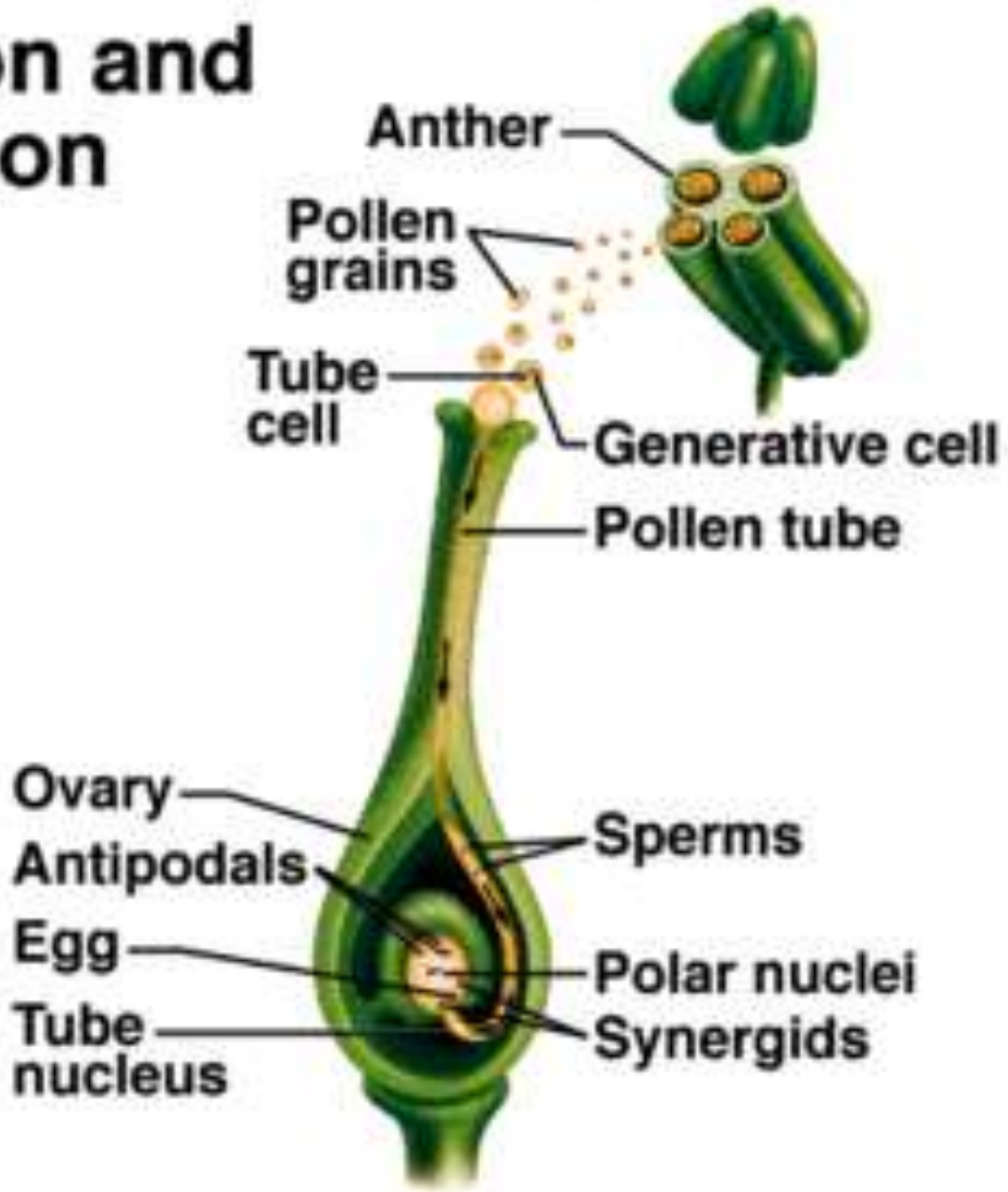
Plant Life Cycle: Fruits and Seeds

From ovary to fruit

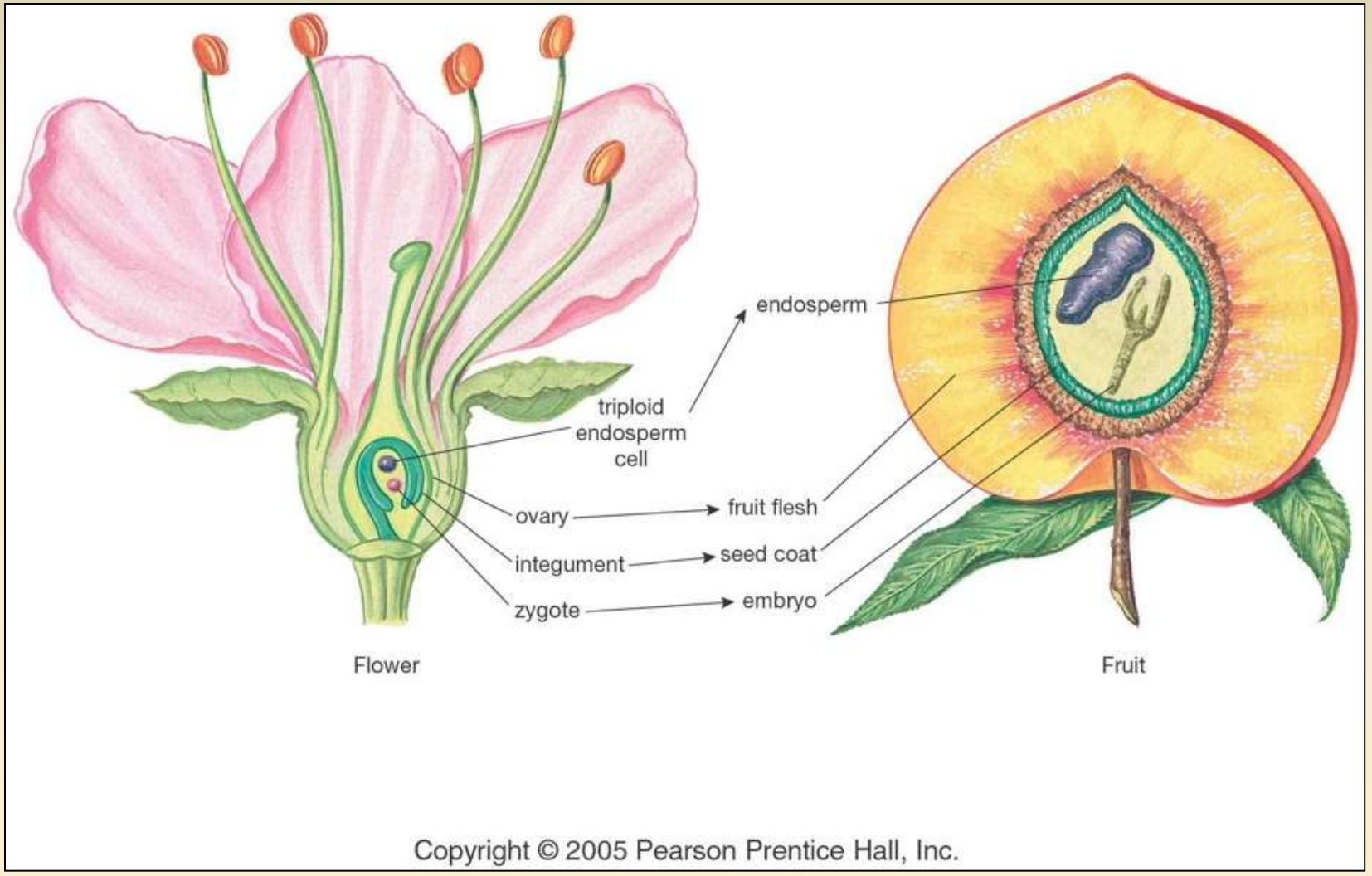
- The ovary of the flower contains the ovules.
- As fertilized ovules develop into seeds, the ovary wall develops into the fruit.
- In science, the term “fruit” refers to a mature ovary that contains seeds.

