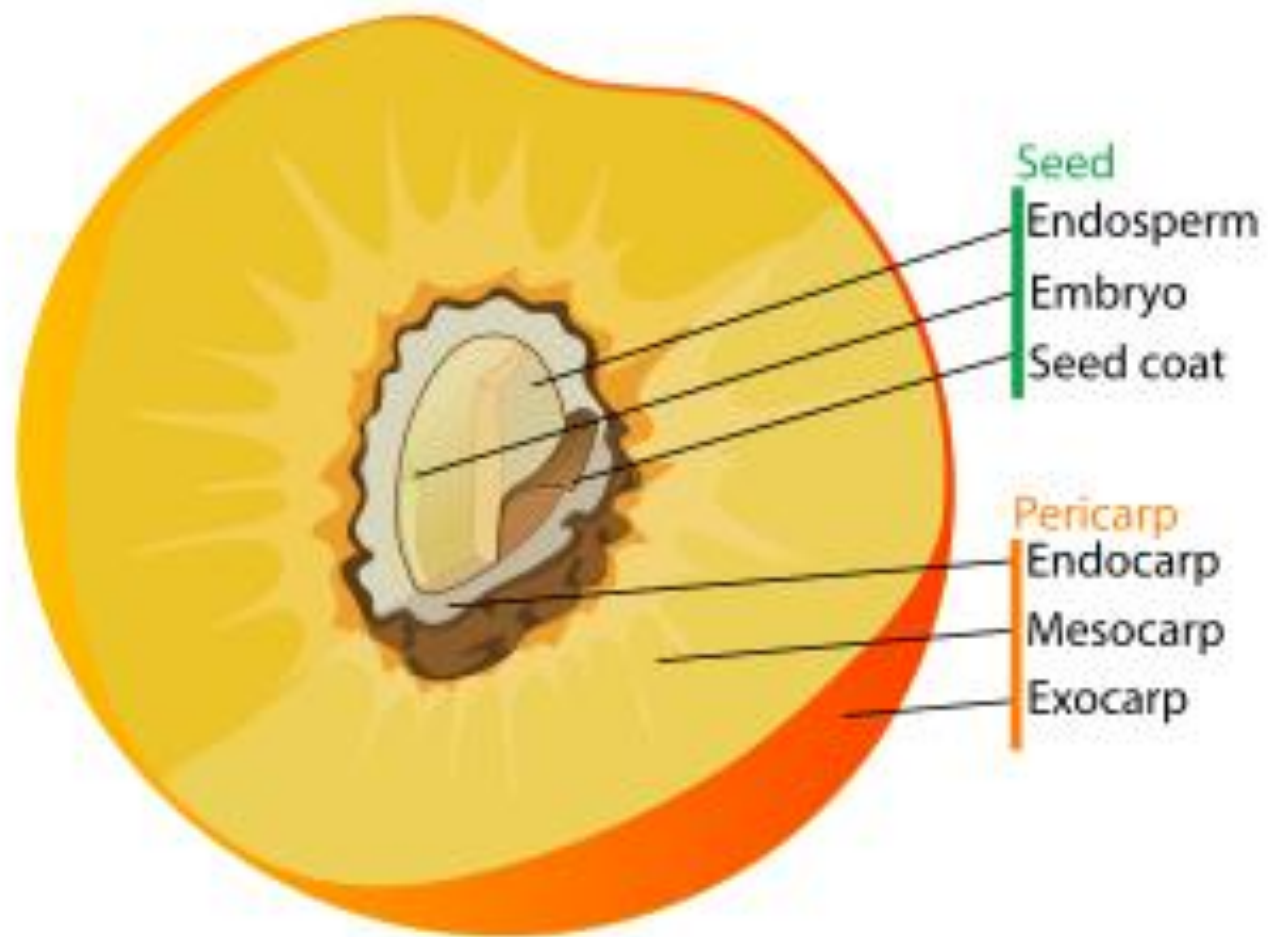


Thematic block: The generative
organs of the herbaceous
plants.

Lesson 4.2. Morphology of the
fruits and seeds.



