DIVISION: *SPERMATOphytae*

Seed-Producers

SUBDIVISIONS:

GymnoSPERMAE – Naked Seed

AngioSPERMAE - Flowering

SPERMATOPHYTAE

Seed-producers are advanced - started 400 mya.

Importance of Seeds

(*Pages 21 & 23*)

- Designed to be dispersed, away from their parent.
- Seed coat (*testa*) protects them in dormancy.
- Seeds contain food for their embryo to germinate.
- Seeds can survive much better than can spores.

SIGNIFICANCE of SEEDS

FOOD

- Come as cereals (like mealies, wheat, rice, oats).
- Also, as legume seeds (like peas, beans, soya).
- Give us energy, carbohydrates, proteins, oils, fibres, vitamins, minerals.

SEED BANKS

Banks are established in case the plant becomes extinct – we can use the seeds stored in these banks from across the world.

iv) Gymnosperms (Cryptogams) :-

The plants of this group bear naked seeds (gymno – means naked and sperma means seed). They are usually perinneal, evergreen and woody.

Eg :- Pines (Pinus), Cycas etc.

Pines

Cycas

DIVISION: *SPERMATOPHYTA*

SUBDIVISION: *GYMNOSPERMAE*

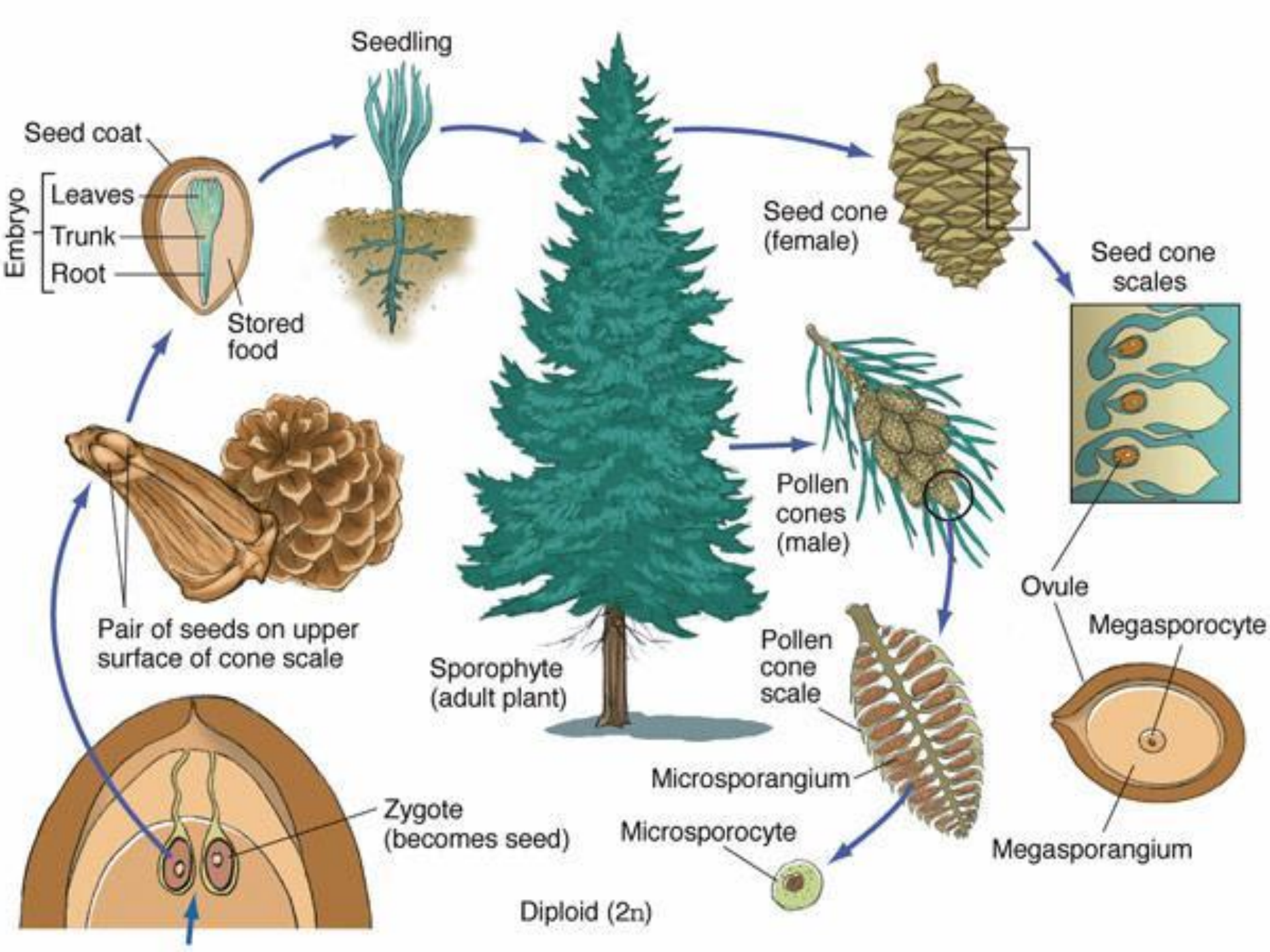
INCLUDES: Conifers & Cycads

EXAMPLE: *PINUS* (PINE TREE)


needle-like leaves
cone containing seeds for reproduction
stems
root system underground