Randy Moore, Dennis Clark, and Darrell Vodopich, Botany Visual Resource Library © 1998 The McGraw-Hill Companies, Inc. All rights reserved.

Pollination and Fertilization



From ovary to fruit



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Fruit Types

- A fruit may be defined as a matured ovary
- There are two basic fruit types – dry or fleshy. These types arise from the development of the ovary wall (=pericarp)
- The pericarp may become dry and these form dry fruits
- The pericarp may also become soft, thick and fleshy – and these form fleshy fruits
- Dryfruits can also split in various ways (dehiscent), or not (indehiscent)

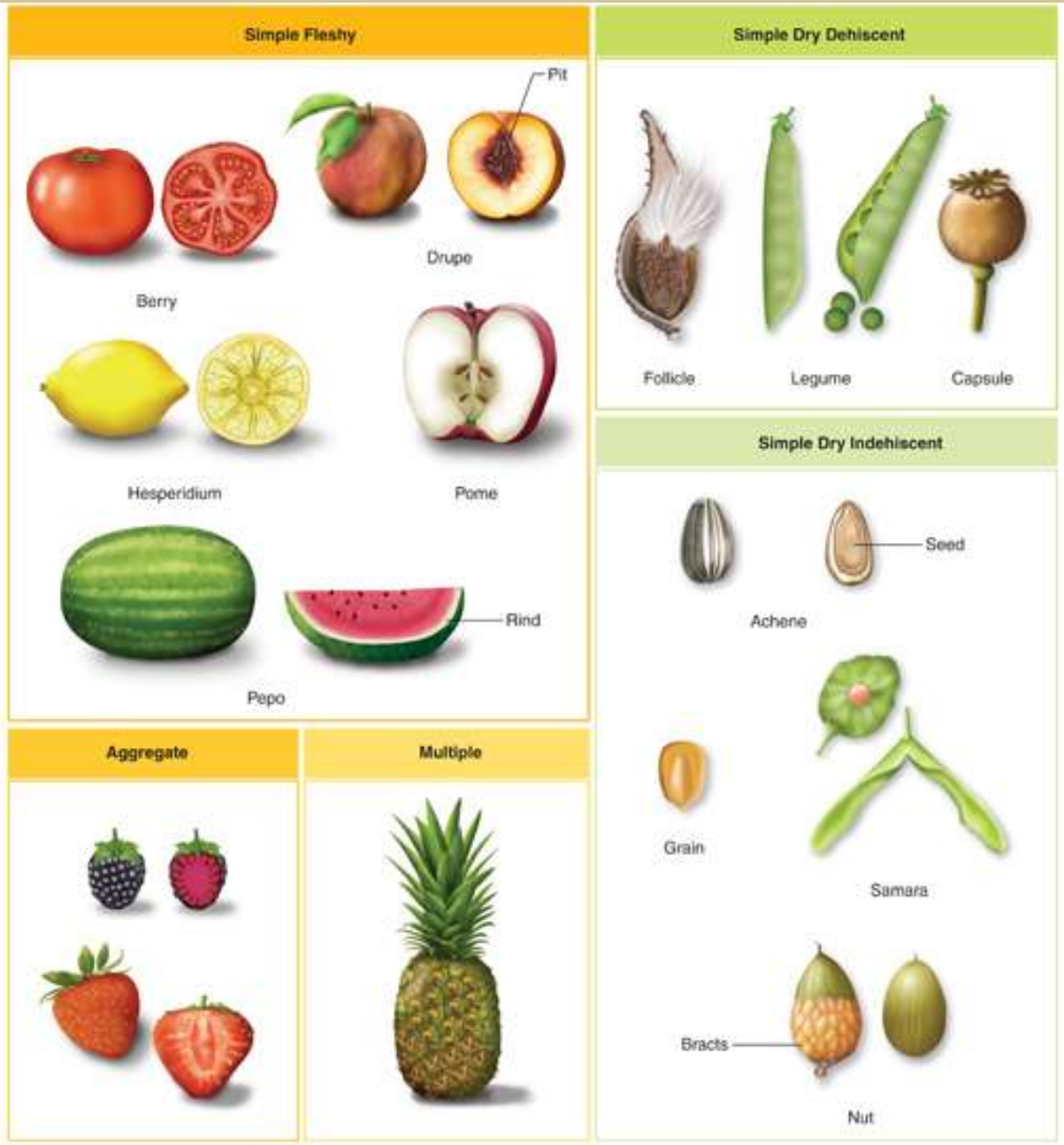
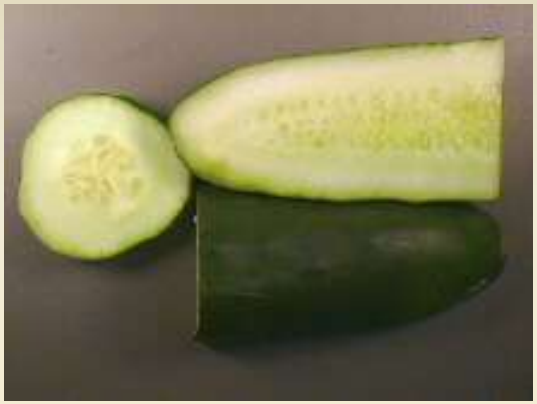


Figure 6.1 The berry, hesperidium, pepo, and pome are fruits in which at least part of the pericarp is soft and juicy. Fruits such as the follicle, legume, and capsule are characterized by the way in which they open. Achenes, grains, and nuts are dry fruits that do not split open to disperse the seed. A samara (as in elm or maple) is a winged fruit that uses wind as the dispersal agent. Blackberries and strawberries are collections of fruits that develop from the many separate carpels of a single flower. The pineapple is a multiple fruit that forms when the ovaries of individual flowers in a flower cluster fuse.

Types of fleshy fruits

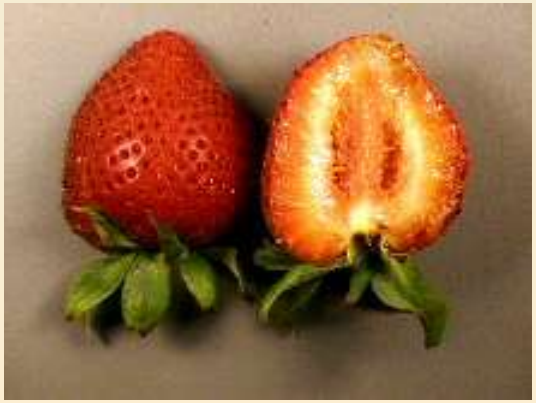
Drupe
(Peach)

Pome
(Apple)



Pepo
(Cucumber)

Berry
(Tomato)



Aggregate
(Strawberry)

Multiple
(Pineapple)

Dry Fruits

Dry Fruits Dehiscent

Follicle-one side

http://arnica.csustan.edu/key/FOLLICLE.JPG

Example: milkweed

Legume-two sides

http://arnica.csustan.edu/key/LEGUME.JPG

Example: honey locust

Capsule-multiple

http://arnica.csustan.edu/key/CAPSULE.JPG

Example: hibiscus

Dry Fruits Indehiscent

Achene - cypsela

http://arnica.csustan.edu/key/ACHENE.JPG

Example: sunflower

Grain - caryopsis

http://arnica.csustan.edu/key/CORN.JPG

Example: corn

Nut with involucre

http://arnica.csustan.edu/key/NUT.JPG

Example: oak

Types of dry fruits

Legume
(Bean pod)

Capsule
(Poppy)

Achene
(Sunflower)

Silique
(Money Plant)

Follicle
(Columbine)

Nut
(Hazelnut)