Fruits with one seed



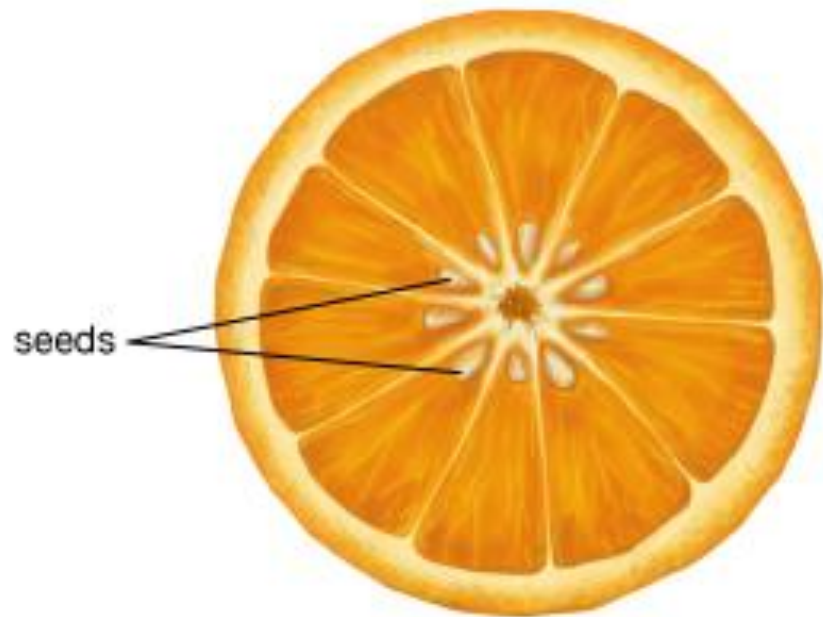
Fruits with many seeds



fleshy fruit



orange

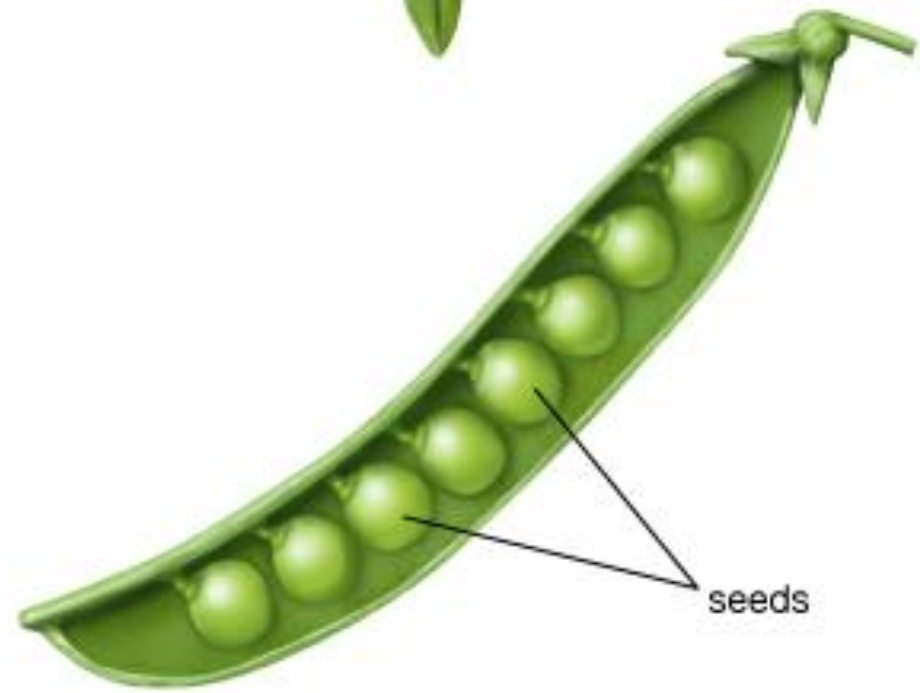


seeds

dry fruit

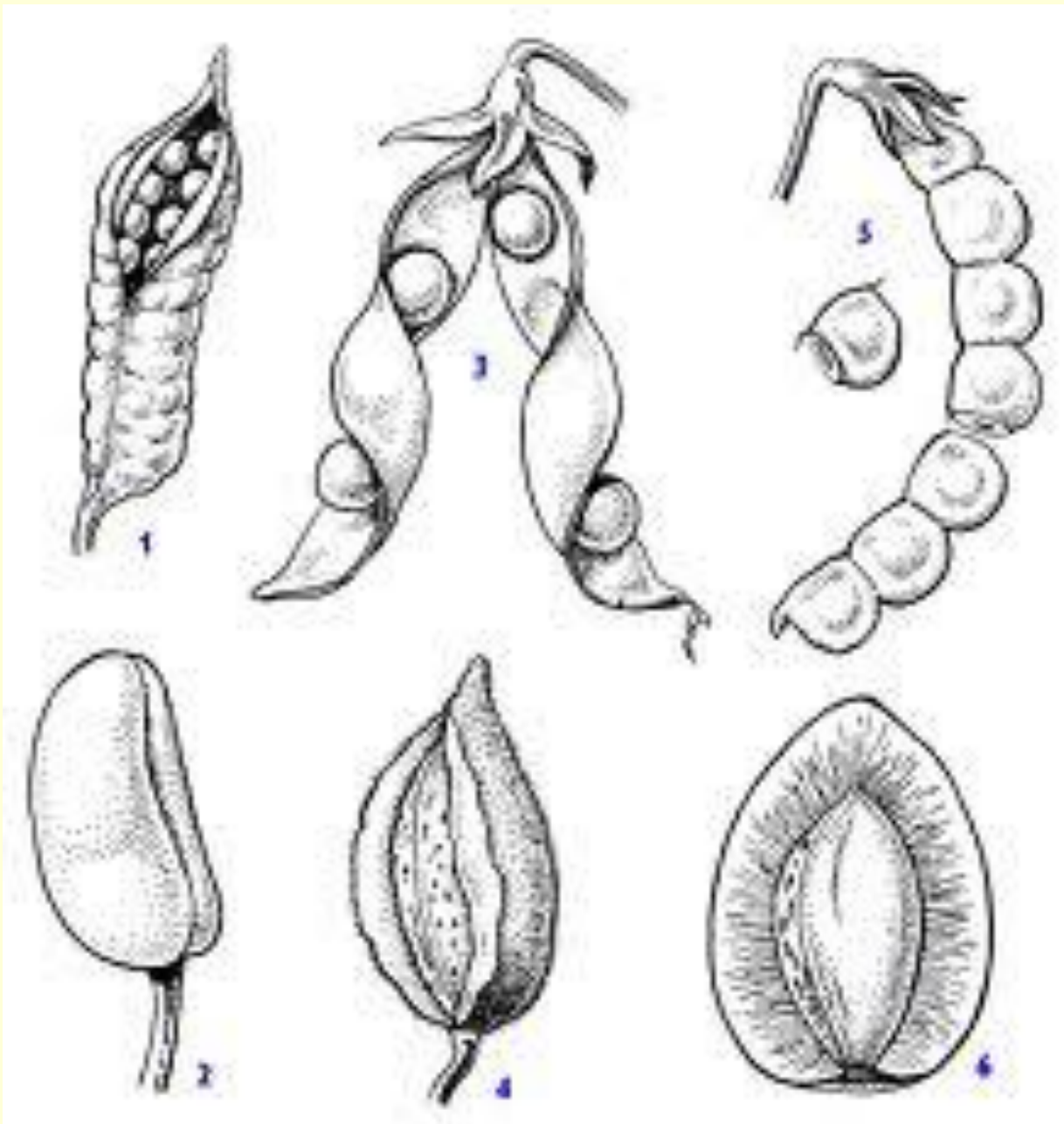


pea

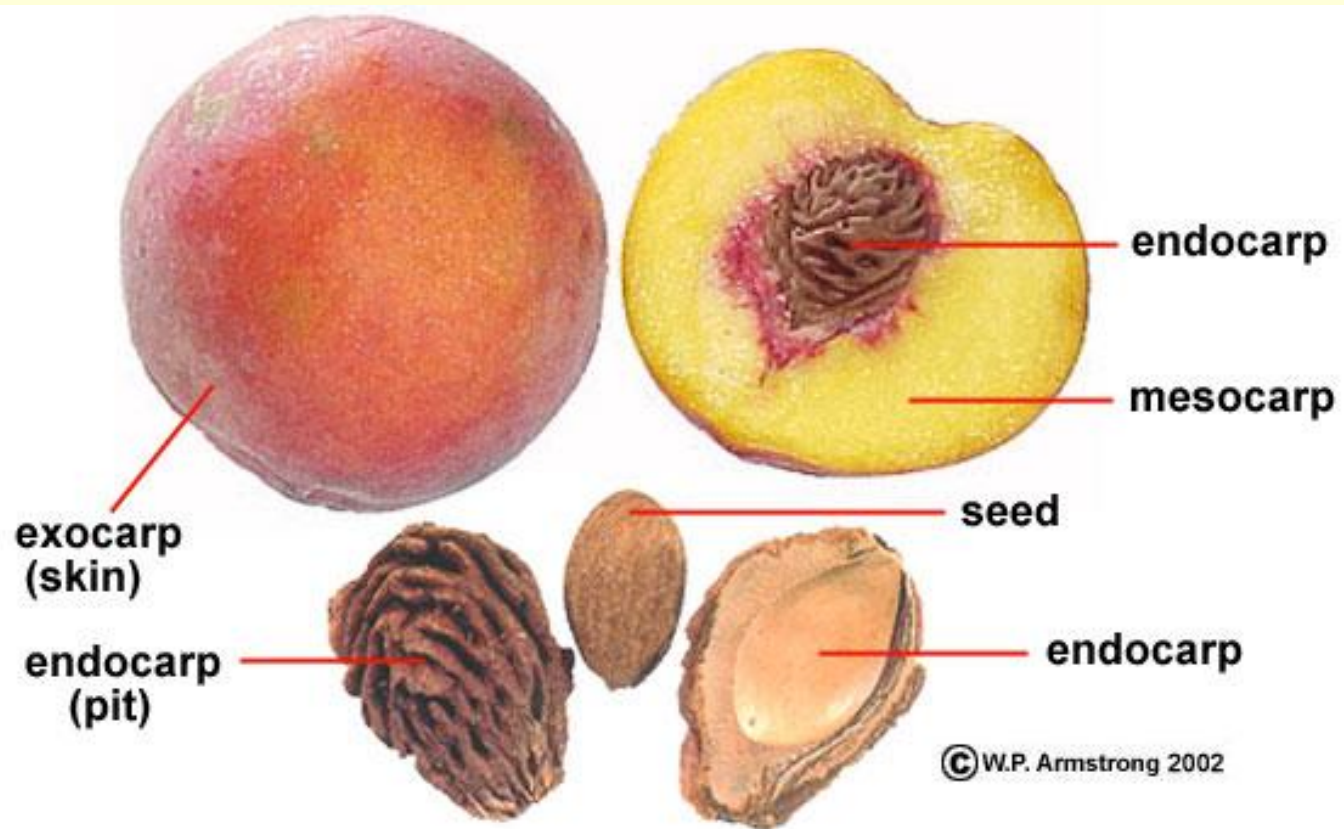


seeds

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

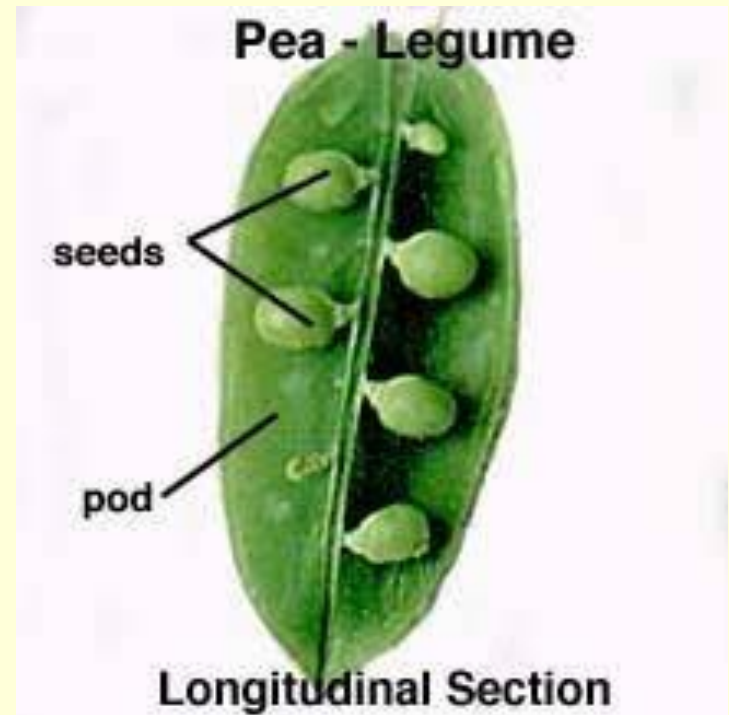


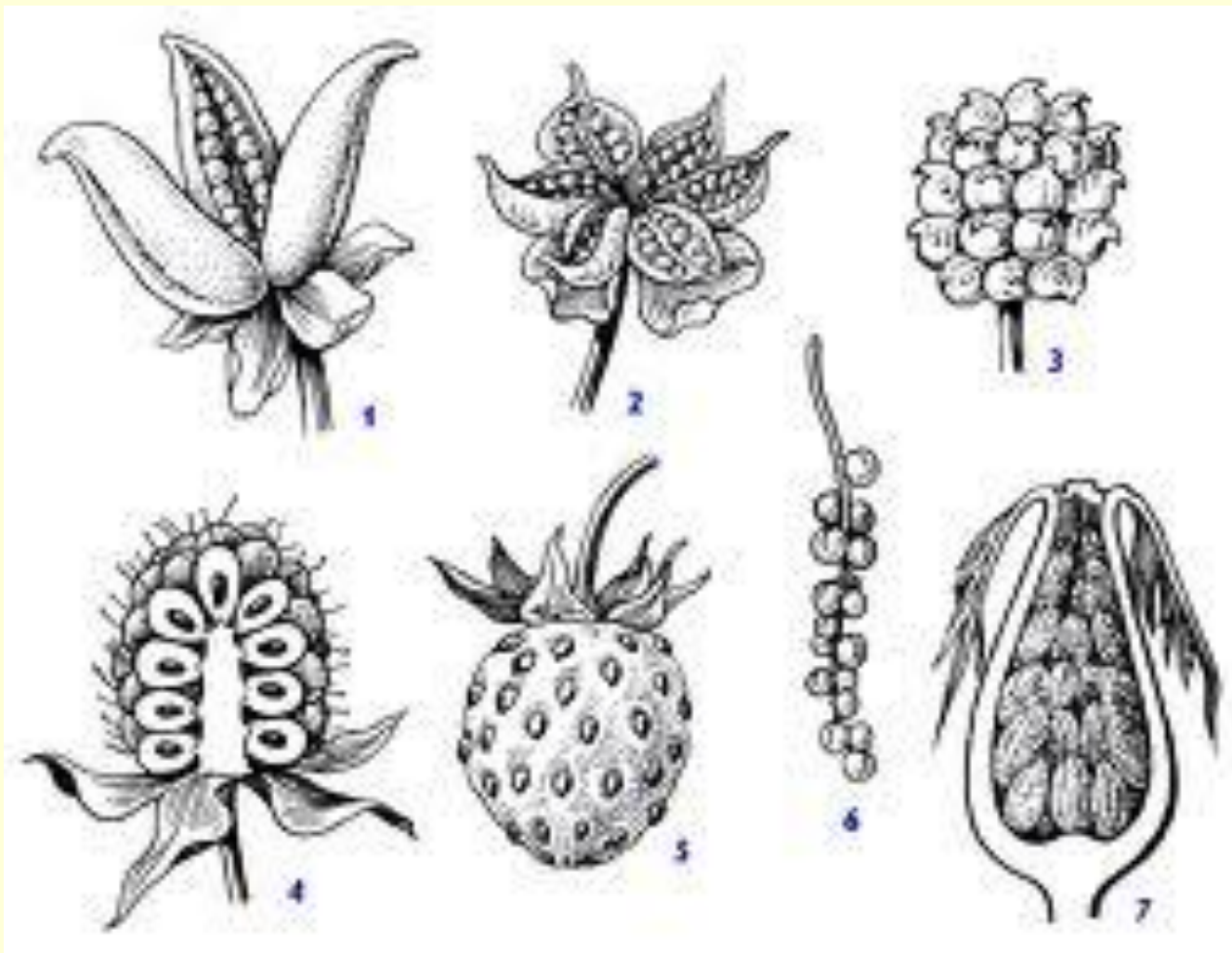
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Drupe (fleshy fruit with a stony endocarp)



the dry drupe of *Amygdalus*



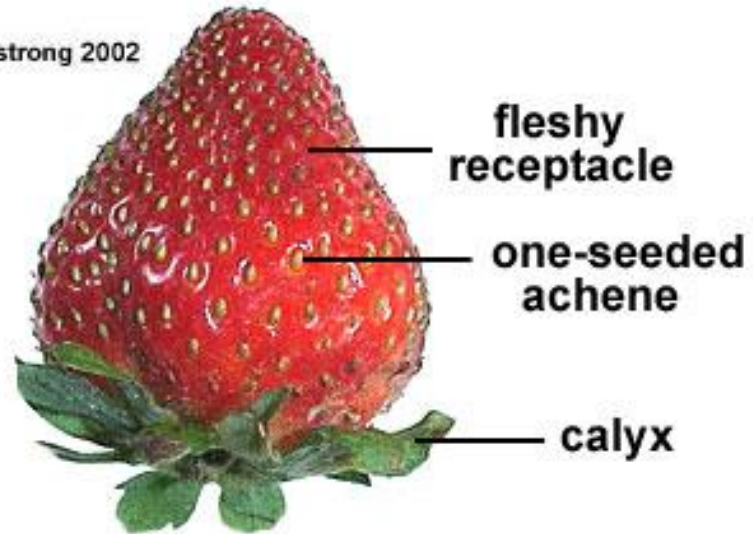


1 – A dry etaerio follicles of Paeonia , 2 - A dry etaerio follicles of Caltha ,
 3 - An etaerio of achenes of Anemone and Ranunculus, 4 - An etaerio of
 drupelets of Rubus ,5 - Utricle of Fragaria ,6 - A flashy etaerio follicles of
Schisandra ,
 7 - cynarrhodium of Rosa .