Pine Tree CHARACTERISTICS

- Leaves, stems and roots are all true.
- *Mycorrhiza* fungus helps the roots with nutrients.
- Have central tap root, with lateral roots. (No hairs.)
- Stem is protected by bark, and has xylem and phloem.
- Main branches of stems keep growing. From them come **dwarf shoots**, which sprout leaves.
- The leaves are needle-shape: covers small area, has thick cuticle, sunken stomata = minimal water loss.


Seedling
Seed coat
Embryo
Leaves
Trunk
Root
Stored food
Seed cone (female)
Seed cone scales
Pollen cones (male)
Pair of seeds on upper surface of cone scale
Sporophyte (adult plant)
Pollen cone scale
Ovule
Megasporocyte
Microsporangium
Zygote (becomes seed)
Microsporocyte
Megasporangium
Diploid (2n)

REPRODUCTION

- Being Conifers, Pines produce cones for sex.
- These are not protected by fruit = naked seeds.
- Small male cones make pollen – cone opens up, pollen (with air sacs) is taken by **wind**.
- They fertilize ova in larger female cone
- Zygote develops, then becomes embry

- Seed has a papery wing – cone opens up, seed is dispersed by **wind**. Has *testa* (seed coat) and nutrients.

QUESTIONS Page 20

Question 1

10 X [1] = [10]

1. *SpermatoPhyta*
2. Testa
3. Rhytodome
4. Dwarf shoots
5. Seed EndoSperm
6. *GymnoSpermae*
7. Devonian era
8. Wind
9. Conifers
10. Tap root

Question 2

4 X [2] = [8]

1. B
2. A
3. C
4. C

Question 3

Pine Branches [5]

Needle shaped leaves

Dwarf shoot

Branch of unlimited growth

Question 4

1. Have many different forms of seed dispersal. Protective coat allows for dormancy until conditions are good. Have a store of food to get germination going. Chances of seed surviving are good. [4]

2. Strong tap root. Roots helped by fungi to take up water. Bark protects stems. Stem supported by conducting tissues. Thin leaves with cuticle to reduce water loss. Sex cells and seeds protected by cones. Pollen grains and seeds are light for wind transport. Seed coat keeps its water in the seed. Seed endosperm gives food to developing embryo. [10]