Fruit Origins: Simple Fruit

Aggregate Fruit

Multiple Fruit

FRUITS

orange

mandarin

grapefruit

lemon

lime

kiwi

pineapple

pomegranate

avocado

pomelo

coconut

melon

banana

pear

peach

plum

quince

apricot

watermelon

cherry

blueberry

apple

strawberry

grape

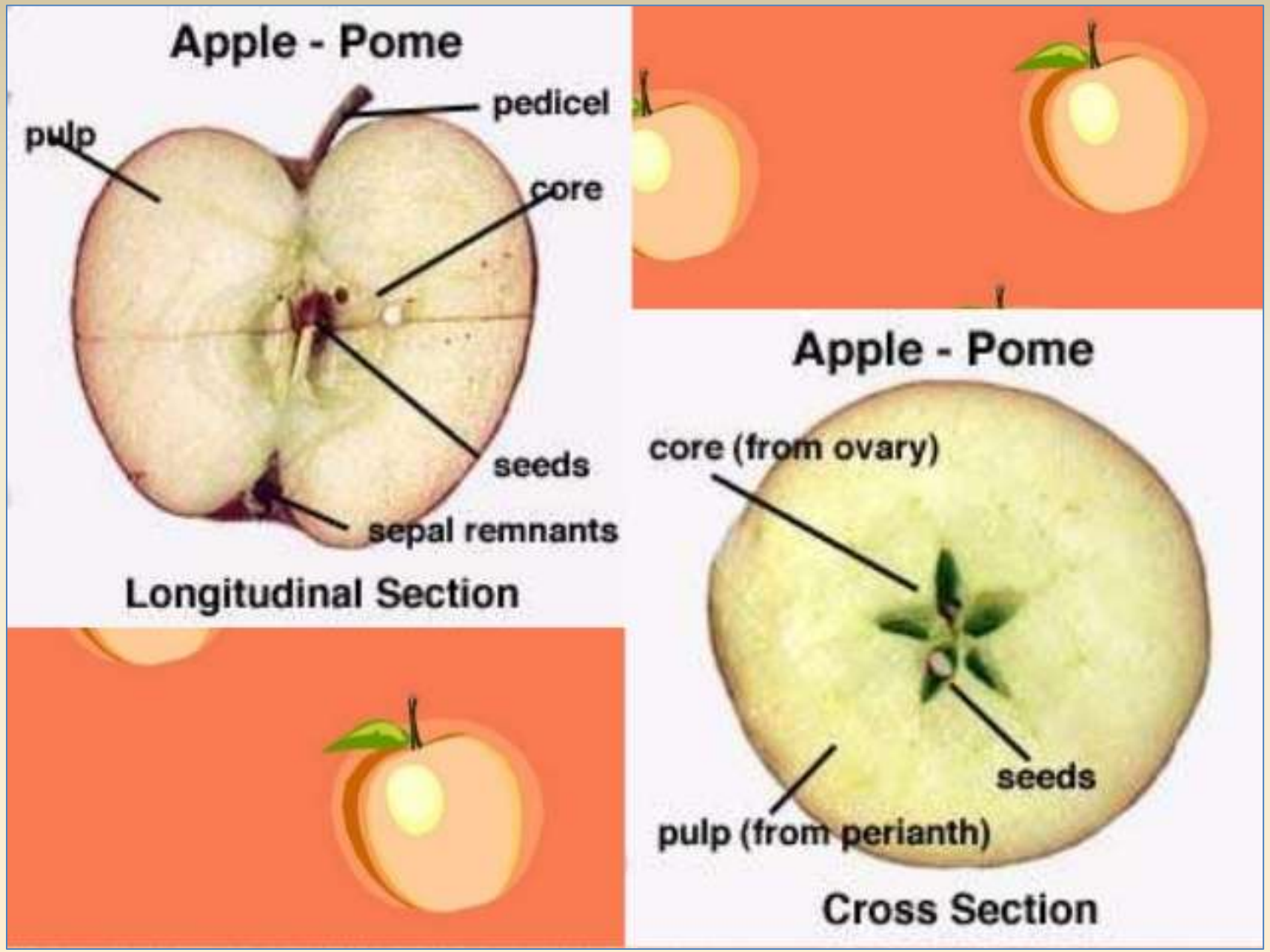
fig

pitaya (dragon)