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Strawberry Flower



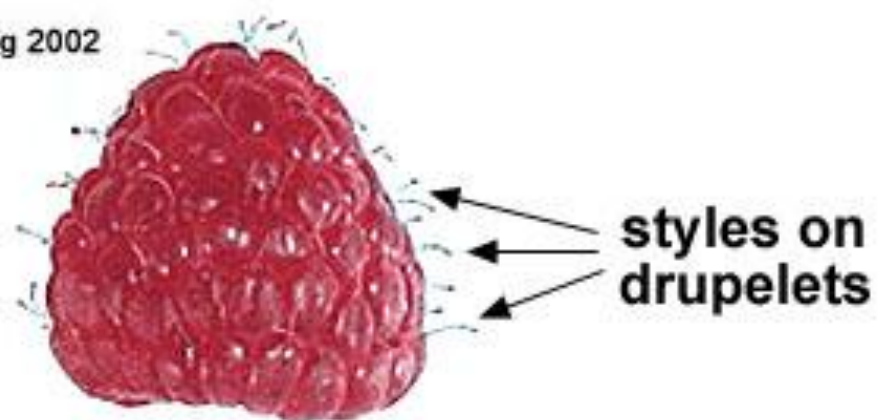
Aggregate Fruit
Many one-seeded achenes
produced by a single flower.

Hybrid Strawberry (*Fragaria ananassa*)

© W.P. Armstrong 2002



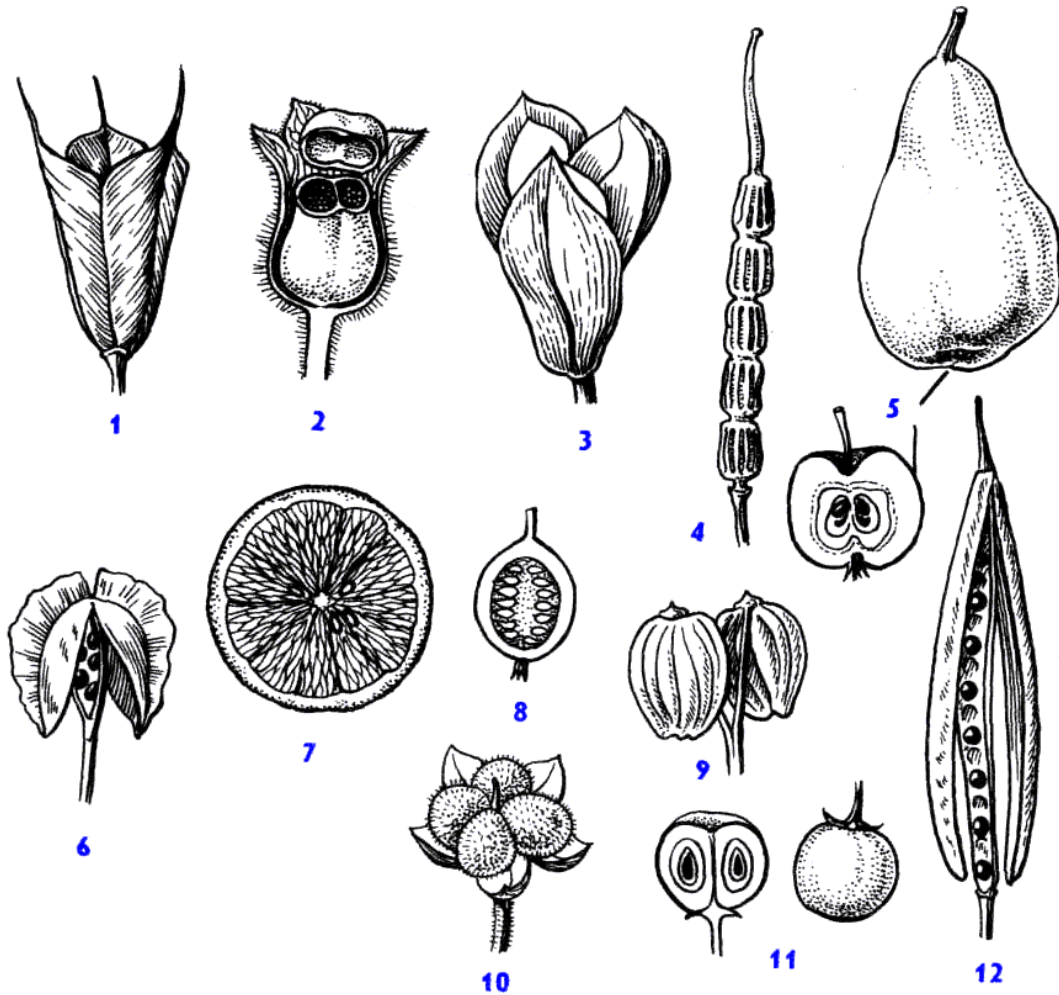
Thimbleberry Flower



Aggregate Fruit

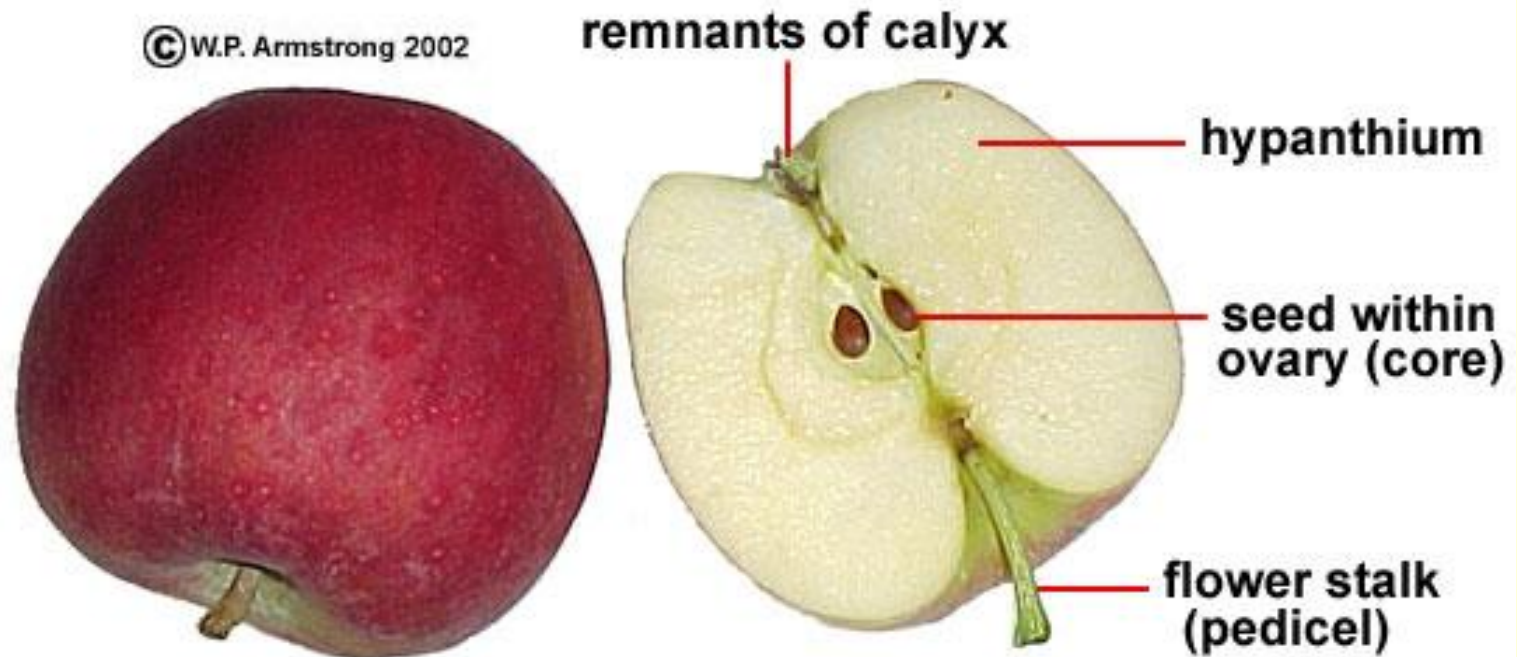
**Many one-seeded drupelets
produced by a single flower.**

Thimbleberry (*Rubus parviflorus*)

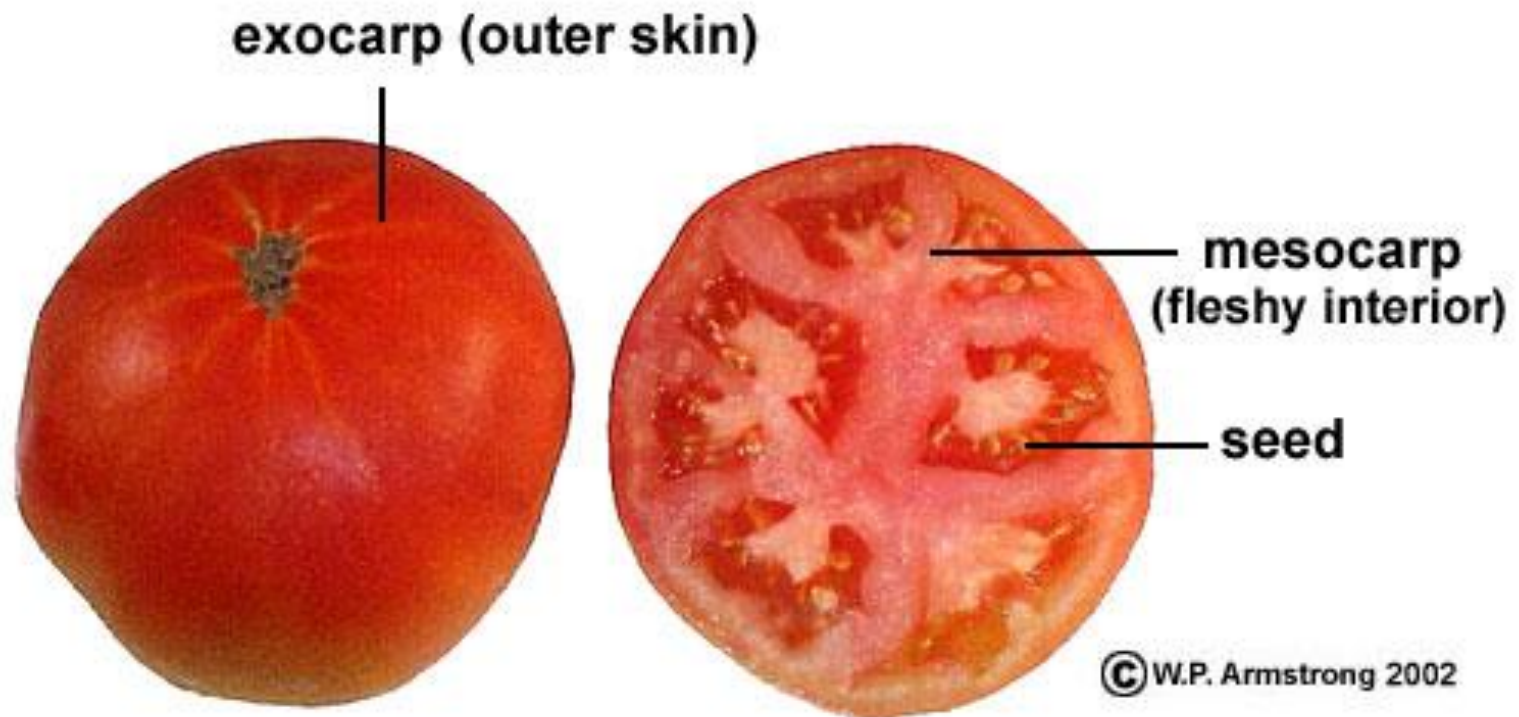


1. An etaerio follicles of Aquifegia ; 2 - loculicidal capsule of Hyoscyamus ; 3 - The septicidal capsule of Tulipa; 4 - lomentaceous silique (pod)of Raphanus ; 5 - pome; 6 - silicle ; 7 - Hesperidium of citrus ; 8 - berry, 9 – Schizocarp of Apiaceae 10 - Coenobium, 11 = berry of Arctostaphylos ; 12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

