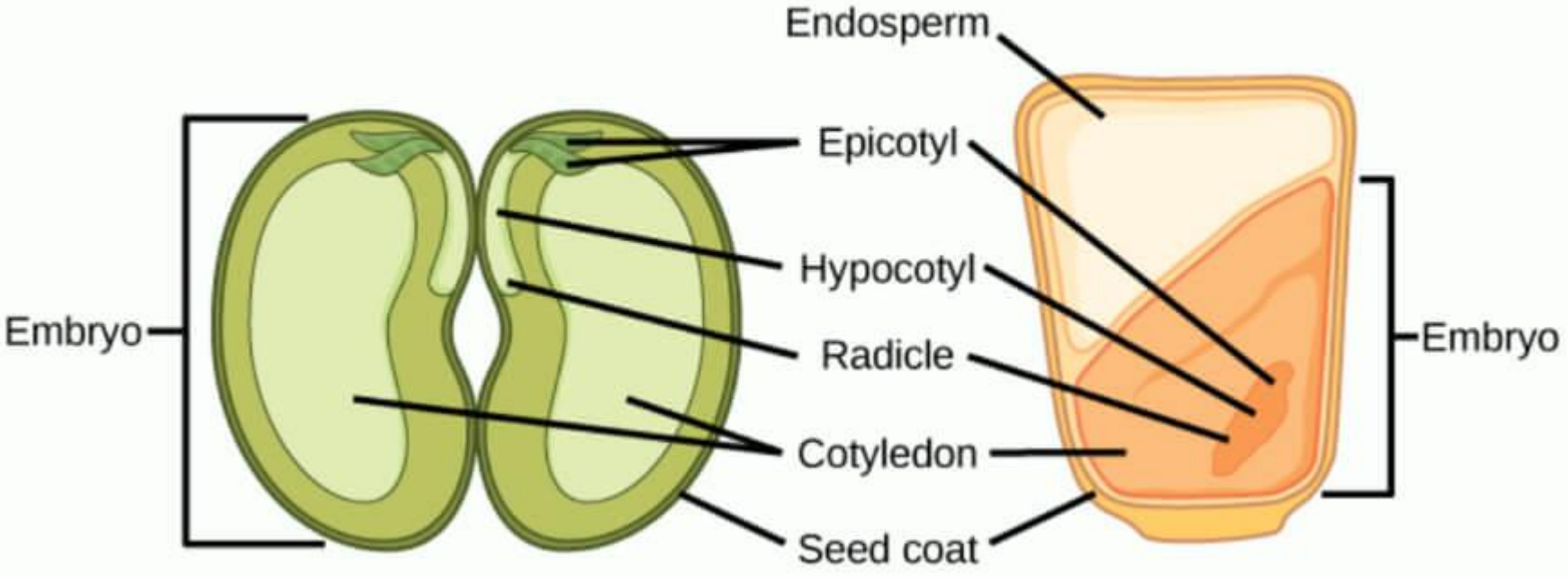


Infructescence

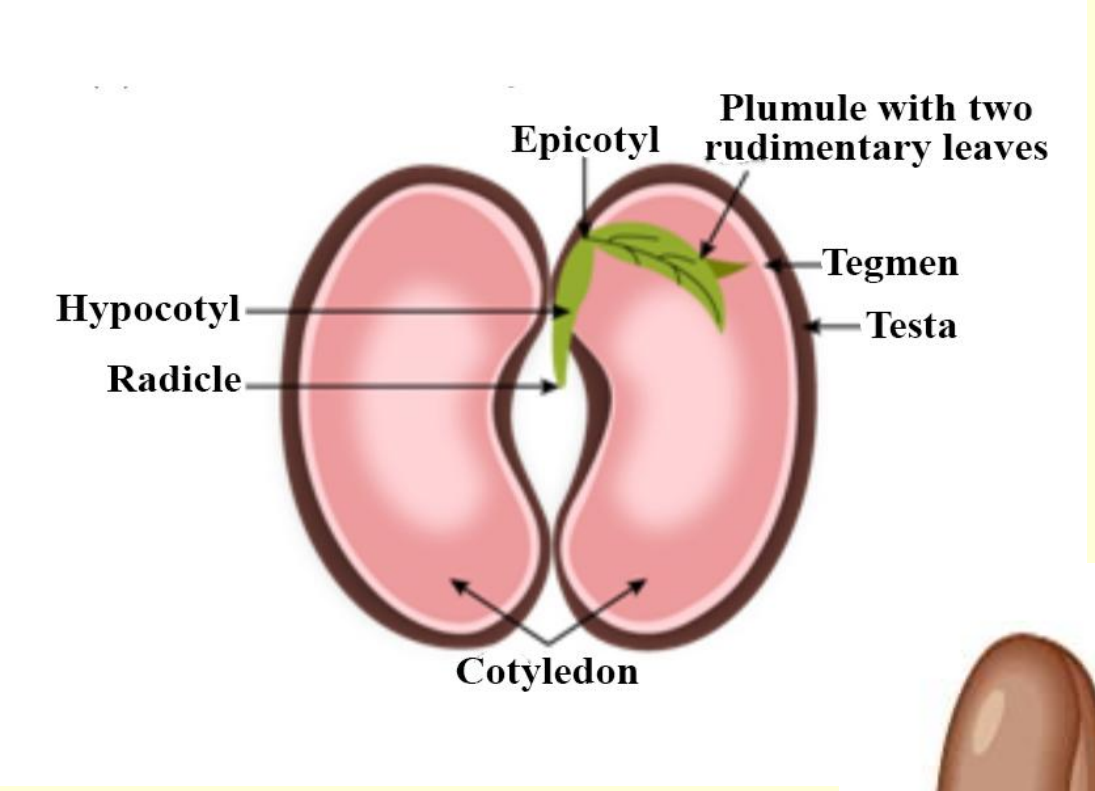


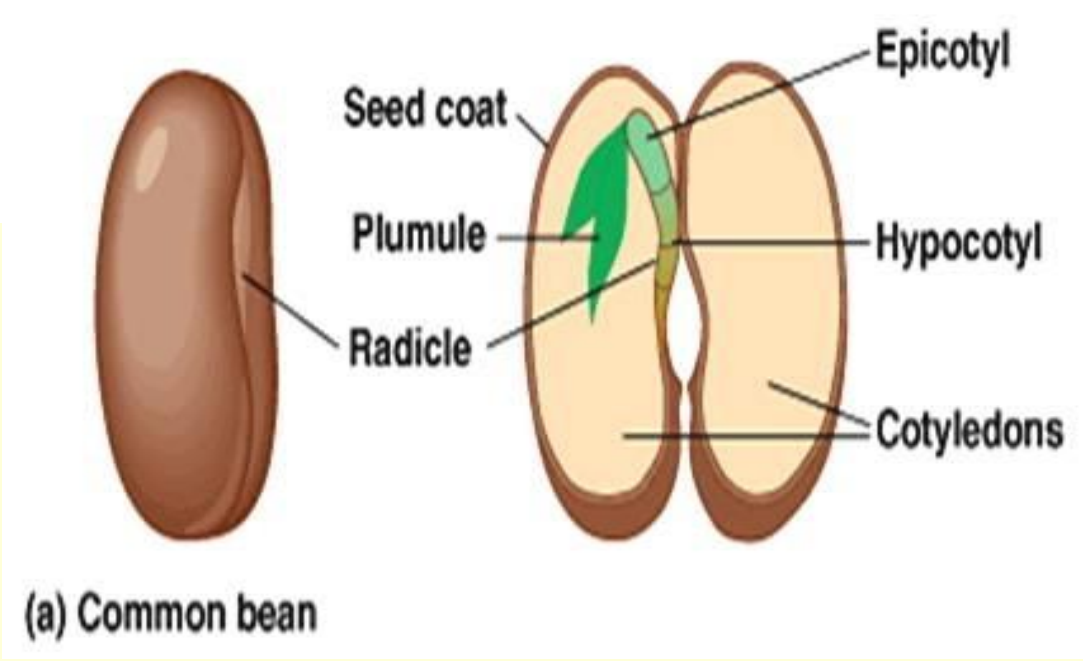
Monocot and Dicot Seed

Definition, Structure, 10 Differences, Examples