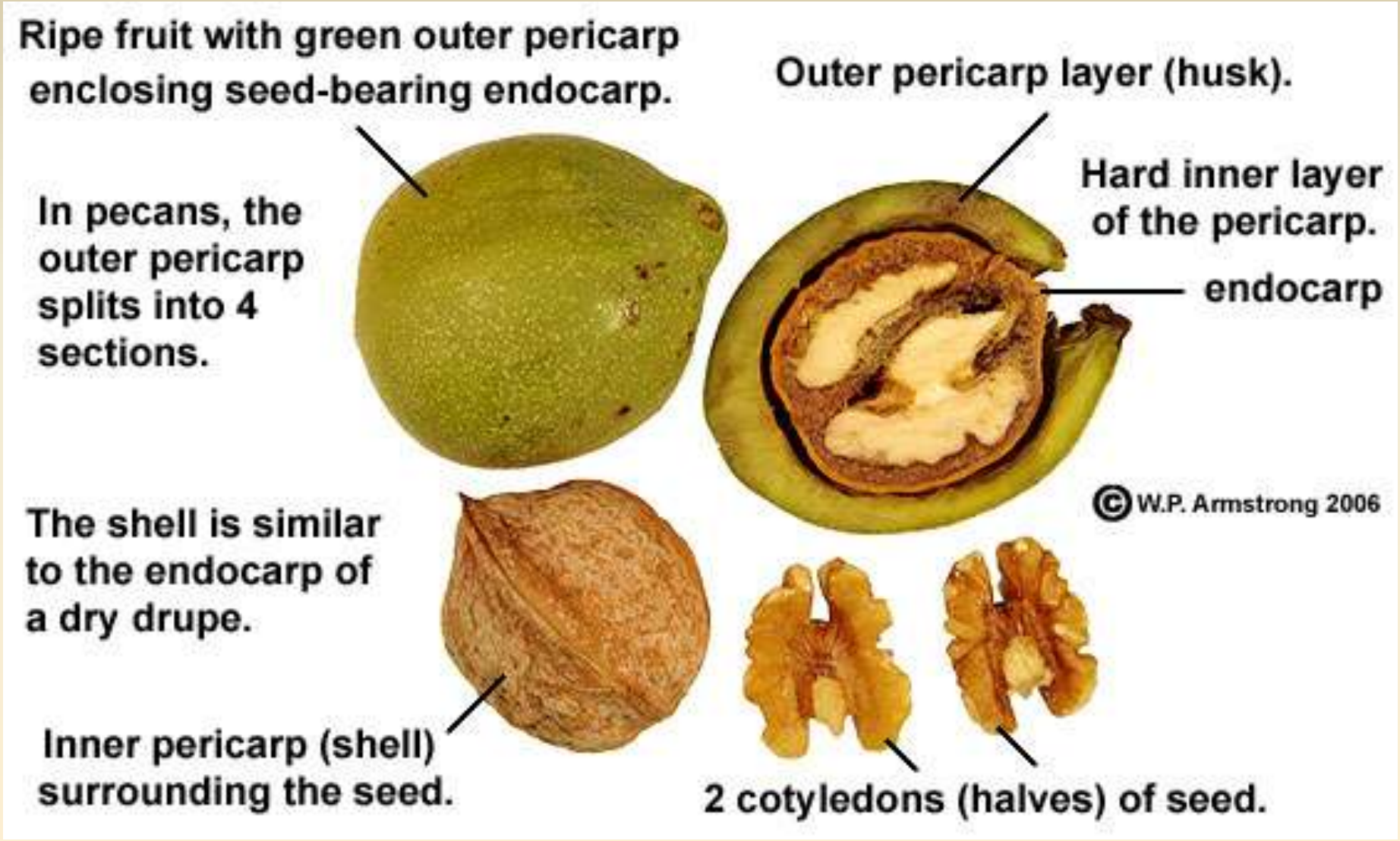
papaya

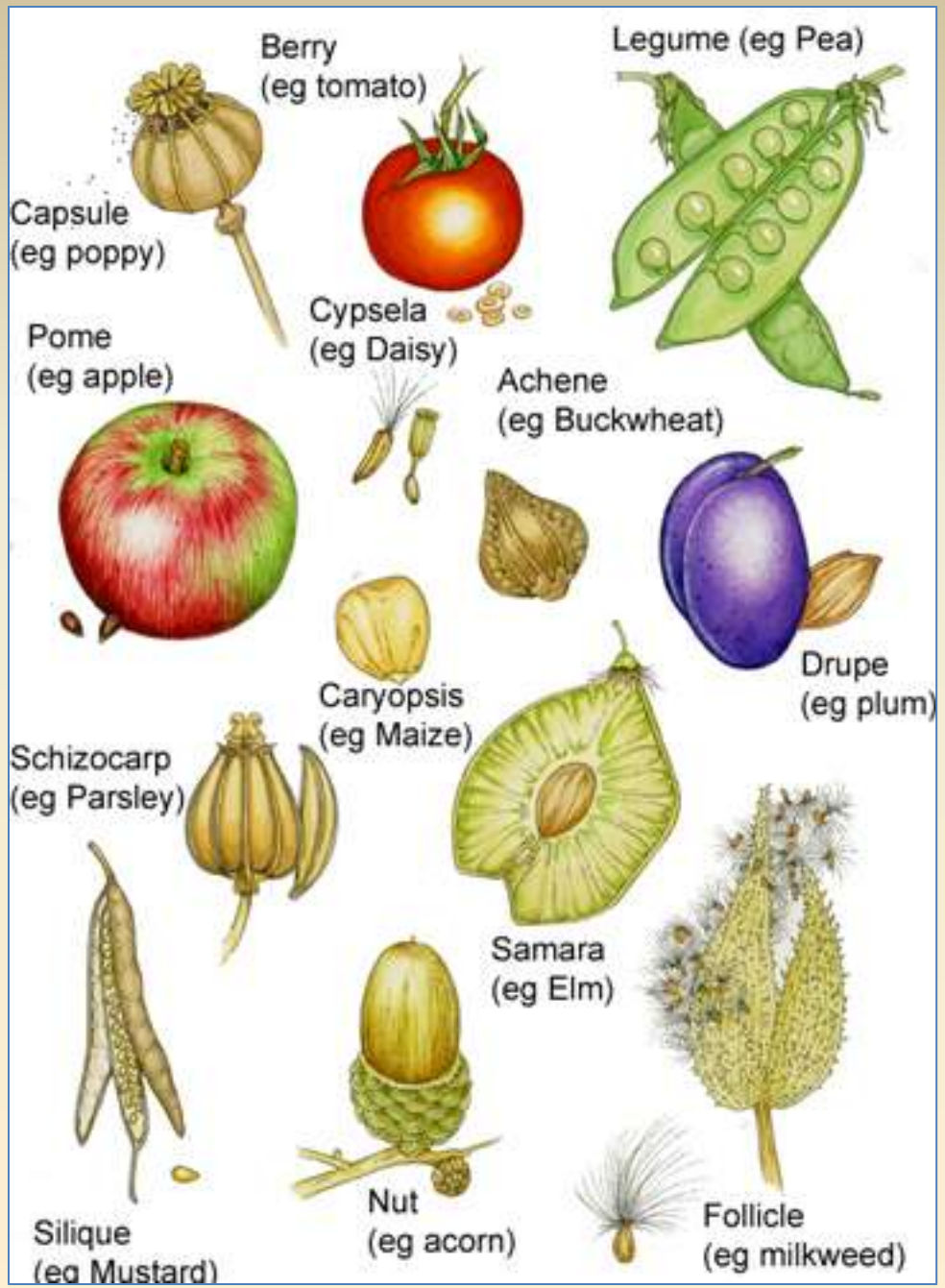
raspberry

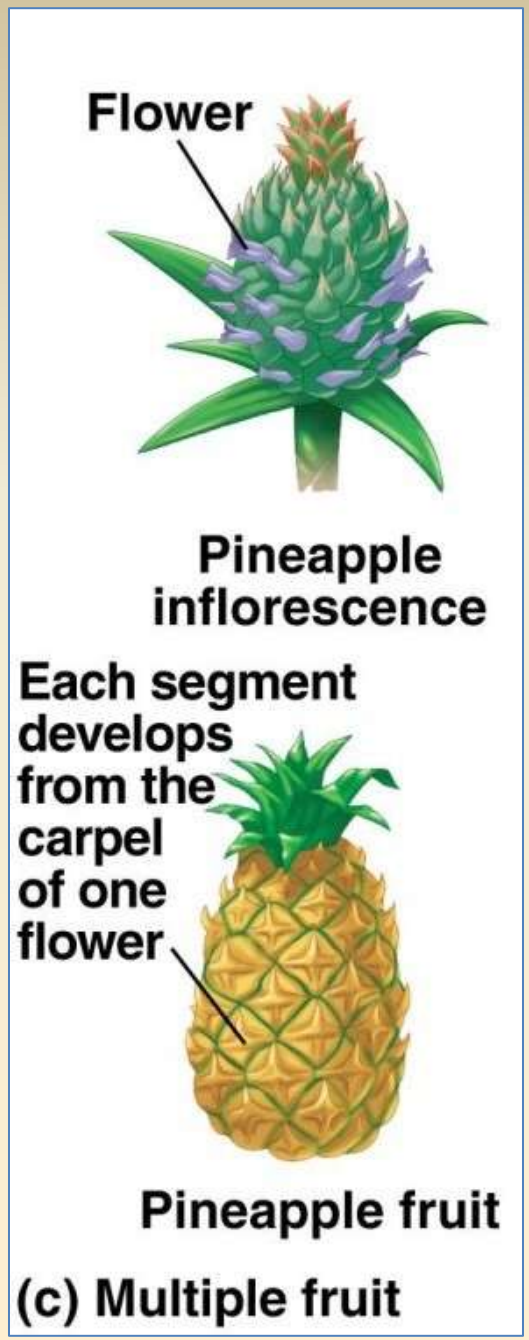
©My two cents...


Apple - Pome
pedicel
pulp
core
seeds
sepal remnants
Longitudinal Section
Apple - Pome
core (from ovary)
seeds
pulp (from perianth)
Cross Section

