CHAPTER 7: Plants

Part 1: What is Plant?

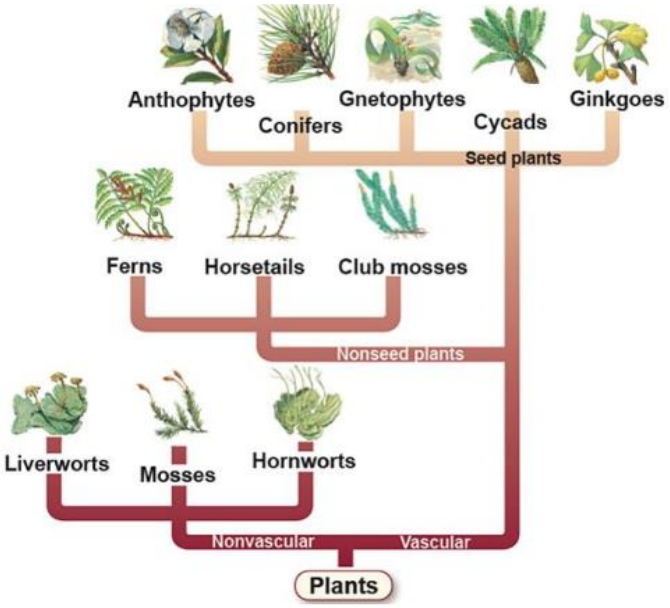
▪ When scientists compare present-day plants and present-day green algae, they find the following common characteristics:
- Cell walls composed of cellulose
- Cell division includes the formation of a cell plate
- The same type of chlorophyll used in photosynthesis
- Similar genes for ribosomal RNA
- Food stored as starch
- The same types of enzymes in cellular vesicles

Non-Vascular Plants:
Characteristics: small, doesn't have vascular tissues, grows in damp, shady environments

• *Division Bryophyta*
- Most familiar bryophytes are the mosses.
- Structures that are similar to leaves
- Produce rootlike, multicellular rhizoids that anchor them to soil or another surface
- Water and other substances move throughout a moss by osmosis and diffusion.

• *Division Anthocerophyta*
- Anthocerophytes are called hornworts.
- Water, nutrients, and other substances move in hornworts by osmosis and diffusion
- One large chloroplast in each cell of the gametophyte and sporophyte, Cyanobacteria grow in this slime.

• *Division Hepaticophytes*
- Hepaticophytes are referred to as liverworts.
- Found in a variety of habitats
- Water, nutrients, and other substances are transported by osmosis and diffusion.



1 **Which of the following is a characteristic of Bryophyta(mosses)?**
CH 7
A Vascular tissues **B** Seeds
C Flowers **D** Rhizoids
Bryophyta (mosses): produce root-like multicellular rhizoids. →D

2 **You examined a plant and noticed that there is no vascular tissue, so you concluded that it is from…**
CH 7
A Pterophyta(ferns) **B** Cycadophyte(cycads)
C Bryophyta(mosses) **D** Conifers
Non-Vascular Plants: -Bryophyta (mosses - Anthocerophyta - Hepaticophytes →C

3 **Hepaticophyta (liverworts) belongs to…**
CH 7
A Vascular plants **B** Nonvascular plants
C Seed plants **D** Flower plants
Non-Vascular Plants: -Bryophyta (mosses - Anthocerophyta - Hepaticophytes →B

4 **Which of the following plants doesn't have transport tissue?**
CH 7
A Conifers **B** Ginkgophyta
C Bryophyta (mosses) **D** Cycads
Non-Vascular Plants: -Bryophyta (mosses - Anthocerophyta - Hepaticophytes →C

5 **What characteristic of nonvascular plants enables them to survive without specialized transport tissues?**
CH 7
A Small size **B** Vinelike stems
C Leaflike structures **D** Rootlike rhizoids
Non-Vascular Plants Characteristics: small, doesn't have vascular tissues, grows in damp, shady environments →A