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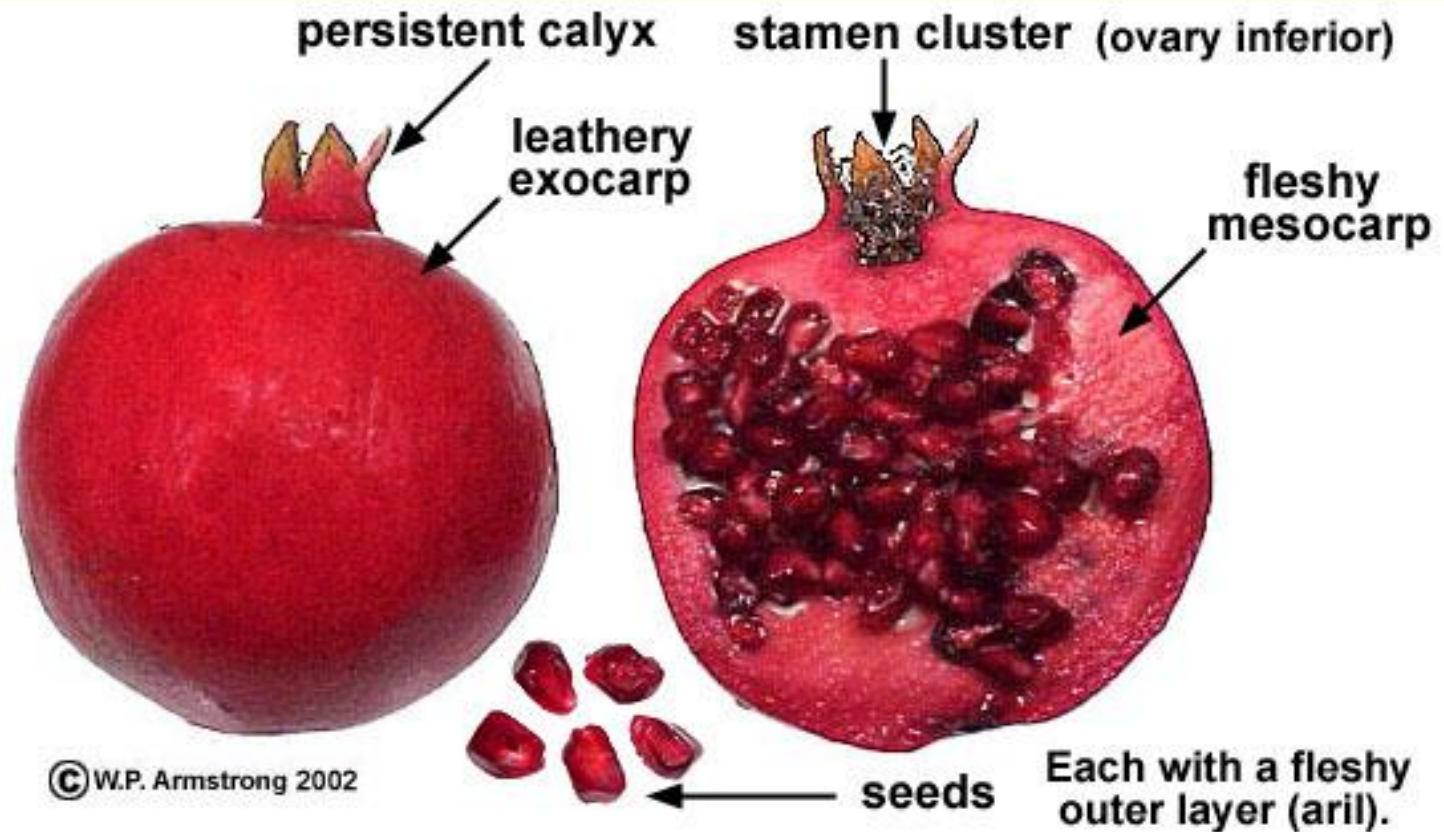


**Pome (ovary surrounded by fleshy hypanthium)
e.g. apple (*Malus domestica* cv. 'gala')**



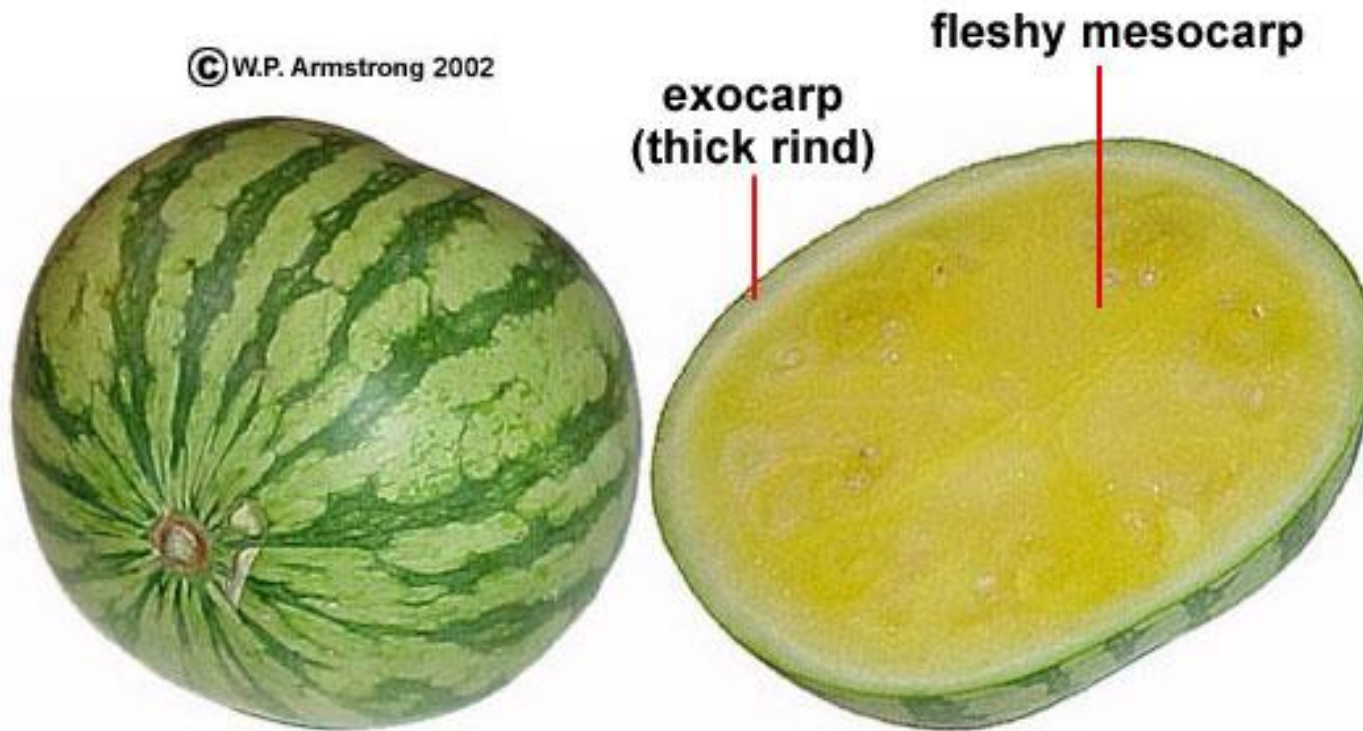
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Berry (All of most of pericarp is fleshy)
e.g. tomato (*Lycopersicon esculentum*)



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

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exocarp
(thick rind)

fleshy mesocarp

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

Leathery rind (exocarp)
with oil glands in pits

mesocarp

endocarp

carpel (section)

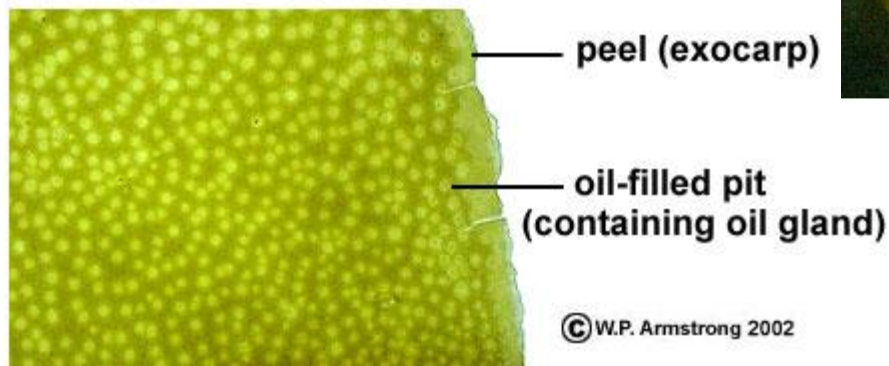
Locule filled with
juice-filled hairs.