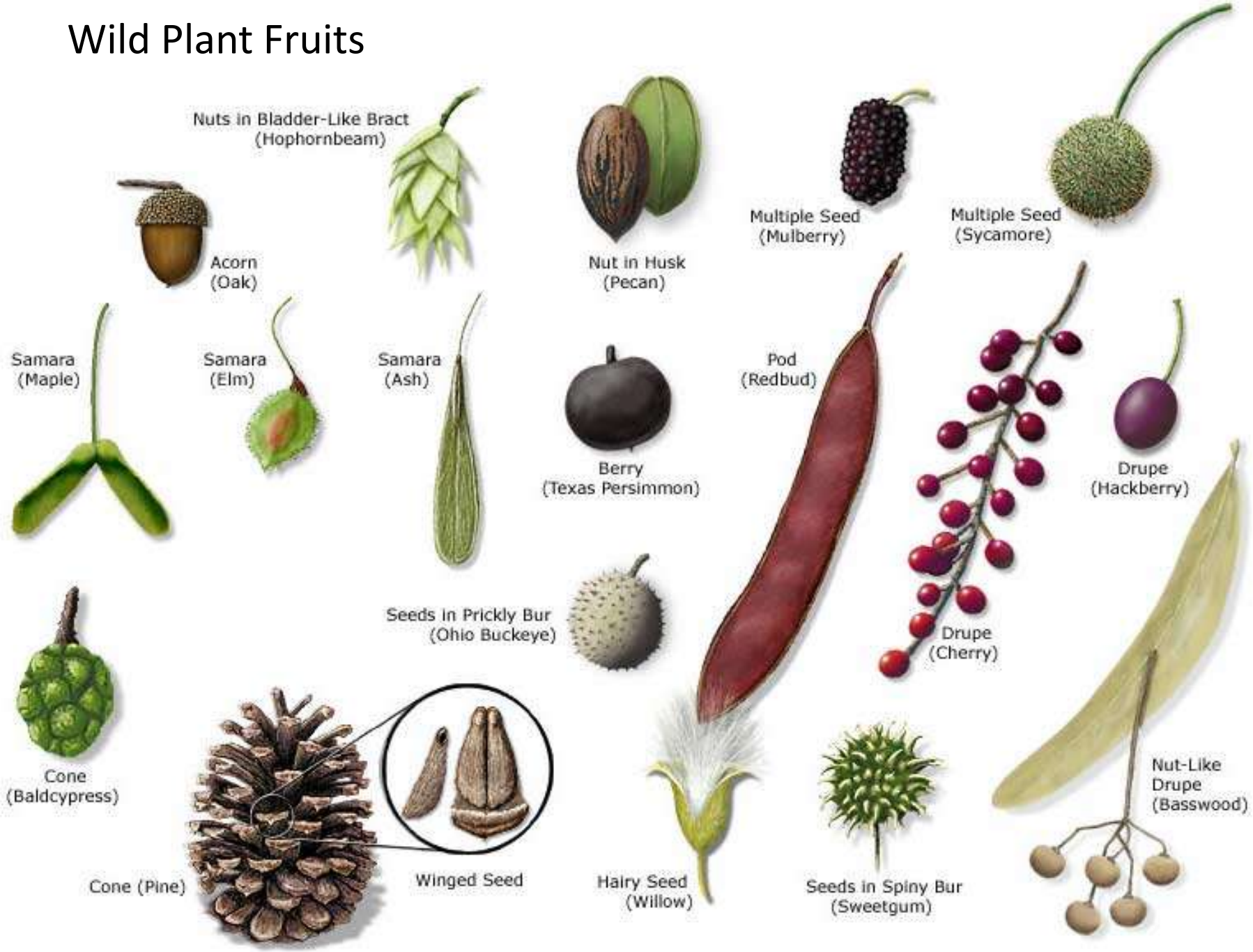
Walnuts and Pecans



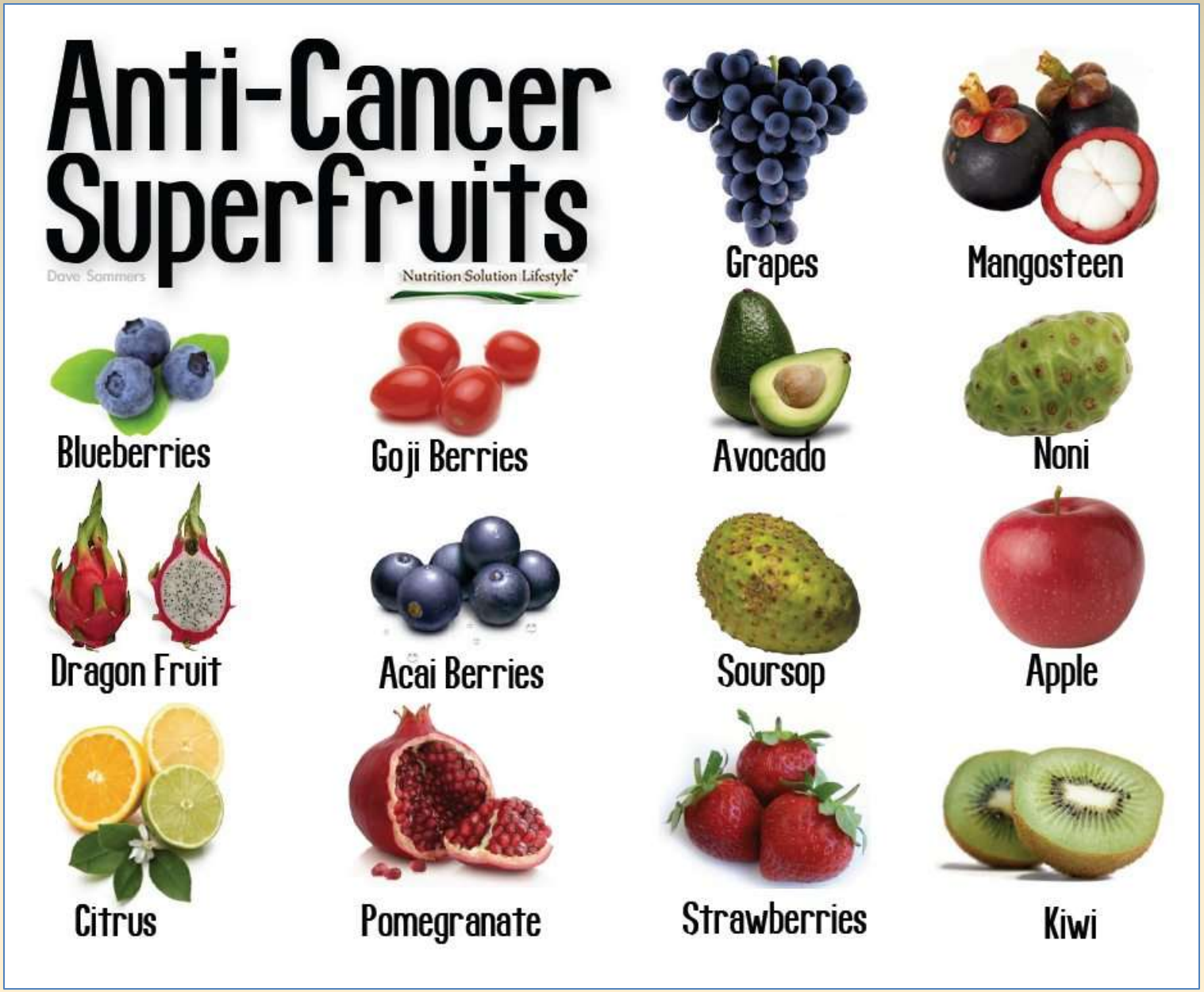

Berry
(eg tomato)
Legume (eg Pea)
Capsule
(eg poppy)
Cypsela
(eg Daisy)
Pome
(eg apple)
Achene
(eg Buckwheat)
Drupe
(eg plum)
Caryopsis
(eg Maize)
Schizocarp
(eg Parsley)
Samara
(eg Elm)
Nut
(eg acorn)
Follicle
(eg milkweed)
Silique
(eg Mustard)


Flower
Pineapple
inflorescence
Each segment
develops
from the
carpel
of one
flower
Pineapple fruit
(c) Multiple fruit

Wild Plant Fruits



Is there evidence for this claim? What? Where published?



Fruit dispersal

- The form of the fruit gives clues about its dispersal.
- Small, dry fruits with “wings” or “parachutes” may be wind-dispersed. Fleshy fruits are often animal dispersed. Explosive fruits can fling seeds away. Floating fruits may be water dispersed.

How Seeds Travel

by the wind

milkweed

dandelion

maple

by animals

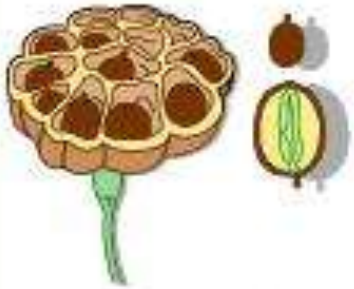
beggar-ticks

sandbur

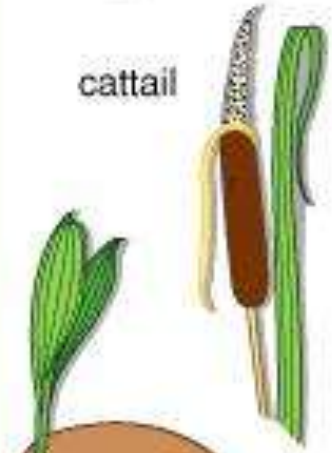
blackberry

by water

lotus



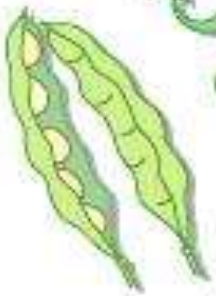
cattail



coconut

by bursting

violet



jewelweed

witch hazel

by humans

bean

wheat

cherry

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Seed dispersal and forest regeneration in a tropical lowland biocoenosis (Shimba Hills, Kenya) . Thomas Engel

How are these fruits dispersed?