6 **What are the most familiar bryophytes?**
CH 7
A Hornworts **B** Horsetails
C Liverworts **D** Mosses
Division Bryophyta
Most familiar bryophytes are the mosses. →D

7 **Which organism has one large chloroplast in each of its cells and cyanobacteria living in between the cells?**
CH 7
A Cycad **B** Fern
C Hornwort **D** Liverwort
Anthocerophytes are called hornworts.
- One large chloroplast in each cell of the gametophyte and sporophyte, Cyanobacteria grow in this slime. →C

8 **Which is the list of three nonvascular plant divisions?**
CH 7
A Pterophyta, Bryophyta, Anthocerophyta
B Bryophyta, Anthocerophyta, Hepaticophyta
C Lycophyta, Anthocerophyta, Hepaticophyta
D Bryophyta, Cycadophyta, Hepaticophyta
Non-Vascular Plants: -Bryophyta (mosses)
- Anthocerophyta - Hepaticophytes →B

9 **In which habitat would a botanist be most likely to find a new species of a nonvascular plant**
CH 7
A Cool mountain lake
B Damp forest soil
C High tree branches
D Sunlit sand dune
Non-Vascular Plants characteristics: small, doesn't have vascular tissues, grows in damp, shady environments →B

Part 2: Vascular plants

Seedless Vascular Plants

Have vascular tissues

• ***Division Lycophyta***

- Sporophyte generation of lycophytes is dominant.
- Reproductive structures produce spores that are club-shaped or spike-shaped.
- Have roots, stems, and small, scaly, leaflike structures
- Two genera—Lycopodium and Selaginella

* ***Division Pteridophyta***

- Plant division includes ferns and horsetails
- Sporophyte produces roots and a thick underground stem called a rhizome, a food storage organ.
- The front is part of the sporophyte generation of ferns.
- Fern spores form in a structure called a sporangium.
- Clusters of sporangia form a sorus.
- Sori usually are located on the undersides of fronds

Vascular Seed Plants

- A variety of adaptations for the dispersal or scattering of their seeds throughout their environment
- The sporophyte is dominant in seed plants and produces spores.

Divisions:

- ***Ginkgophyta:*** have small fan shaped leaves Ex: Cycads
- ***Coniferophyta***: have needlelike or scale like leaves Ex: Conifers
-***Anthophyta***:

* Annual plants: completes its life span in one growing season or less
* Biennial plants: life spans 2 years
* Perennial plants: lives several years
* Angiosperms: seeds are part of the fruit
* Gymnosperms: seeds are not part of the fruit

10 **Lycophyte (spike mosses) and Pteridophyta (ferns) are vascular…**

CH 7 **A** Seed plants **B** Flower plants **C** Seedless plant **D** Thallous plants

Seedless Vascular Plants: Division Lycophyta and Division Pteridophyta →C

11 **Which of the following has xylem and phloem and reproduce by spores?**

CH 7 **A** Bryophyta(mosses) **B** Pteridophyta (ferns) **C** Cycads **D** Ginkgophyta

Pteridophyta (ferns) has xylem and phloem and reproduce by spores →B

12 **Which of the following plants is a seedless vascular plant?**

CH 7 **A** Bryophyta(mosses) **B** Pteridophyta (ferns) **C** Hornworts **D** Hepaticophyta