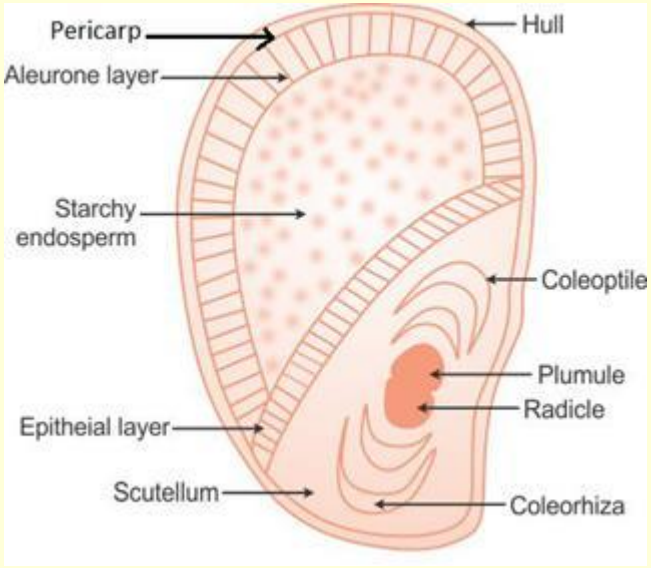


Task 2. Morphology of seeds of dicotyledonous plants.





Task 3: Morphology of the grain of a cereal.



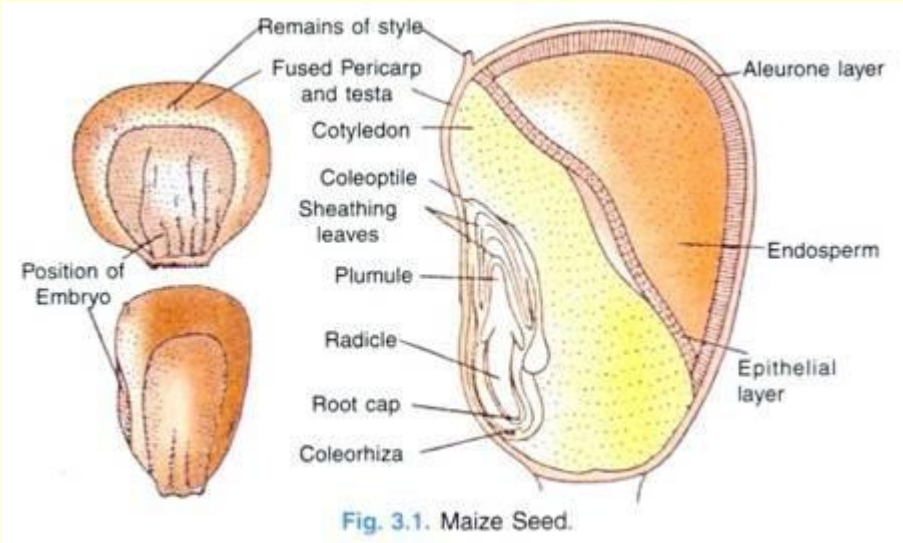


Fig. 3.1. Maize Seed.