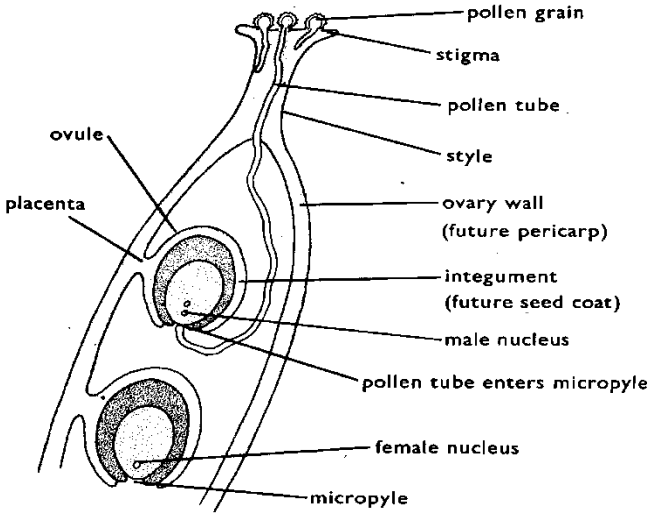
PENANG SANGAM HIGH SCHOOL
P.O.BOX 44, RAKIRAKI
LESSON NOTES

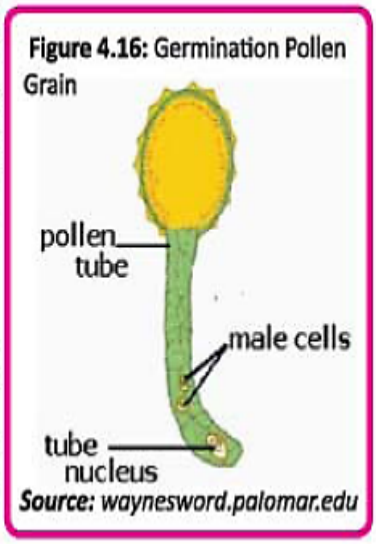
Subject: Biology **Year/Level:** 11
Week 20

Strand	1 Structure and Life Processes
Sub Strand	1.5 Structure And Functions In Plants
Content Learning Outcome	Discuss fertilization, parts of seed and functions, how and when it germinates.

Fertilization

- Occurs immediately after pollination.
- Pollen grain develops a long hollow outgrowth called the pollen tube
- Pollen tube penetrates through the stigma and style, and receives nourishment from their tissues.
- male nucleus enters the ovule and fuses with the ovum
- Female nucleus in the embryo sac to form a zygote.





perm
s go
h double
ation.

le
zation:

hen a llen grain nds on the gma it velops a pollen tube down through the style to the entrance of the ovary (ovary is made up two protective layers of **integument** which joins to form a small opening called **microphyle**).

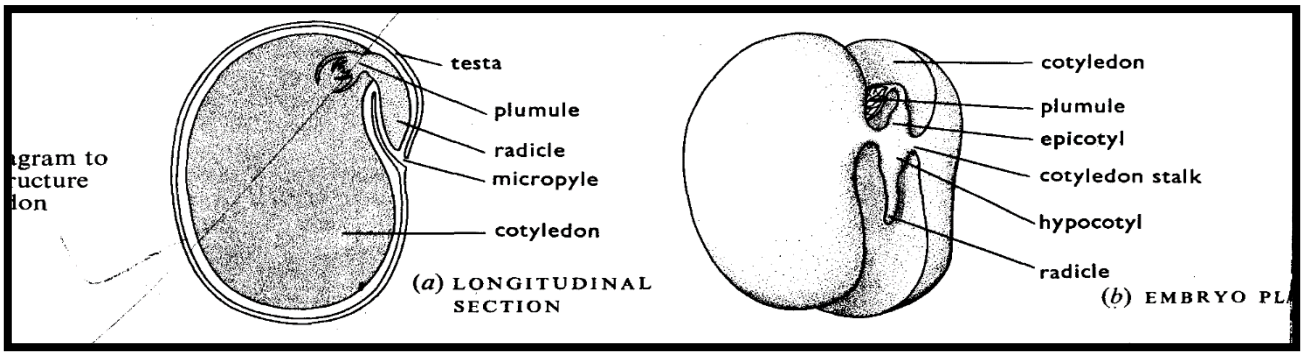
- The pollen grain contains a generative cell which divides by mitosis to form two sperm nuclei.
- The pollen tube connects with the microphyle.
- The two sperm nuclei travel down the style one after the other.
- The generative nuclei (having one nucleus) fertilize an egg cell having one nucleus to form the **zygote**.
- The second sperm nuclei fertilize the egg cell having two nucleuses to form the **triploid endosperm** or **food storage**.
- After fertilization the zygote divides by mitosis to form the seed. (cell differentiation during mitosis causes the development of different parts of the seed)

Production of seeds and fruits

- The fertilized egg grows into an embryo

- The ovule changes into a seed
- The ovary becomes the fruit.