seed

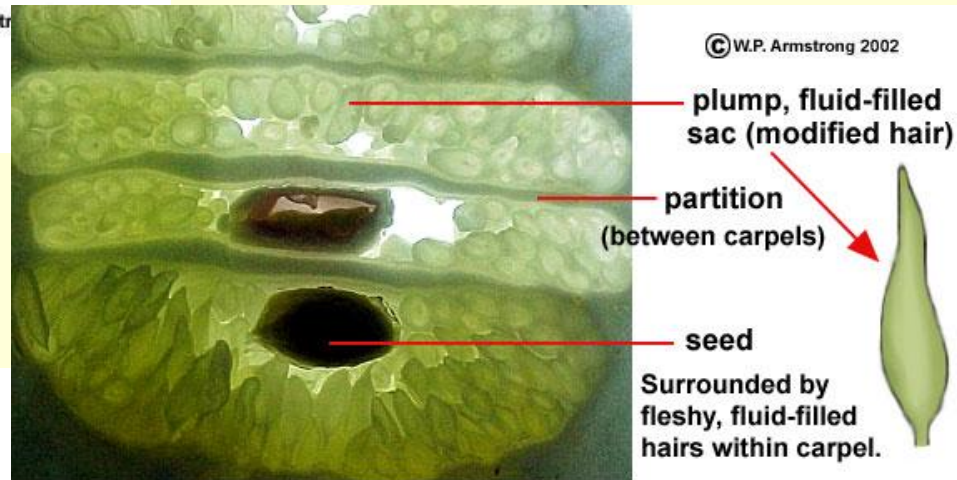
exocarp

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



Magnified View Of The Surface Of A Lemon Peel



Magnified View Of The Sections (Carpels) Of An Orange

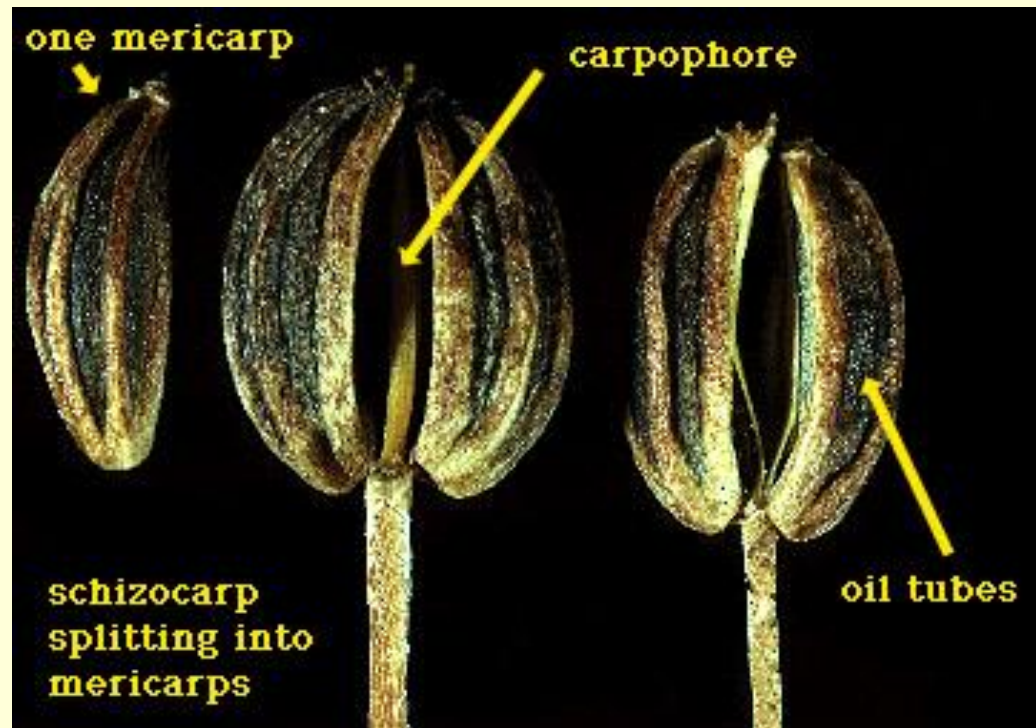


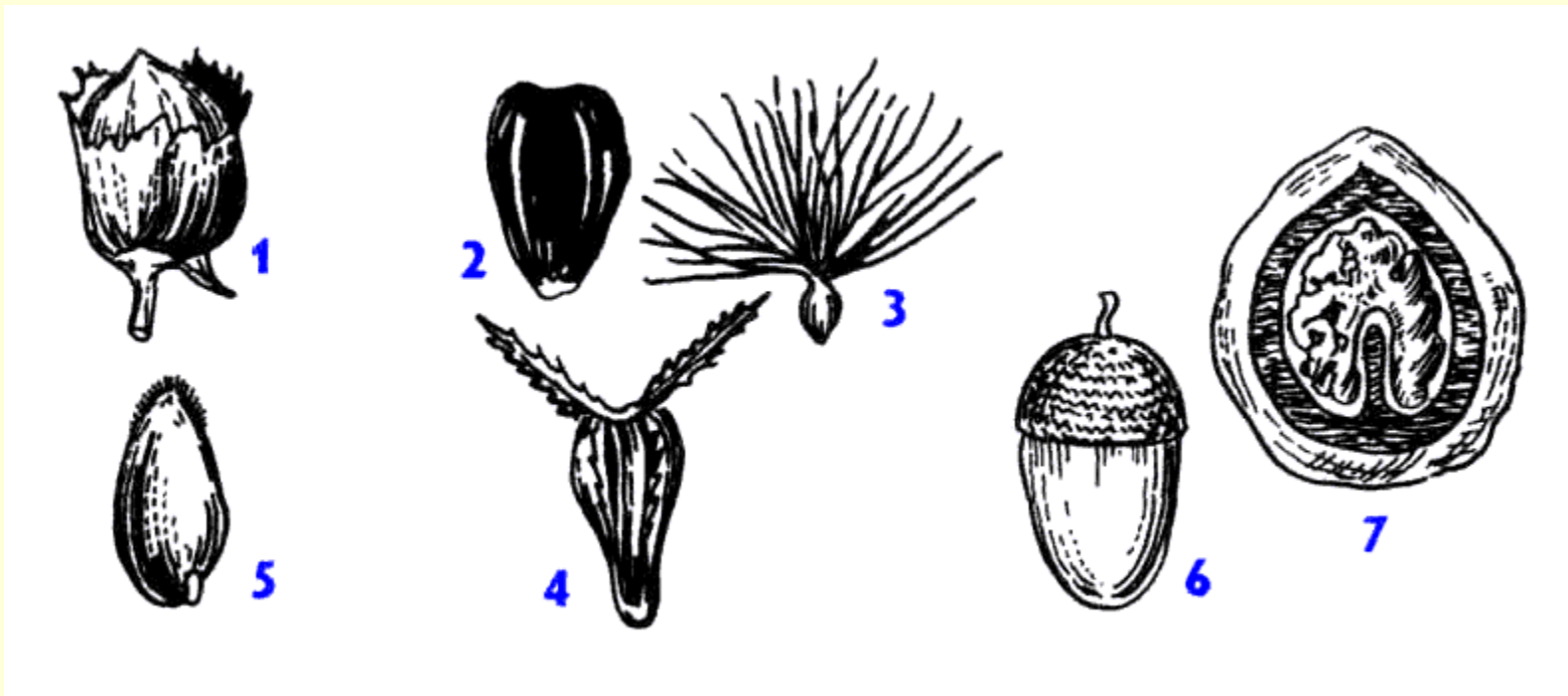
Coenobium of Cynoglossum



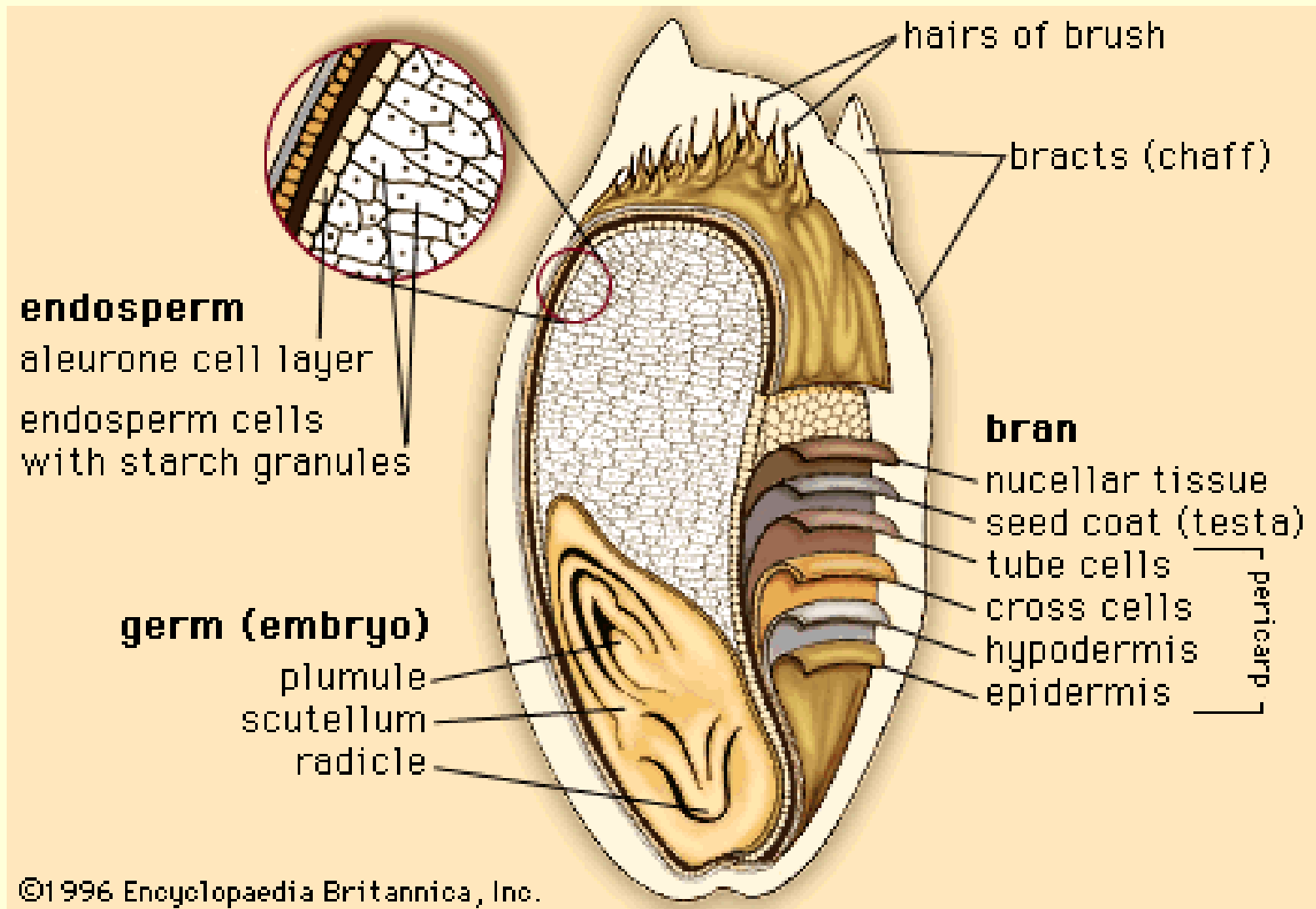
Schizocarp of Malvaceae

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



- **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

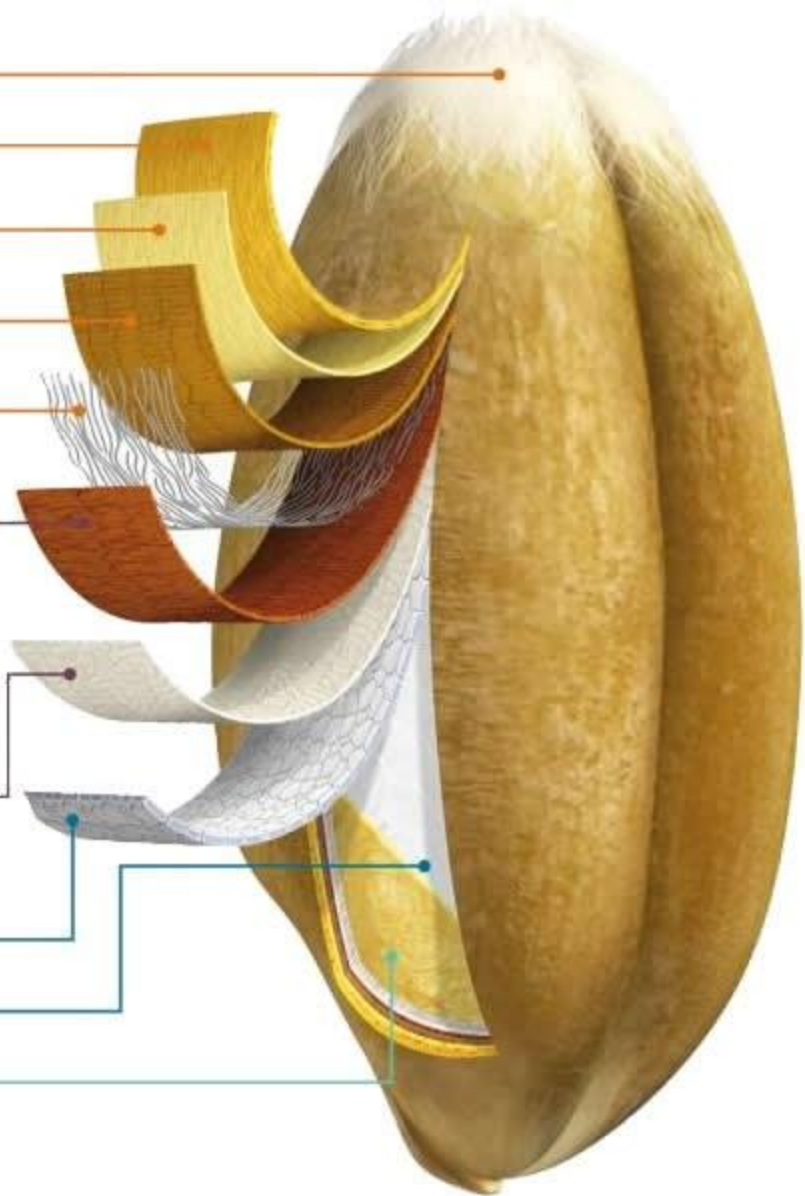
- Hyaline layer/Nucellar layer

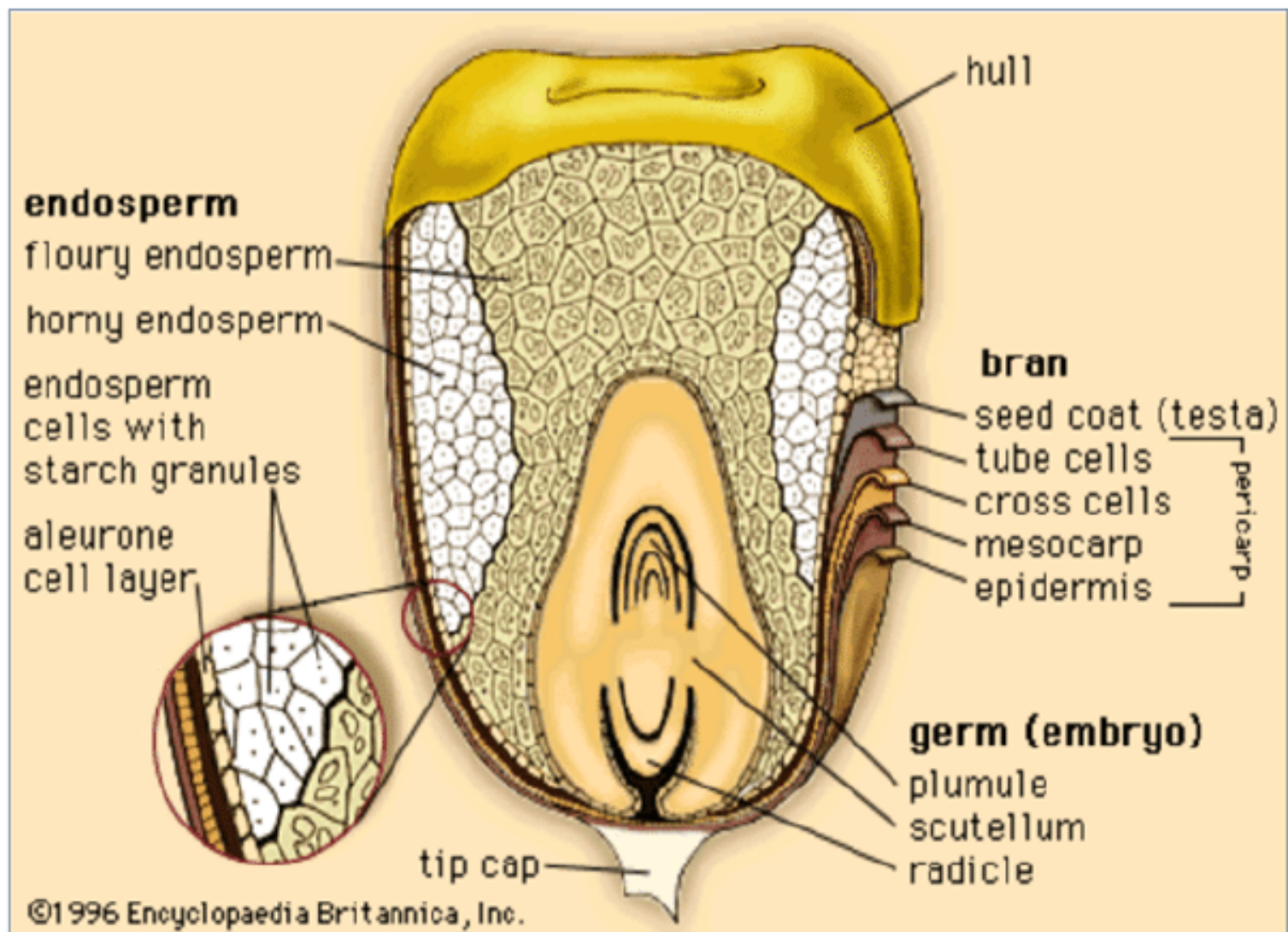
- **ENDOSPERM**

- Aleurone cells/Aleurone layer

- Starchy endosperm/Flour

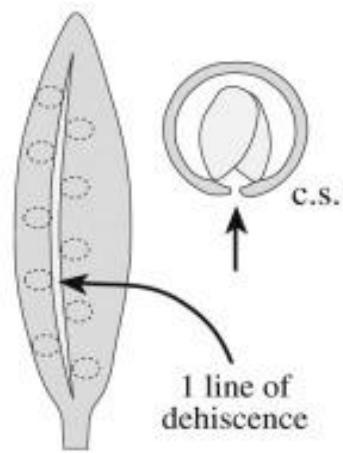
- **GERM/EMBRYO**



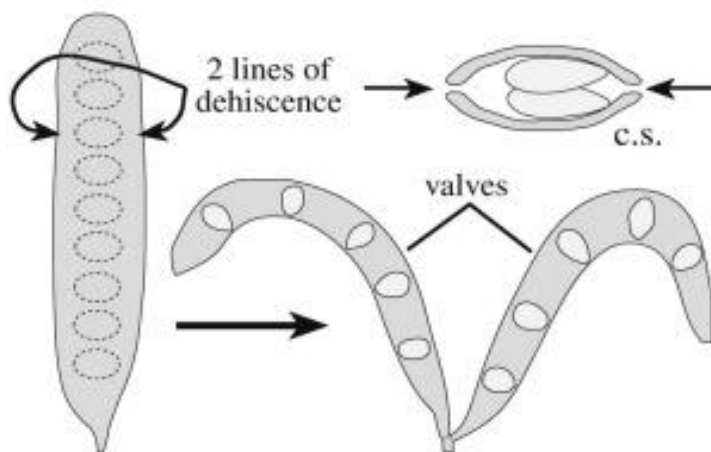




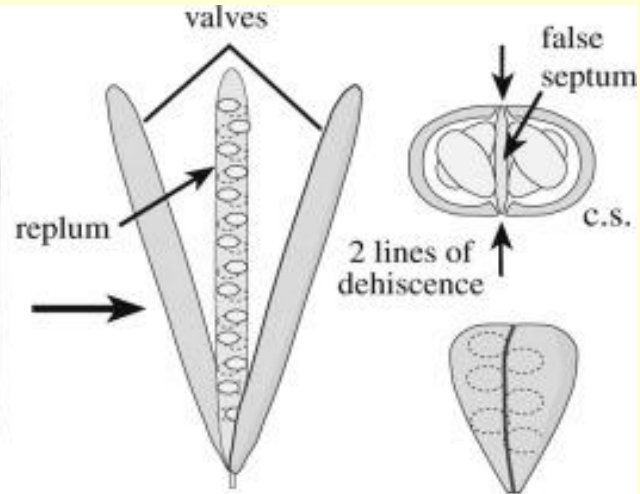
Cypsela of sunflower



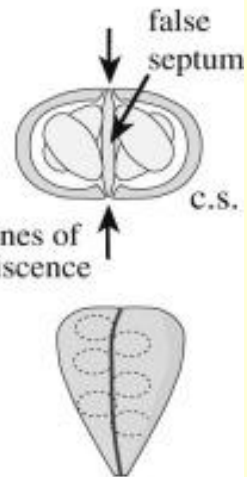
follicle



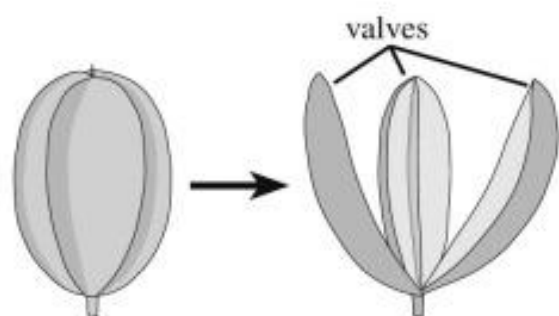
legume



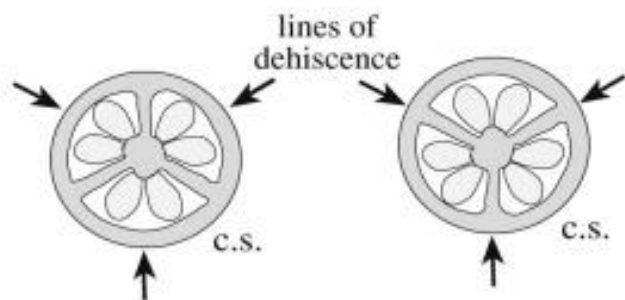
silique



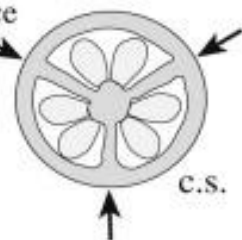
silicle



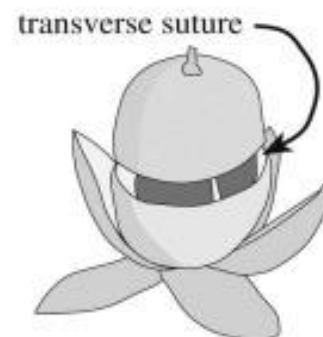
capsule



loculicidal capsule



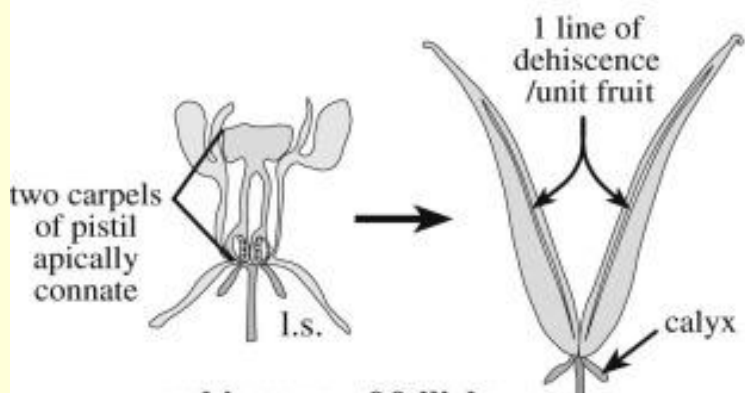
septicidal capsule



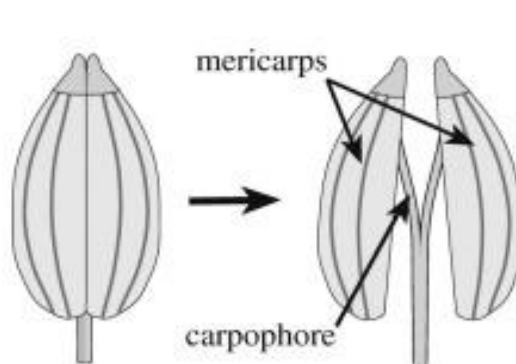
circumscissile capsule



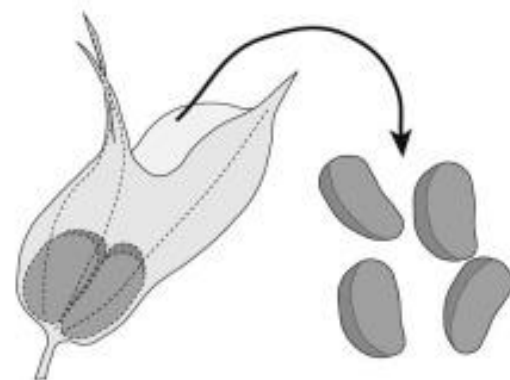