Seedless Vascular Plants: Division Lycophyta and Division Pteridophyta →B

13 **Which of the following plants is from Pteridophyta?**

CH 7 **A** Juniper **B** Ferns **C** Hornworts **D** Pine

Division Pteridophyta includes ferns and horsetails →B

14 **Fern sporophyte forms a stem underground called…**

CH 7 **A** Spores **B** Rhizome **C** Fronds **D** Sorus

Rhizome: a thick underground stem that stores food. →B

15 **A……. plants life spans two years.**

CH 7 **A** Annual **B** Perennial **C** Biennial **D** Conifer

Biennial plants: life spans 2 years →C

16 **Which of the following is a vascular seed plant?**

CH 7 **A** Liverworts **B** Club mosses **C** Mosses **D** Cycads

- Vascular Seed Plants Ginkgophyta: have small fan shaped leaves Ex: cycads →D

17 **Which of the following plants have needlelike or scale like leaves?**

CH 7 **A** Gnetophytes **B** Conifers **C** Flowering plants **D** Cycads

- Vascular Seed Plants Ginkgophyta: have small fan shaped leaves Ex: cycads →B

18 **…… have seeds that are part of the fruit.**

CH 7 **A** Angiosperms **B** Gymnosperms **C** Seedless plants **D** Nonvascular plants

Angiosperms: seeds are part of the fruit →A

19 **…… have seeds that are part of the fruit.**

CH 7 **A** Angiosperms **B** Gymnosperms **C** Seedless plants **D** Nonvascular plants

Angiosperms: seeds are part of the fruit →A

20 **The mobile reproductive parts of all nonvascular seedless plants are**

CH 7 **A** Rhizoids. **B** Cones. **C** Spores. **D** Epiphytes.

Cones are reproductive parts, but not considered mobile. Spores are reproductive parts that are mobile →C

21 **Of the divisions of gymnosperms, which one might be chosen to use as wood for making wood carvings or fine furniture?**

CH 7 **A** Cycadophyta **B** Gnetophyta **C** Ginkgophyta **D** Coniferophyta.

Coniferophyta includes pines, cypress, and redwoods, all of which make beautiful, finished wood. This division contains the only gymnosperms with long woody stems suitable for woodworking. →D

Part 3: Plant Structure and Function

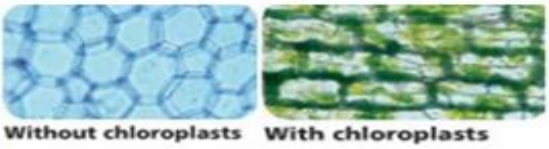
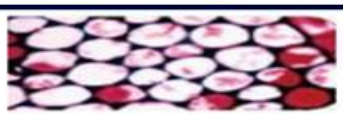
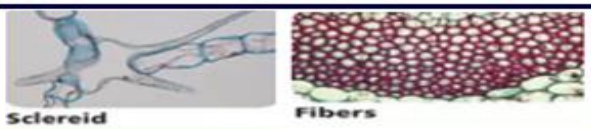
Plant cells have a cell wall and chloroplasts

Types of plant cells and their functions…

- **Parenchyma:** Storage, photosynthesis, gas exchange, protection
- **Collenchyma:** allows plants to bend without breaking
- **Sclerenchyma:** support and transport, have two types (sclereid or stone cells, and fibers)

(Parenchyma and Collenchyma cells are capable of dividing when the plant matures but sclerenchyma cells can't.)

Plant Cells and function

Cell Type	Example	Function
Parenchyma	 Without chloroplasts With chloroplasts	- Storage - Photosynthesis - Gas exchange - protection - Tissue repair and replacement
Collenchyma		- Storage for surrounding tissues - Provides flexibility
Sclerenchyma	 Sclereid Fibers	- Support - Transport of minerals

22 **Plant cells have ….. but animal cells don't have it.**
CH 7 **A** Nucleus **B** Plasma membrane **C** Cytoplasm **D** Chloroplasts
Plant cells have a cell wall and chloroplasts →D

23 **Collenchyma, parenchyma, and sclerenchyma are examples of plant _____**
CH 7 **A** Cells **B** Fibers **C** Hormones **D** Tissues
plant cells are: - Parenchyma - Collenchyma - Sclerenchyma →A

24 **Which of the following cells undergo photosynthesis?**
CH 7 **A** Collenchyma **B** Parenchyma **C** Cytoplasm **D** Root hairs
Parenchyma: Storage, photosynthesis, gas exchange, protection →B