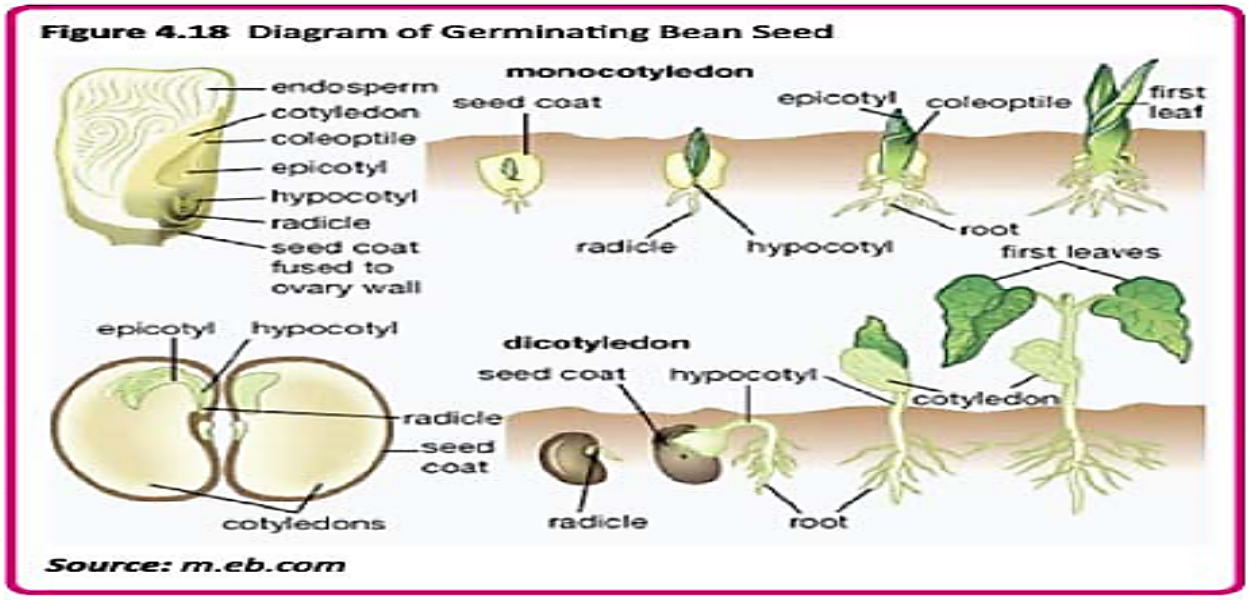
Seed structure



Parts of a Seed and Functions

Part	Function
Seed coat	Protects the seed from dehydration
Endosperm	Provides food for the young new plant to use until it can make its own by photosynthesis
Embryo	"Baby" plant
Radicle	Seed root
Cotyledons	Seed leaves
Micropyle	Small hole where water enters the seed
Plumule	"Baby shoot"

Seed germination



Three main parts of the embryo lie between the cotyledons:

1. Hypocotyl: embryonic stem
2. Epicotyl: embryonic shoot – plumule.
3. Radicle: the embryonic root.

- The epicotyl contains a terminal bud that will grow into a shoot.

Seed Dormancy

- Is a period of inactivity before germination.

- Embryo becomes inactive until conditions are favorable for germination.
- Dormancy can be overcome in seeds by exposure to light, temperature and fire.

Note:
Gardeners sometimes artificially break seed dormancy using various methods:

- Freezing
- Soaking in water
- Scraping or chipping testa

- When conditions are favourable dormancy ends and germination begins.
- The ability of a seed to germinate is called **viability**.
- The hypocotyl and epicotyl undergo rapid cell division. The energy needed is supplied by the cotyledons. During this time a lot of O_2 is needed.
- The food stored differs between monocots and dicots.
- In dicots e.g. bean the food is stored in the form of proteins and oils. In monocots e.g. corn kernel it is protein and starch.
- During germination the starch is first converted to sugar by enzyme amylase and then it is used in the respiration reaction. This explains why germinating seedlings taste sweet such as bean sprouts.

Activity

1. Discuss the gas exchange in herbaceous and woody stems.

_____
_____
_____
_____

2. By which process does mineral enter the root cells?

_____

3. How does water enter the root cells?

_____

4. Give one importance of reproduction.

_____