poricidal capsule



schizocarp of follicles

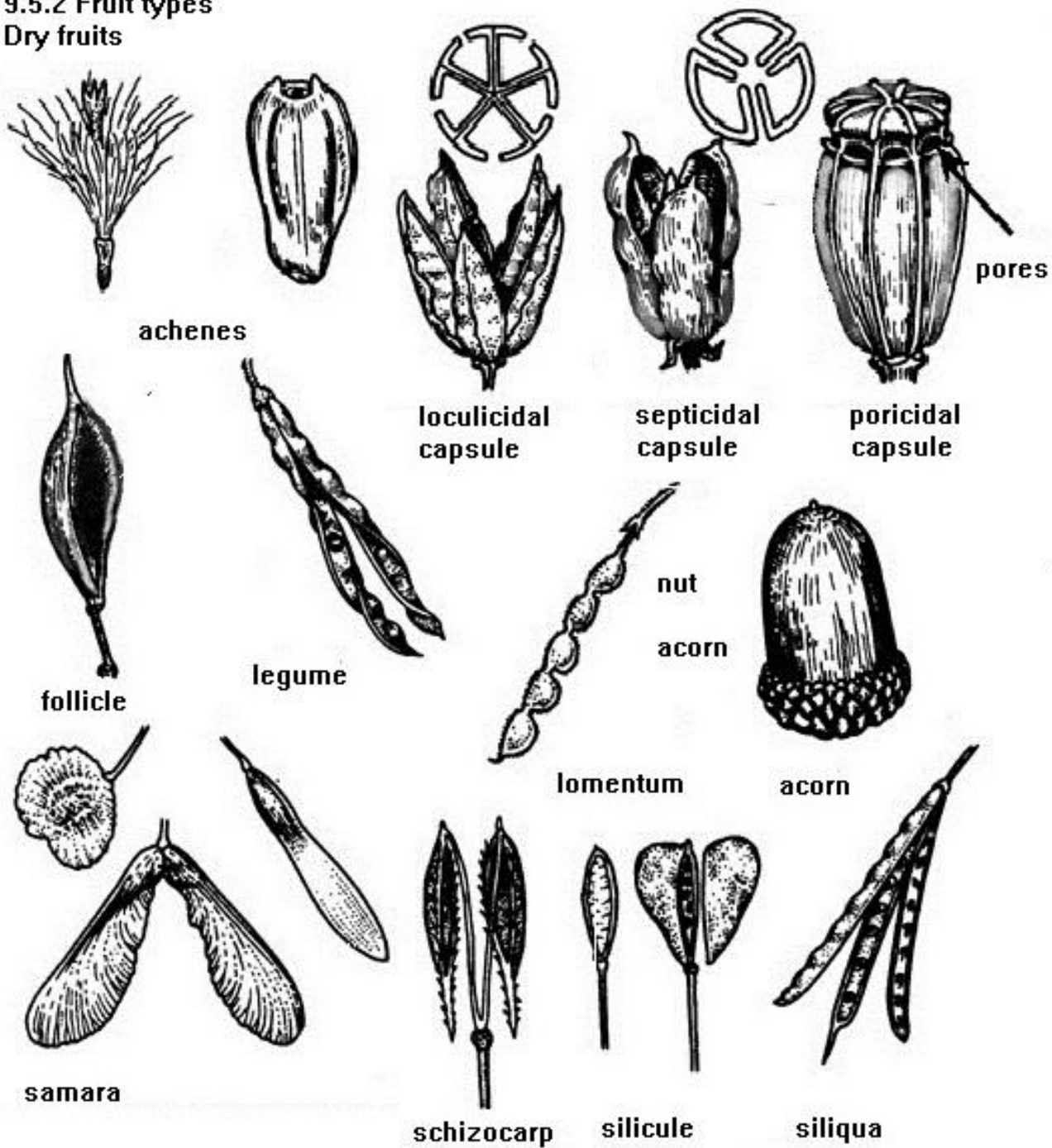


schizocarp of mericarps



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

Сочные костянки барбариса
обыкновенного *Berberis vulgaris*

Бобы Караганы древовидной
Caragana arborescens

Бобы Робинии лжеакации
Robinia pseudoacacia

Однолистовки Живокости полевой
Consolida regalis

Бобы Цериса розкового
Cercis siliguastrum

Бобы Пузырника восточного
Colutea orientalis

Сухая костянка миндаля низкого
Amygdalus nana

Боб Гледичии трехколючковой
Gleditschia triacantha

Боб Гледичии каспийской
Gleditschia caspia



Apocarpous fruits



Многолистовки водосбора
гибридного *Aquilegia hybridum*



Сочные многолистовки
Лимонника китайского
Schisandra chinensis



Многокостянка малины
обыкновенной *Rubus idaeus*



Фрага земляники лесной
Fragaria vesca

Многолистовка Магнолии
крупноцветковой
Magnolia grandiflora



Многолистовки Пузыреплодника
калинолистного *Physocarpus
opulifolius*



Многоорешек Гравилата
городского *Geum urbanum*



Многоорешек роголавника
серповидного *Ceratocephalus
falcatus*



Цин

Apocarpous fruits



Etaherio of achenes of Nelumbo

Syncarpous fruits

стручочки

стручки



Ярутка полевая
Thlaspi arvense



Клоповник пронзеннолистный
Lepidium perfoliatum



Клоповник сорный
Lepidium ruderae