25 **What is the function of Sclerenchyma cells in plants?**
CH 7 **A** Gas exchange **B** Photosynthesis **C** Support **D** Root hairs
Sclerenchyma: support and transport, have two types (sclereid or stone cells, and fibers) →C

26 **Stone cells is a type of ….. cell**
CH 7 **A** Sclerenchyma **B** Parenchyma **C** Collenchyma **D** Meristematic
Sclerenchyma: support and transport, have two types (sclereid or stone cells, and fibers) →A

27 **Which of the following plant cells can't divide?**
CH 7 **A** Sclerenchyma **B** Parenchyma **C** Collenchyma **D** Meristematic
Sclerenchyma: support and transport, have two types (sclereid or stone cells, and fiber) →A

28 **When a person looks at a herbaceous plant, what type of cell is the person mostly seeing?**
CH 7 **A** Sclerenchyma cells **B** Parenchyma cells **C** Collenchyma cells **D** Guard cells
Herbaceous plants have photosynthetic leaves and stems. All photosynthetic cells are parenchyma cells. →B

29 **Which plant cells are flexible and provide support for surrounding cells?**
CH 7 **A** Collenchyma cells **B** Meristematic cells **C** Parenchyma cells **D** Sclerenchyma cells
Collenchyma: allows plants to bend without breaking Provides flexibility →A

30 **Which type of cells provides fiber that humans use to make ropes and clothing?**
CH 7 **A** Collenchyma cells **B** Meristematic cells **C** Parenchyma cells **D** Sclerenchyma cells
Sclerenchyma: support and transport, have two types (sclereid or stone cells and fibers) →D

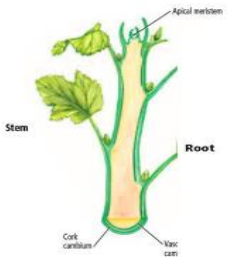
31 **What is the function of parenchyma cells in a fruit?**
CH 7 **A** Gas exchange **B** Photosynthesis **C** Protection **D** Storage
Parenchyma helps in storing food in a fruit. →D

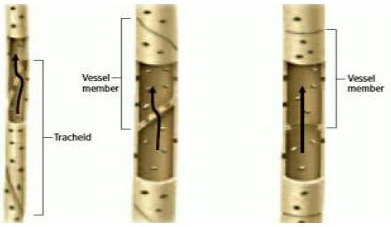
32 **What is the function of parenchyma cells in a fruit?**
CH 7 **A** Gas exchange **B** Photosynthesis **C** Protection **D** Storage
Parenchyma helps in storing food in a fruit. →D

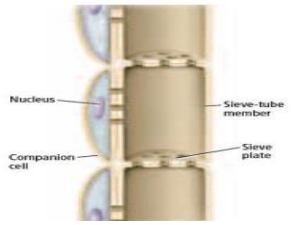
1 **What is the function of parenchyma cells?**
Do It? **A** Accelerate plant growth in stems and roots **B** Form wood to support the entire plant **C** Provide support for surrounding cells **D** Undergo cell division to help repair a plant

Part 4: Plant tissues and Function

Types: Meristematic, dermal, vascular, and ground.
- ***Meristematic tissue***: Regions of rapidly dividing cells.
- Apical Meristem: at the tip of roots and stems, which produce cells that result in an increase in length.
- Intercalary Meristem: it is responsible for the growth of the grass after being mowed.
– Lateral meristem: increase the diameter of the roots and stems.
- Dermal tissue: contains stomata, trichrome, and root hairs.
Stomata: Small openings through which carbon dioxide, water, oxygen, and other gases pass.
The two cells that border a stoma are guard cells.
Trichomes: Hairlike projections that protect the plant
Root Hairs: Increase a root's surface area and enable the root to take in a greater volume of materials
- Vascular tissue: contains xylem, phloem.
- **Xylem**: transports water that contains minerals to the plant.
Composed of specialized cells called vessel elements and tracheids
▪ Vessel elements are tubular cells stacked end-to-end that enables free movement of water and dissolved substances.
▪ Tracheids are long, cylindrical cells with pitted ends that allow the movement of water and dissolved substances.
▪ Because mature tracheids have end walls, they are less efficient than vessel element
▪ **Phloem**: food-carrying tissue.
Transports dissolved sugars and other organic compounds throughout the plant.
- Contain Sieve-tube member, and Companion cells
Ground Tissue
▪ Consist of parenchyma, collenchyma, and sclerenchyma cells
▪ Functions include photosynthesis, storage, and sup