Dandelion

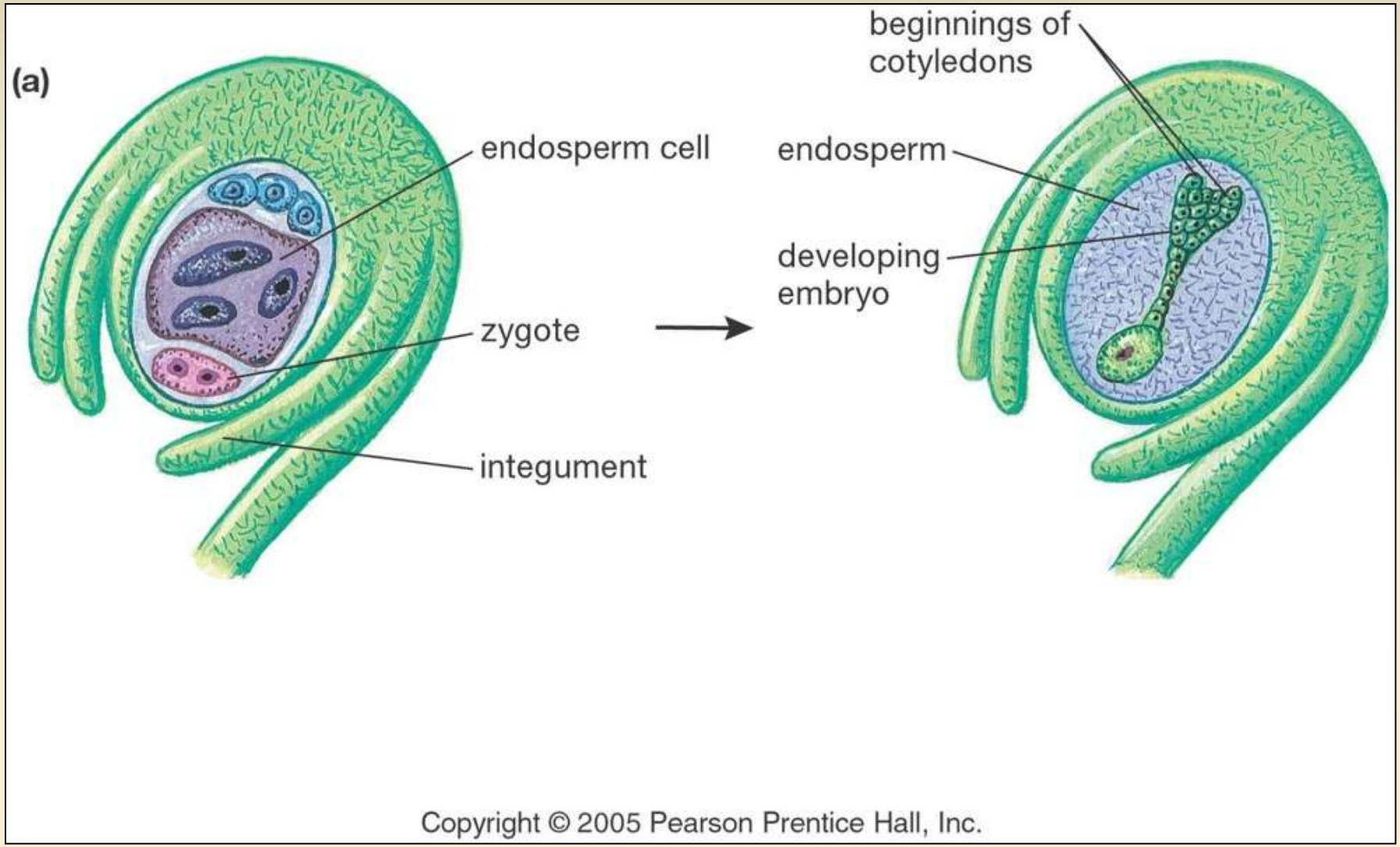
Coconut

Maple

Cocklebur

Jewelweed

Ovule to seed



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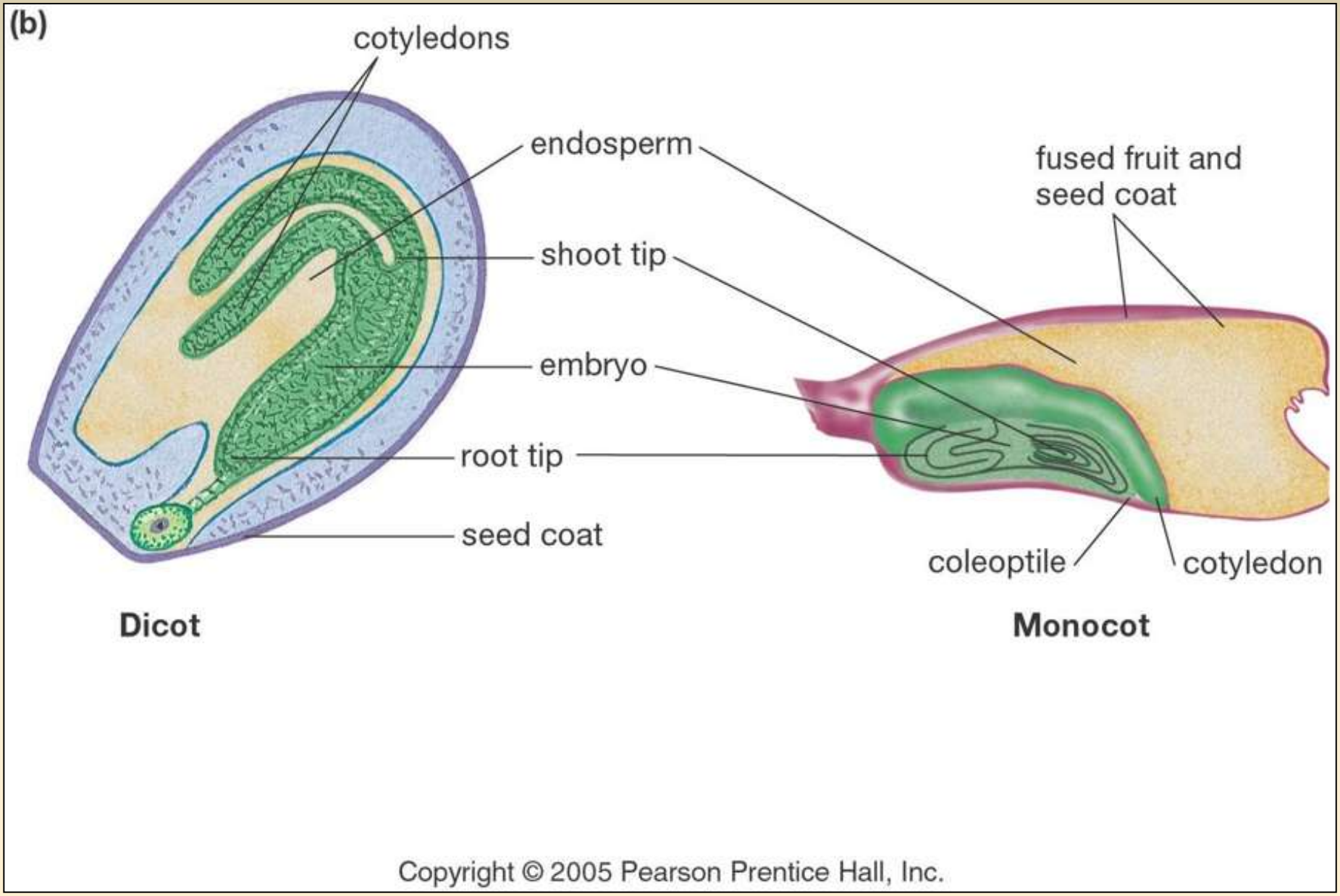
Seed Components

A seed contains all of the genetic information needed to develop into an entire plant. It contains three parts.