Лунник оживающий
Lunaria rediviva



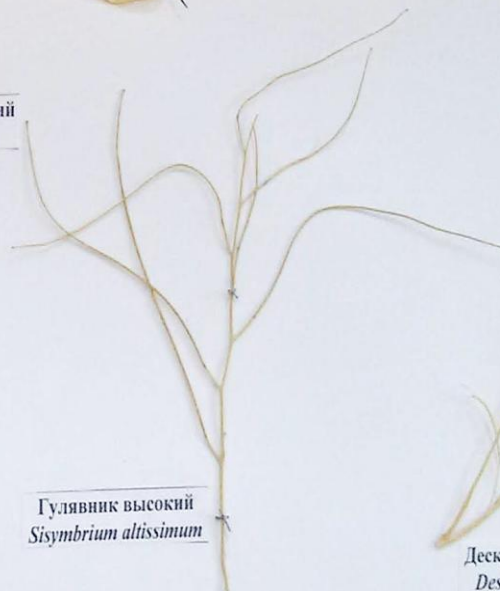
Гулявник волжский
Sisymbrium wolgens



Пастушья сумка
Capsella bursa-pastoris



Икотник серо-зеленый
Berteroa incana



Гулявник высокий
Sisymbrium altissimum



Дескуренния Софьи
Descurainia sofia

Syncarpous fruits

коробочки



Эвкалипт шариковый
Eucalyptus globules



Заразиха песчаная
Orobanche arenaria



Дурман индийский
Datura innoxia



Тюльпан Геснера
Tulipa gesneriana



Белена черная
Hyoscyamus niger



Рябчик русский
Fritillaria ruthenica



Ирис низкий
Iris pumila

Дадарция восточная
Dadarcia orientalis



Клешиевидная обыкновенная
Ricinus communis



Сирень обыкновенная
Syringa vulgaris



Мак самосейка
Papaver roeas



Лук репчатый
Allium cepa



Дрема белая
Melandrium album

Syncarpous fruits



Схизокарпий Мальвы
морщинистой *Malva rugosa*



Ценобий чернокорня
лекарственного *Synoglossum
officinale*



Схизокарпий Провириника
низкого *Malva pusilla*



Ценобий Пустырника сердечного
Leonurus cardiaca



Вислоплодник купыря лесного
Anthriscus sylvestris



Ценобий Чернокорня
лекарственного *Synoglossum
officinale*

Syncarpous fruits



Coriandrum

Schizocarp of Apiaceae



Capsule of Datura

Carum

Syncarpous fruits



Яблочки Ирги круглолистной
Amelanchier rotundifolia



Яблочки боярышника
Crataegus sp.