33 **The reason for the continuation of the weeds growing in length despite the cutting of the growing tops is the presence of**
CH 7
A Vascular cambium **B** Cork cambium
C Intercalary Meristem **D** Lateral meristem
Intercalary Meristem: it is responsible for the growth of the grass after being mowed. →C

34 **Which is a result of the growth of lateral meristem tissue?**
CH 7
A Increasing the diameter of a branch
B Lengthening of a stem
C Production of leaves
D Starch and water storage in a root
Lateral meristem: increase the diameter of the roots and stems. →A

35 **A botanist notices that the cuticle is not forming properly on one of his plants. He thinks the plant has an infection. Which tissue is most likely infected?**
CH 7
A Dermal tissue **B** Meristematic tissue
C Ground tissue **D** Vascular tissue
Most epidermal cells can secrete a fatty substance that forms the cuticle. →A

36 **What is the benefit of xylem and phloem?**
CH 7
A Anchoring plants to soil
B Light absorptions.
C Water and food transportation.
D Rapid growth
The benefit of xylem and phloem water and food transportation. →C

37 **Which vascular tissue carries food to plants**
CH 7
A Dermis **B** Parenchyma.
C Xylem. **D** Phloem.
Phloem: food-carrying tissue →D

38 **What type of plant tissue contains rapidly dividing cells that result in primary and secondary growth?**
CH 7
A Dermal tissue **B** Meristematic tissue
C Ground tissue **D** Vascular tissue
Meristematic tissue: Regions of rapidly dividing cells. →B

39 **What is the term for a tissue that transports substances?**
CH 7
A Dermal tissue **B** Meristematic tissue
C Ground tissue **D** Vascular tissue
The benefit of vascular tissue, xylem and phloem Water and food transportation. →D

40 **What tissue replaces cells of the root cap that are rubbed off as the root grows?**
CH 7
A Apical meristem **B** Cork cambium
C Dermal tissue **D** Ground tissue
Apical Meristem: at the tip of roots and stems, which produce cells that result in an increase in length. →A

2 **Which plant tissue trans locates nutrients from sources to sinks?**
Do It?
A Cambium **B** Mesophyll
C Phloem **D** Xylem

Part 5: Plant Hormones and Responses

Plant hormones

Auxin: the first plant hormone to be identified, apical dominance (plant growth is upward).
- Stimulates the lengthening of cells.
Affects the rate of growth in roots, stems, and leaves.

Gibberellins: causes cell elongation, stimulates cell division, and affects seed growth, transported in vascular tissue.
- Applying gibberellins to a plant can cause an increase in height.

Ethylene: the only gaseous hormone, it primarily affects the ripening of fruits. Fruits are softer and sweeter than unripe fruits.
- Found in plant tissues such as ripening fruits, dying leaves, and flower
- Transported within the phloem.

Cytokinesis: a hormone that increases the rate of growth.
- Promote cell division by stimulating the production of the proteins needed for mitosis and cytokinesis
- Produced in rapidly dividing cells.

Plant response

*** Nastic responses**

A response of a plant that causes movement independent of the direction of the stimulus
- Solar tracking
- Closing of a Venus flytrap's leaves

*** Tropic Responses**

A **tropism** is a plant's growth response to an external stimulus.
Types of tropisms: ***phototropism, gravitropism, and thigmotropism.***
Positive tropism: growth of the plant toward the stimulus.
Negative tropism: growth of the plant away from the stimulus.