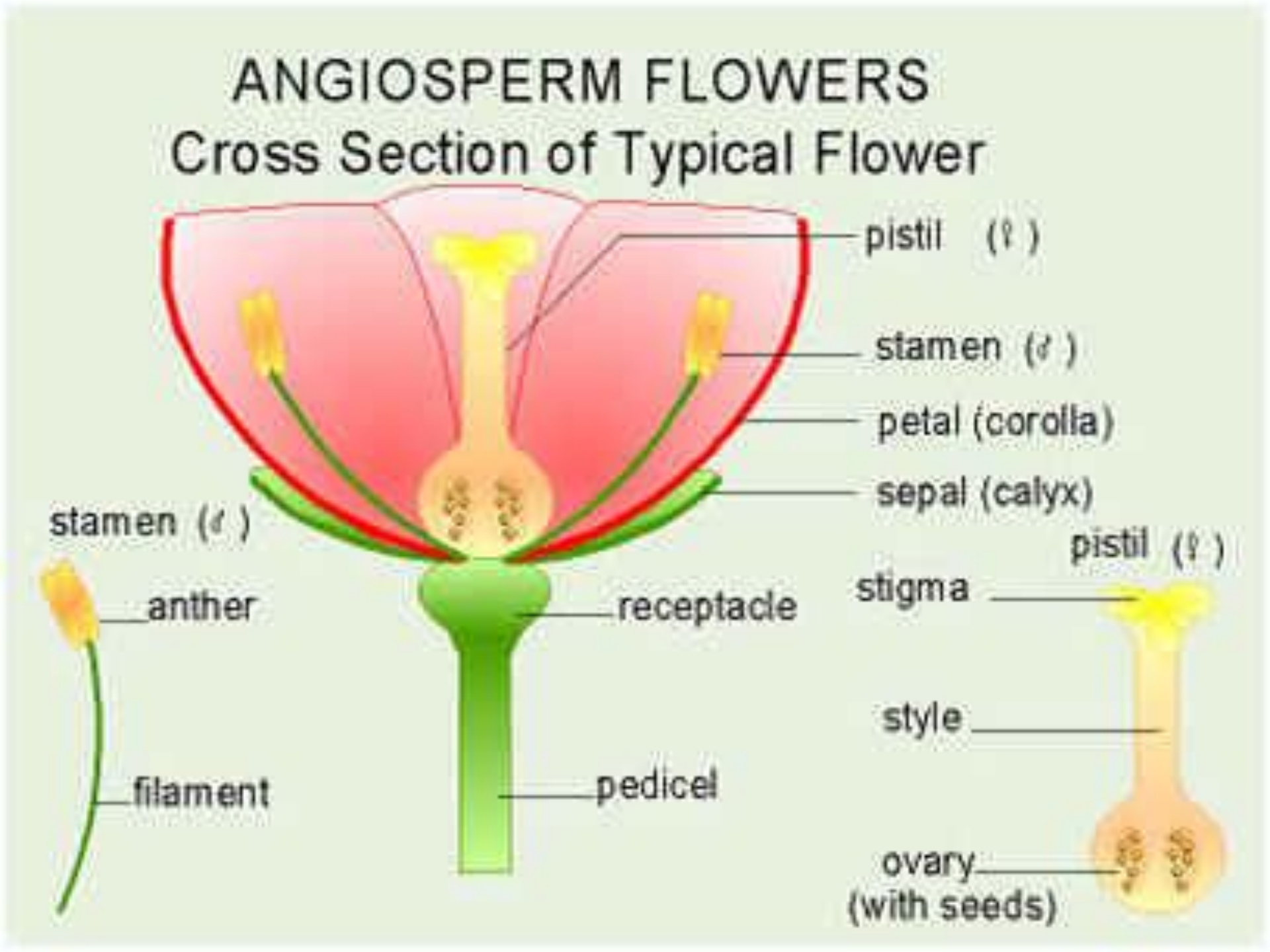
DIVISION: *SPERMATOPHYTA*

SUBDIVISION: *ANGIOSPERMAE*

INCLUDES*:* ALL FLOWERING PLANTS

Flowering Plant CHARACTERISTICS

- Evolved 70 mya – is the most highly developed of all plants.
- Has xylem, phloem, cuticle, stoma, flower, fruit.
- Roots, stems, leaves are all true.
- Gametophyte is in the flower, but is not significant.
- Sex happens through flowers. Pollination occurs by using agents.
- The ovary becomes the fruit, in which fertilized ovules become seeds. Protected. Distributed.
- ***Andro****ecium* = group of Stamens.
- ***Gynae****cium* = Group of Pistils


ANGIOSPERM FLOWERS
Cross Section of Typical Flower
pistil (♀)
stamen (♂)
petal (corolla)
sepal (calyx)
stamen (♂)
anther
filament
receptacle
pedicel
pistil (♀)
stigma
style
ovary
(with seeds)

QUESTIONS Page 22

Question 1

10 X [1] = [10]

1. Anther
2. Pedicel
3. Pollination
4. Fertilization
5. Sepal/Calyx
6. Mesozoic era
7. Sepal/Calyx
8. SporoPhyte
9. Androecium
10. Self-Pollination

Question 2

4 X [2] = [8]

1. B
2. D
3. C
4. B

Question 3

Flower [12]

Petal

Sepal

Pedicel

Anther + Filament = male stamen (androecium)

Stigma + Style + Ovary + Ovules = female pistil (gynaecium)

Question 4

Store seeds from all around the world. Endangered plants will not die out. We can use good genes stored if our crops go wrong. Conditions in banks preserve seeds for years. We can germinate them easily. [4]

Question 5 [5]

Vascular (xylem and phloem). True roots, true stems, true leaves. Good tissues of strength, so can grow into trees. Makes flowers, with seeds in fruits for protection and seed dispersal. Pollination allows many agents – not just water. SporoPhyte is dominant – GametoPhyte is only inside flower.

Question 6

Seeds of cereals for starch. Seeds of nuts for oils and lipids. Seeds of legumes (peas and beans) for proteins. [6]

Question 7 [26]

	BRYOPHYTE	PTEROPHYTE	GYMNOSPERM	ANGIOSPERM
DOMINANT		Sporophyte	Sporophyte	Sporophyte
CUTICLE	Absent	Present	Present	
RHIZOIDS	Present		Absent	
RHIZOME		Present	Absent	Absent
ROOT HAIR	Absent		Absent	Present
VASCULAR	Absent	Present		Present
WATER	Yes		No	No
SPORES	Yes	Yes	No	
SEEDS	No	No		Yes