Гесперидий Лимона
Citrus limonum



Яблоко Груши обыкновенной
Pyrus communis

Тыквина Тыквы обыкновенной
Cucurbita pepo



Гранат Гранатового дерева
Punica granatum

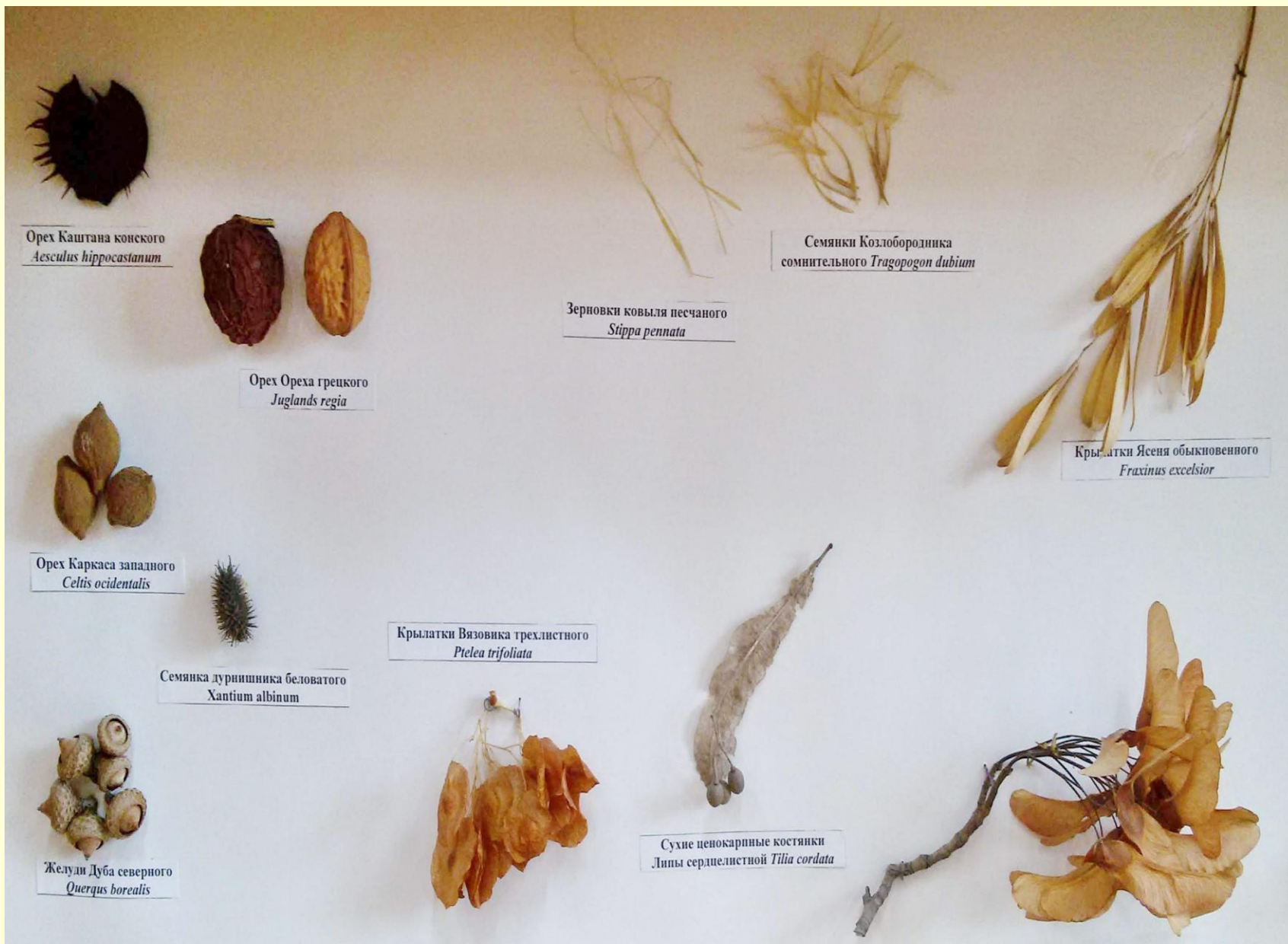


Ягода Перца однолетнего
Capsicum annuum

Ягода Спаржи лекарственной
Asparagus officinalis



Pseudomonocarpous fruits



Infructescence



Хмель вьющийся
Humulus lupulus



Шелковица белая
Morus alba



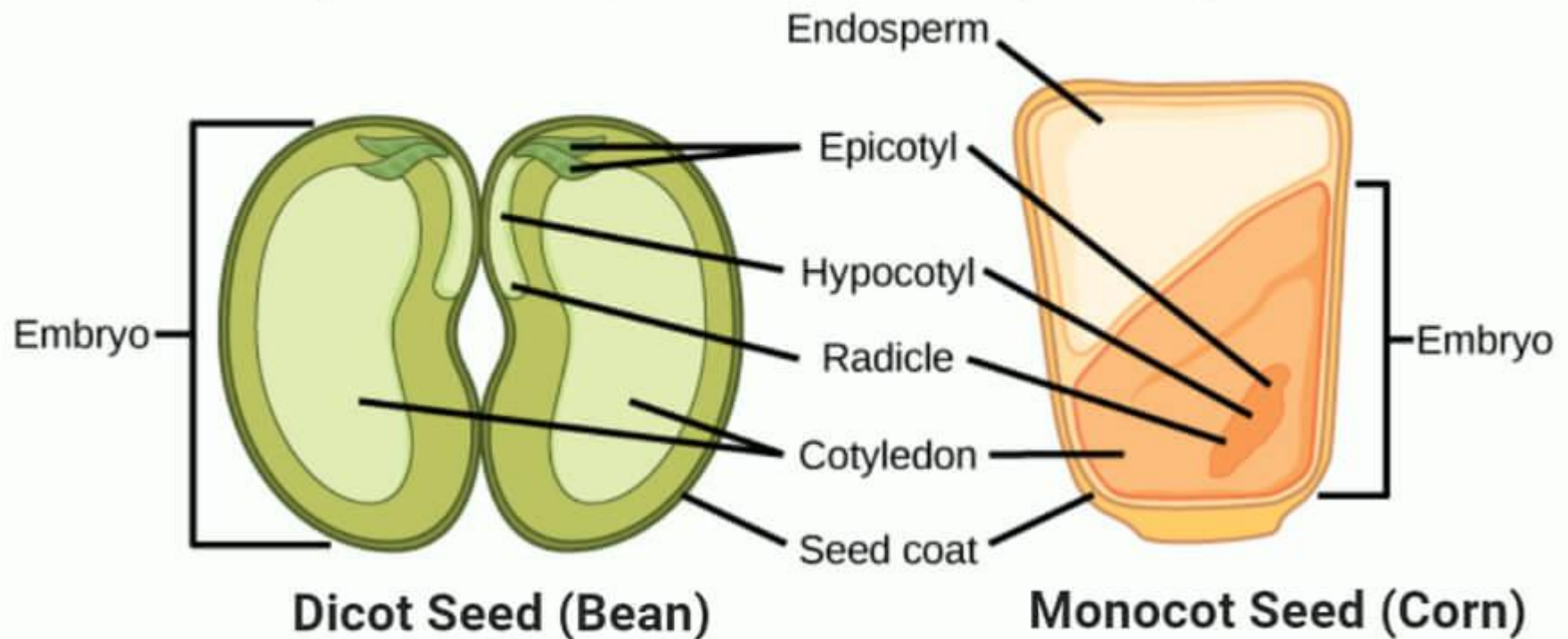
Нижир
Ficus carica



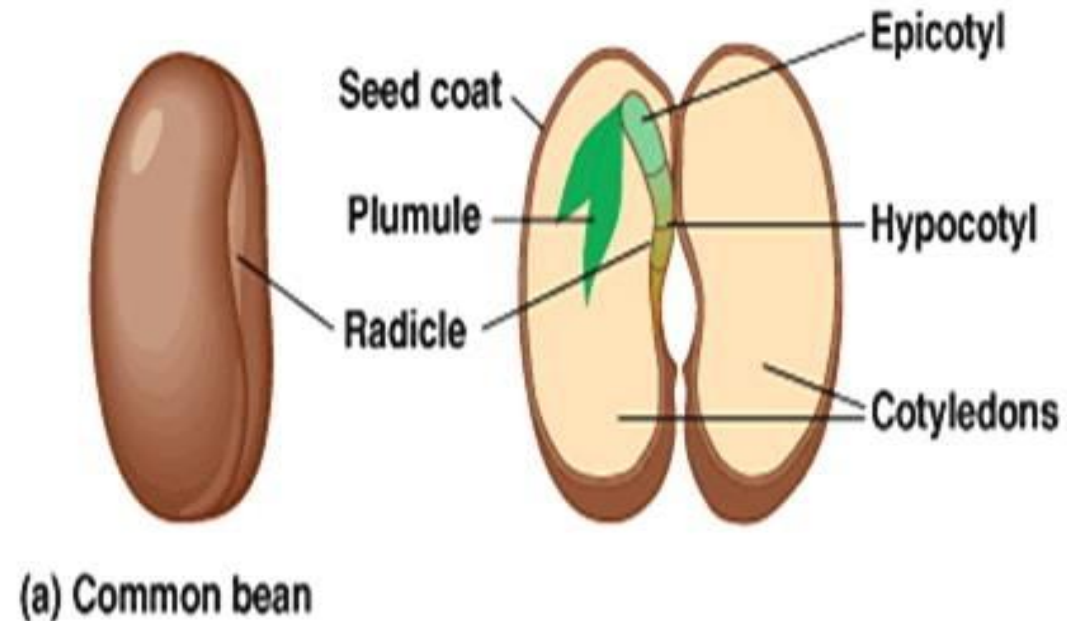
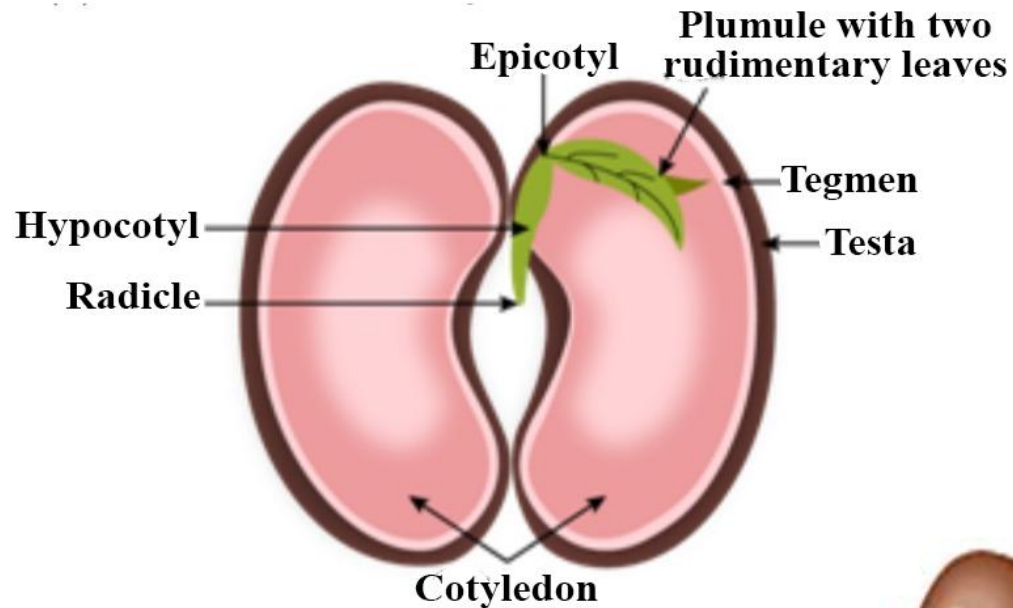
Ольха клейкая
Alnus glutinosa

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.