Plant Tropisms

Tropism	Stimulus/ Response	Example
Phototropism	Light • Growth toward light source	
Gravitropism	Gravity • Positive: downward growth • Negative: upward growth	
Thigmotropism	Mechanical • Growth toward point of contact	

41 **A hormone that causes the apical dominance phenome in plants is…**

CH 7 **A** Auxin **B** Gibberellins. **C** Ethylene **D** Cytokinesis.

Auxin: the first plant hormone to be identified, apical dominance (plant growth is upward). →A

42 **Hormone that causes elongation of cells is..**

CH 7 **A** Methylene. **B** Gibberellins. **C** Ethylene **D** Cytokinesis

Gibberellins: causes cell elongation, stimulates cell division, and affects seed growth. of fruits. →B

43 **Which of the following has a role in transporting gibberellins through plants?**

CH 7 **A** Cork cambium **B** Guard cells. **C** Vascular tissue **D** Tips.

Gibberellins: transported in vascular tissue. →C

44 **Which of the following hormones enhance the process of fruit repining?**

CH 7 **A** Auxin **B** Ethylene **C** Cytokinesis **D** Gibberellins

Ethylene: the only gaseous hormone, it primarily affects the ripening of fruits. →B

45 **Which of What hormone will accumulate in an enclosed sack that contains unripe bananas? he following hormones enhance the process of fruit repining?**

CH 7 **A** Auxin **B** Ethylene **C** Cytokinesis **D** Gibberellins

Ethylene: the only gaseous hormone, it primarily affects the ripening of fruits. →B

46 **A researcher notices that the cells of the stem have elongated in a plant she is observing. Which hormone(s) might cause this to occur?**

CH 7 **A** Auxin only **B** Auxin and gibberellins **C** Gibberellins only **D** Cytokinin's and gibberellins

Both auxin and gibberellins are capable of causing cell elongation. →B

47 **The growth of grapes toward a light source is an example of…**

CH 7 **A** Positive tropism. **B** Negative tropism. **C** Nastic response. **D** Thigmotropism

Positive tropism: growth of the plant toward the stimulus →A

48 **The growth of the plants away from a light source Is called…**

CH 7 **A** Positive tropism. **B** Negative tropism. **C** Nastic response. **D** Thigmotropism

Negative tropism: growth of the plant away from the stimulus. →B

49 **What type of response causes plant movement that can be reversed and repeated?**

CH 7 **A** Hormonal response. **B** Nastic response. **C** Thigmoresponse **D** Tropic response

Nastic responses: A response of a plant that causes movement independent of the direction of the stimulus
- Solar tracking
- Closing of a Venus flytrap's leaves →B

Part 6: Flowering plants

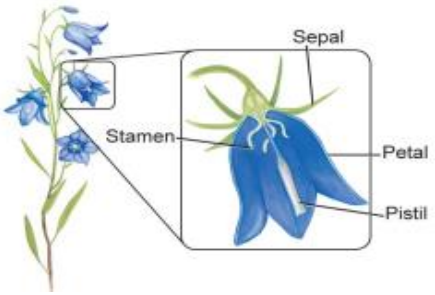
Flowers: are the reproductive organs of the plant.
- A complete flower consists of sepals, petals, stamen, and one or more pistils.
- Petals: colored leaves that attract pollinators.
- Stamen: male reproductive organs consist of a filament and anther which produces pollens.
- Pistil: the female reproductive organ that consists of the ovary, stigma, and style. Produce eggs.