- **Embryo**-a miniature plant which will grow when conditions are favorable.
- **Endosperm**-built in food supply for the plant.
- **Seed Coat**—Hard outer covering, protects the seed from disease and insects. Prevents water from entering the seed before the proper time.

Mature Seed



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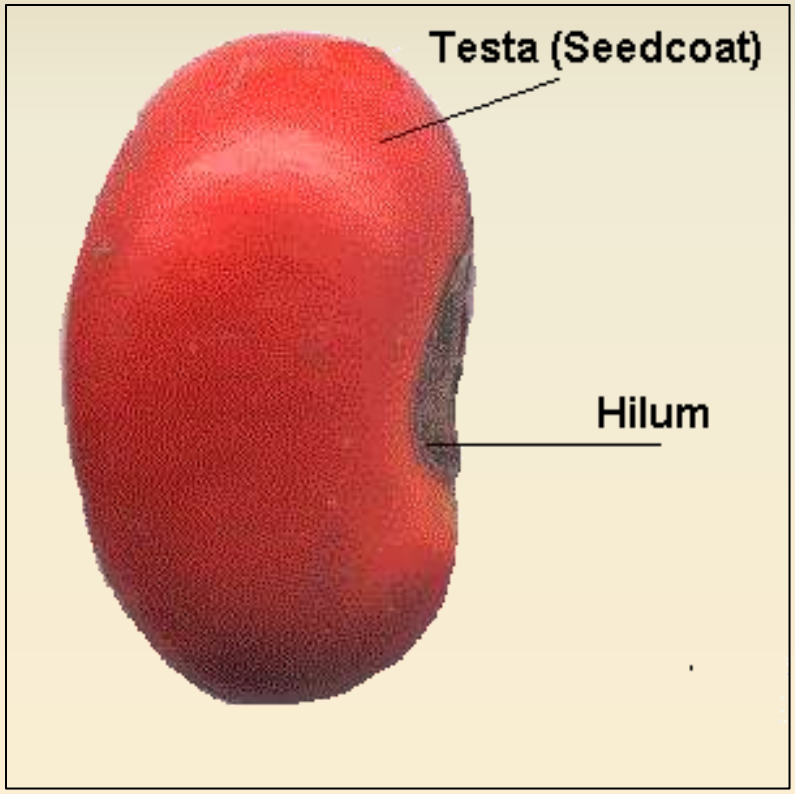
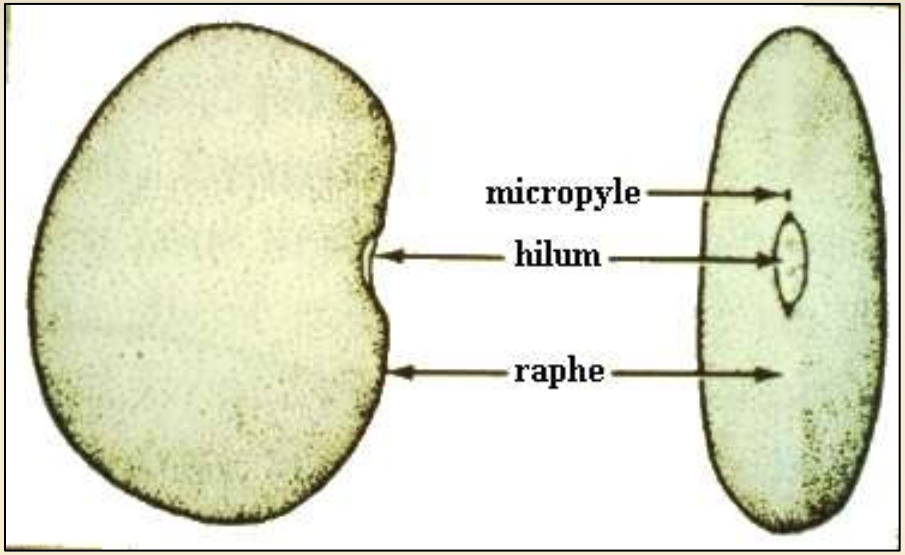
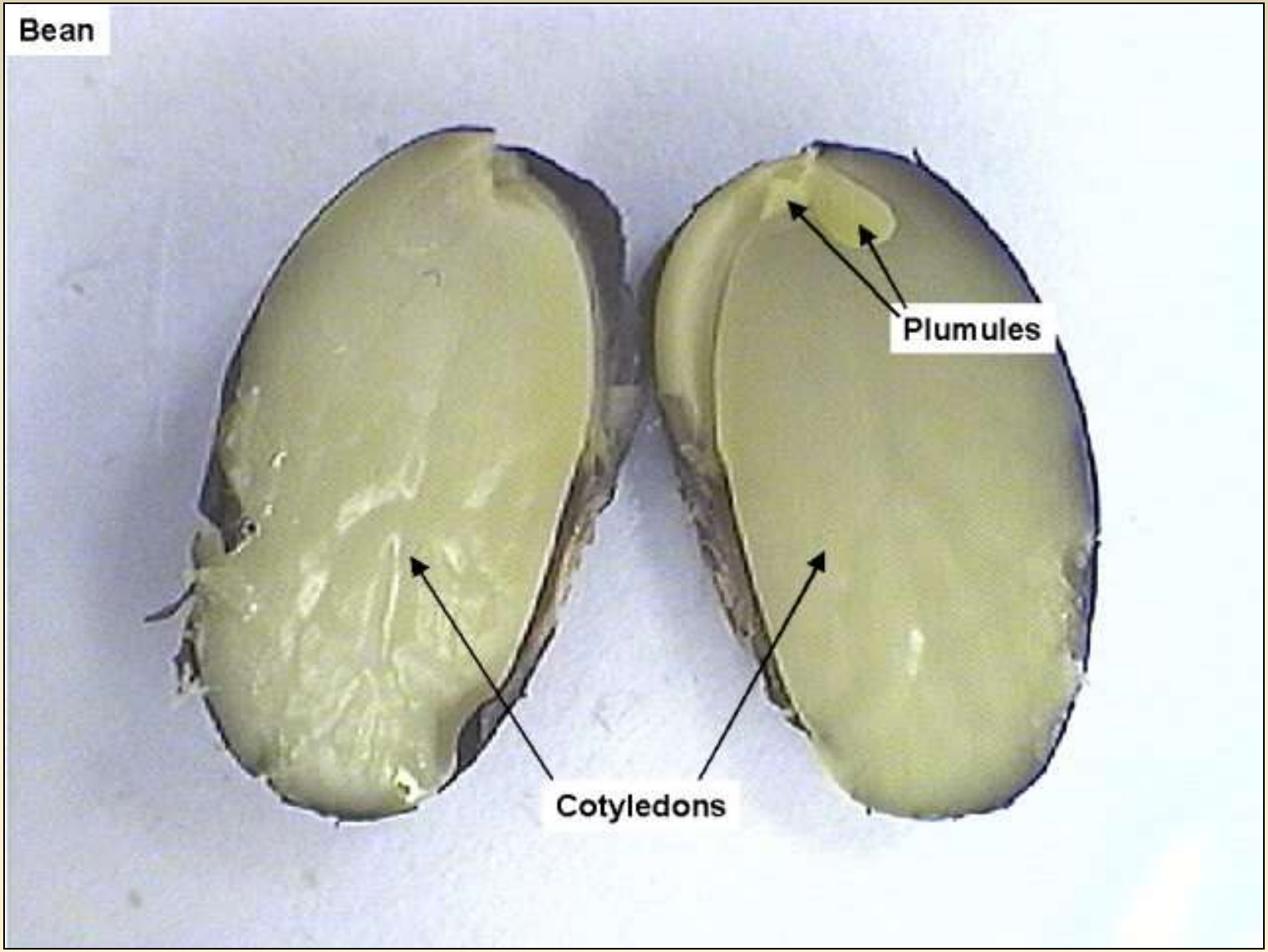
Dicot Seed Parts