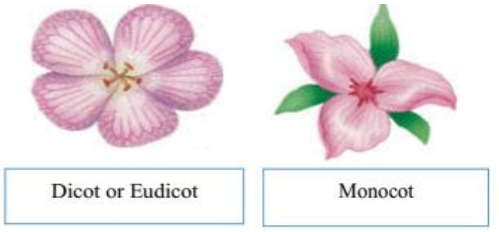
Types of flowers
- Complete flower: have 4 flower organs.
- Incomplete flowers: miss one or more of the organs
- Perfect flowers: have both pistils and stamens.
- Imperfect flowers: have either a pistol or a stamen.
- **Dicot:** flower organs multiple of four or five.
- **Monocots**: flower organs of multiples of three

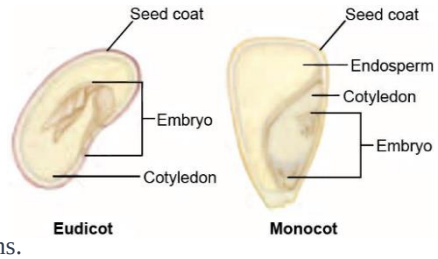
Results of Reproduction
- ***Fertilization*** is only the beginning of a long process that ends with the formation of a seed.

Seed and Fruit Development
- The sporophyte begins as a zygote or a 2n cell.
- The zygote undergoes numerous cell divisions to form an embryo.
- Nourishment for the embryo comes from a tissue called the endosperm

Some seeds can survive harsh environmental conditions, such as drought and cold. Other seeds germinate soon after dispersal and still others can germinate after long Periods. Some maple seeds must germinate within two weeks after dispersal or they will not germinate at all. Most seeds produced at the end of a growing season enter dormancy, a period of little or no growth.
Dormancy is an adaptation that increase the survival rate of seeds exposed to harsh conditions. The length of dormancy varies from species to another.







50 **A colored organ found in flowers that attracts pollinators**

CH 7
A Petal **B** Sepal
C Pistil **D** Stamen

Petals: colored leaves that attract pollinators. →A

51 **Which organ of the flower contains the male gametes in flowers?**

CH 7
A Petal **B** Sepal
C Pistil **D** Stamen

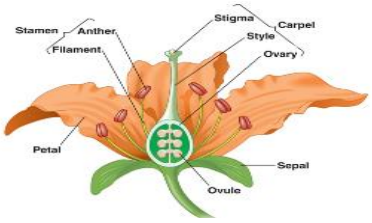
Stamen: male reproductive organs consist of a filament and anther which produces pollens. →D

52 **Female reproductive organs in flowers are found in?**

CH 7
A Petal **B** Sepal
C Pistil **D** Stamen

Pistil: the female reproductive organ that consists of the ovary, stigma, and style. Produce eggs →C

53 **Which of the following describes the shown flower?**



CH 7
A Perfect complete flower
B Perfect incomplete flower
C Imperfect incomplete flower
D Imperfect complete flower

Complete flower: have 4 flower organs.
Perfect flowers: have both pistils and stamens. →A

54 **A flower contains 3 anthers which of the following the flower belongs to?**

CH 7
A Monocots **B** Dicots
C Gymnosperms **D** Conifers

Monocots: flower organs of multiples of three. →A

55 **A tissue that provides nutrients for the seed**

CH 7
A Cotyledon **B** Fruit
C Ovary **D** Endosperm

Nourishment for the embryo comes from a tissue called the endosperm →D

56 **In which of the following organs does the fruit "orange" is produced?**

CH 7
A Petal **B** Anther
C Ovary **D** egg

Fruit produced in ovary. →C

57 **A process in which a seed starts to grow**

CH 7
A Germination **B** Dormancy
C Fertilization **D** Pollination

Germination is a process in which a seed starts to grow →A

58 **A phase in which the seed is inactive**

CH 7
A Germination **B** Dormancy
C Fertilization **D** Pollination

Dormancy is a phase in which the seed is inactive →B

59 **What is an adaptation that increases the survival rate of seeds exposed to harsh conditions?**

CH 7
A Germination **B** Dormancy
C Fertilization **D** Pollination

Dormancy is an adaptation that increase the survival rate of seeds exposed to harsh conditions →B

Part 7: Photoperiodism & Types of fruits

▪ The flowering response to the number of hours of uninterrupted darkness is known as photoperiodism.

▪ Flowering plants are divided into four different groups based on the critical period.

A short-day plant flowers when exposed daily to a number of hours of darkness that is greater than its critical period

Ex: chrysanthemum, rice, soybean, onion, violet , and poinsettia.

A long-day plant flowers when the number of hours of darkness is less than its critical period.

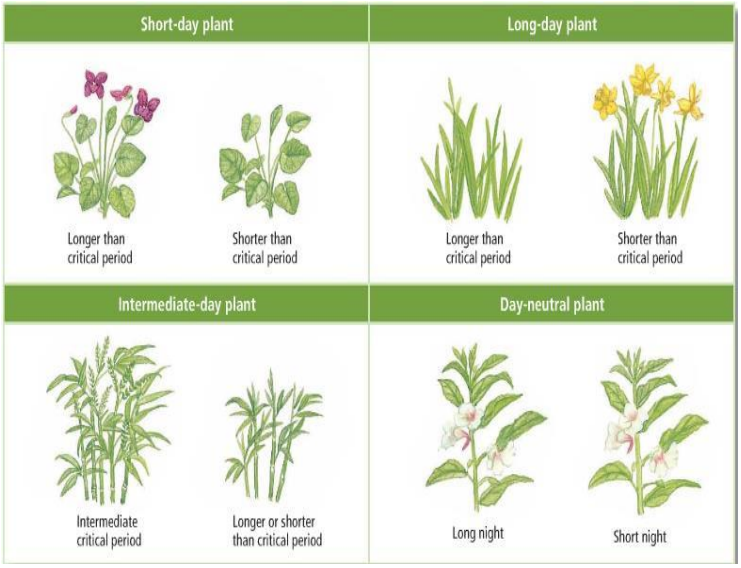
Ex: aster, hibiscus, coneflower, lettuce, spinach, radish, sugar beet, and potato.

An intermediate-day plant flowers as long as the number of hours of darkness is neither too great nor too few.

EX: sugarcane, grass

A day-neutral plant flowers over a range in the number of hours of darkness.

Ex: cucumber, cotton, dandelion, sunflower



Types of Fruit

Fruit Type	Example of Flower and Fruit	Description
Simple fleshy fruits	 Peach	Simple fleshy fruits can contain one or more seeds. Apples, peaches, grapes, oranges, tomatoes, and pumpkins are simple fleshy fruits.
Aggregate fruits	 Raspberry	Aggregate fruits form from flowers with multiple female organs that fuse as the fruits ripen. Strawberries, raspberries, and blackberries are examples of aggregate fruits.
Multiple fruits	 Pineapple	Multiple fruits form from many flowers that fuse as the fruits ripen. Figs, pineapples, mulberries, and osage oranges are examples of multiple fruits.
Dry fruits	 Redbud	When mature, these fruits are dry. Examples of dry fruits include pods, nuts, and grains.

60 **Photoperiodism is associated with what plant necessity?**

CH 7

A Hours of daylight
B Hours of darkness
C Ability to perform photosynthesis
D Ability to reproduce

The flowering response to the number of hours of uninterrupted darkness is known as photoperiodism. →B

61 **What is a plant that flowers over a range of daylight hours called?**

CH 7

A Day-neutral plant
B Long-day plant
C Intermediate-day plant
D Short-day plant

Plant that are not sensitive to photoperiod are called day-neutral. →A

62 **Strawberries are examples of what kind of fruit?**

CH 7

A Aggregate fruit **B** Multiple fruit
C Dry fruit **D** Simple fruit

It is an aggregate →A

63 **Figs are examples of what kind of fruit?**

CH 7

A Aggregate fruit **B** Multiple fruit
C Dry fruit **D** Simple fruit

Multiple fruits Ex: Pineapple, figs →B

64 **grapes are examples of what kind of fruit?**

CH 7

A Aggregate fruit **B** Multiple fruit
C Dry fruit **D** Simple fruit

Simple fruits Ex: apple, grapes →D

Chapter 1: Do It Answer key	
1	2
D	C