Seed anatomy



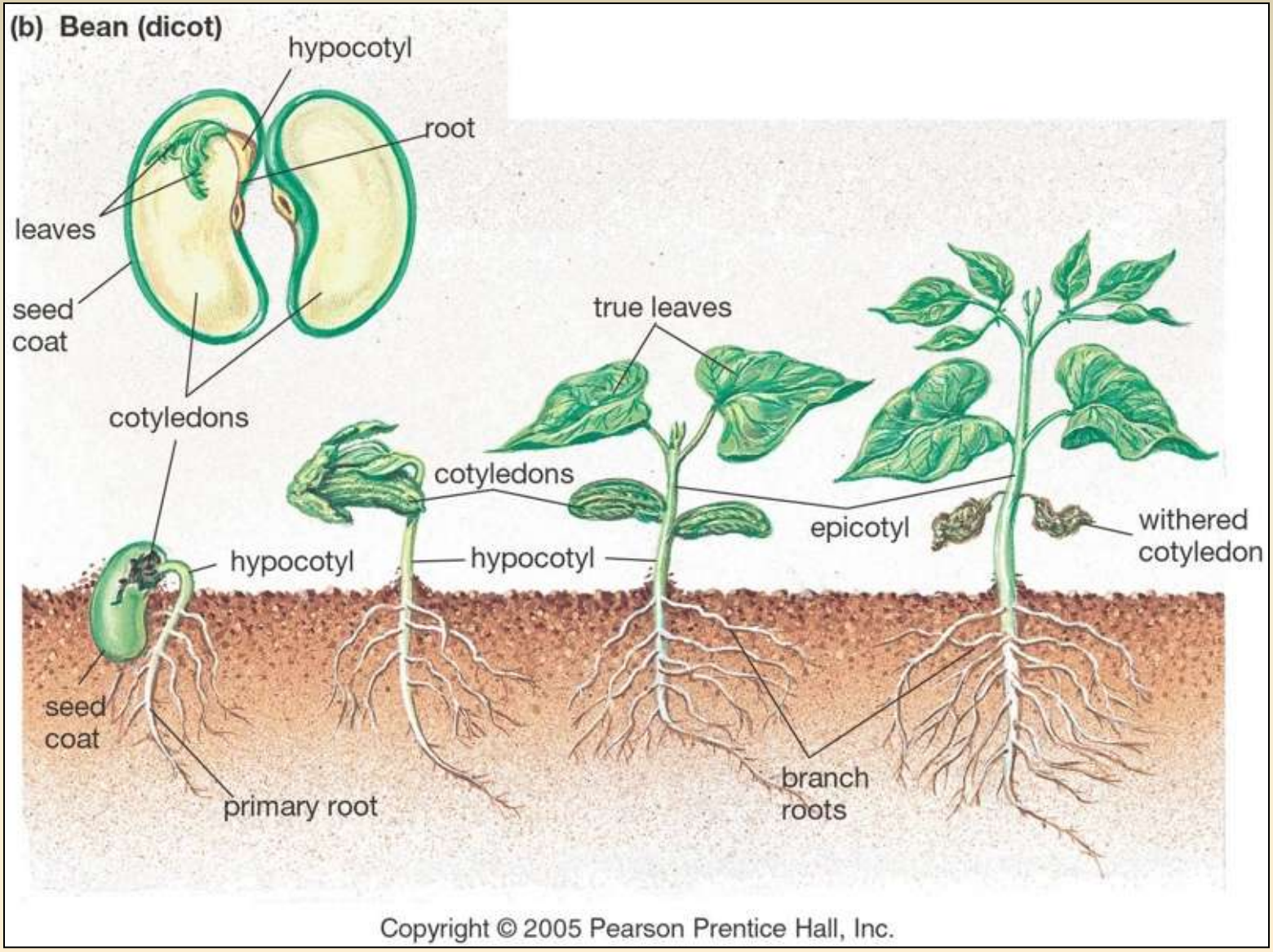
Seed dormancy

- Seeds can remain dormant in the soil for long periods of time. Dormancy helps ensure that seeds only germinate when conditions are right.
- When we weed or cultivate a bare patch of soil, the weeds that sprout up immediately usually come from the “seed bank” already in the soil.

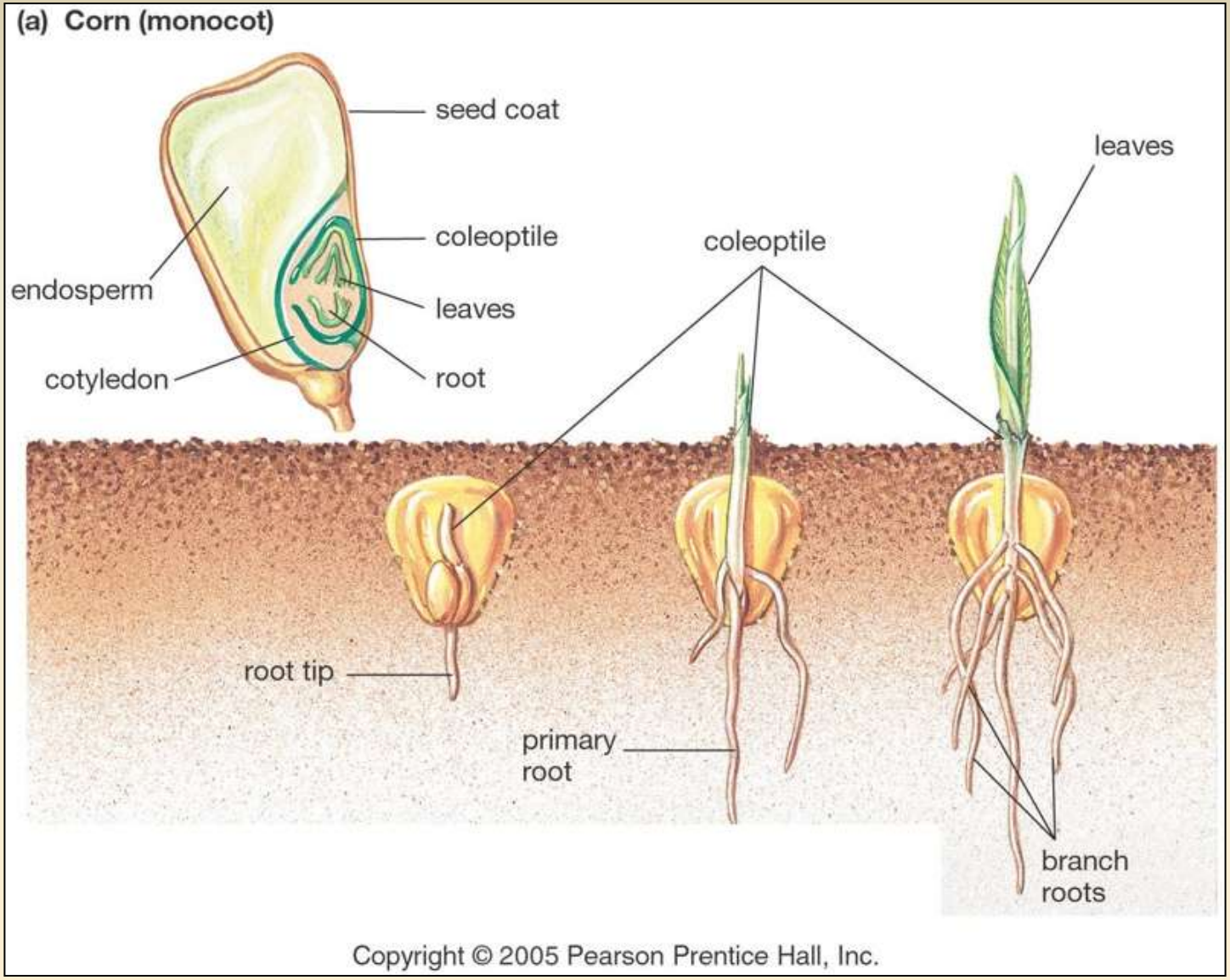
Breaking dormancy

- Seeds require moisture and the right temperature to germinate.
- In addition, some seeds germinate only after certain environmental signals:
  - Drying
  - Temperature (period of cold or heat)
  - Disruption of the seed coat

Germination: dicot



Germination: monocot



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