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

Subject: Biology **Year/Level:** 11
Week 21

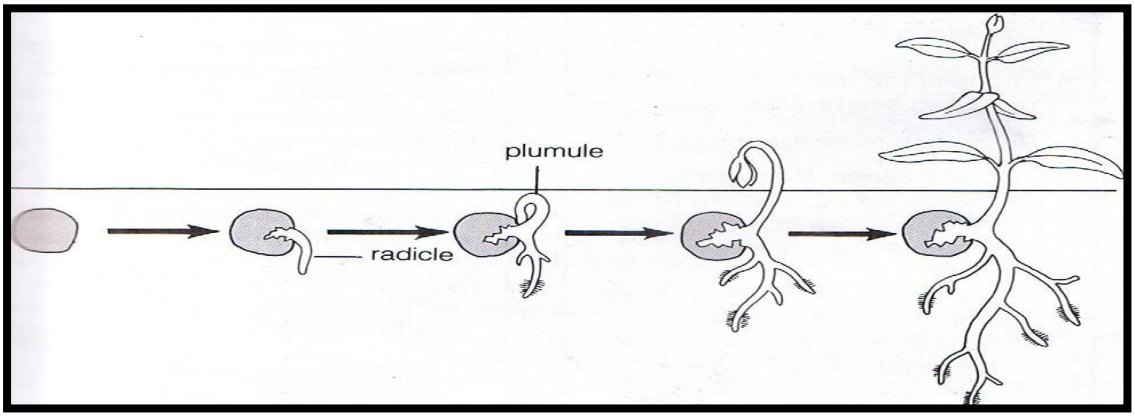
Strand	1 Structure and Life Processes
Sub Strand	1.5 Structure And Functions In Plants
Content Learning Outcome	Discuss the conditions needed for, changes that occurs during germination, seed dispersal methods.

Conditions for Germination

- Right amount of moisture - to soften the testa and cause swelling.
- Right amount of oxygen- for respiration reaction to provide energy to growing shoot and root.
- And correct temperature.
- However too much moisture with high temperature will stimulate fungal growth destroying the seeds.

During germination the following changes take place:

- Water enters the seed through the **micropyle** and the seed coat swells.
- Cotyledons digest the food in the endosperm.
- The **testa** splits and the baby root **(radicle)** comes out.
- The baby shoot comes out **(plumule)** and emerges above the soil.



Types of Germination

There are two types:

1. **Epigeal germination** – is where the seeds are carried above the ground during seedling growth. The cotyledon and the plumule then develop into a new shoot e.g. bean plants and peanuts.

2. **Hypogeal germination** – is where the seeds remain below the ground e.g. maize.

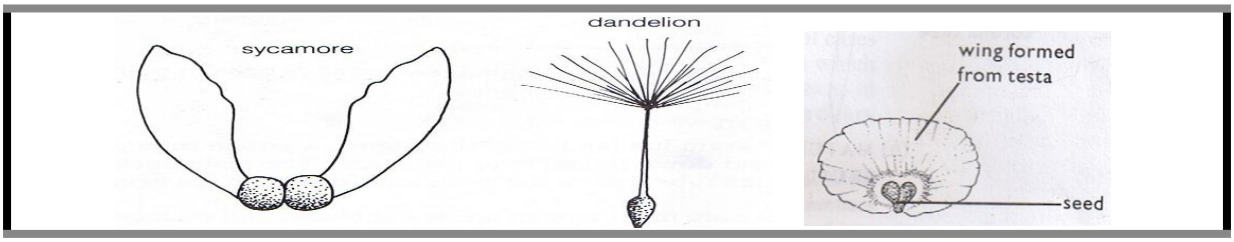
Seed dispersal

Dispersal of seeds is desirable for the following reasons:

1. To avoid overcrowding and competition for light and nutrients
2. To help colonize new and favorable habitats.

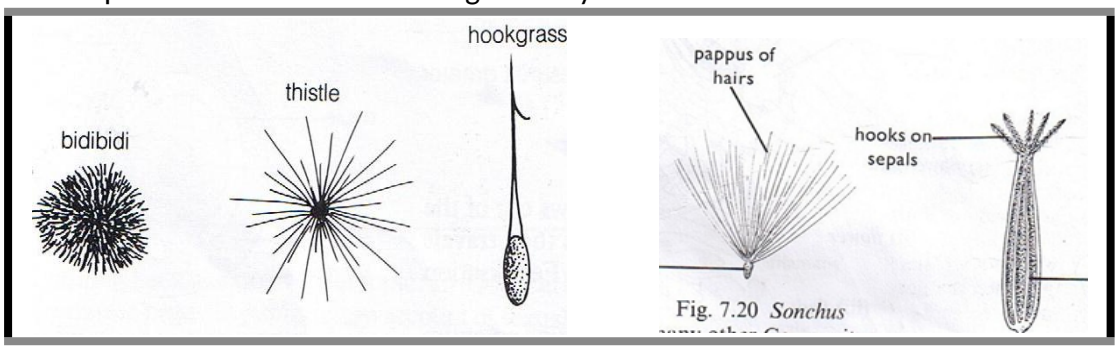
Methods of dispersal

1. **Wind dispersal**
   - Light seeds which are carried away by the wind.
   - Those seeds generally have fruits that form wings or feather like structures so that they can "catch" the wind.
   - E.g. tulip, sycamore, grass etc.

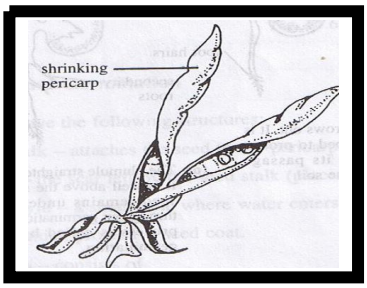


2. **Water dispersal**
   - Plants that grow near streams and oceans produce large hollow seeds that can float away to new area of land
   - E.g. coconuts, mangroves, Ivi, etc

3. **Animal dispersal**
   - Animals disperse seeds in two ways:
     a) The seeds get stuck on the animal's body. Such seeds usually have hooks or spines.
     b) The animals eat the fruits. (e.g. pawpaw, tomatoes, chilli etc.)
     -Such fruits are usually fleshy and sweet.
     -The seed passes unharmed via the digestive system and comes out in the faeces.



4. **Pod explosion (self-dispersal)**
   - Some plants enclose their seeds in pods that explode and scatter the seeds once they have matured and dried out
   - E.g. balsam, beans, etc.



Types of Plants

- Most plants reproduce before they die – this is the **life cycle**.
- Life cycles vary in length.

Annuals: Plants whose life cycle is for only one year. This means the plant grows reproduces and dies within one year.
Biennials: plants that complete their life cycle in two years. This means these plants live for two years.
Perennials: plants which live for more than two years.

Primary and Secondary Growth
Primary Growth- Plant grows taller

- Occurs in the **primary meristems**
- 2 types of primary meristems:
  (i) tips of the roots
  (ii) tips of the stems (shoots)
- Occurs due to cell division and cell elongation (lengthening of cells)

Primary Growth in the Roots and Stems
Two ways:
(i) Meristematic cells rapidly divide to produce new cells.
(ii) Cells elongate.

Branch Formation
Part of the meristem breaks off and grows to one side of the main stem.

Secondary Growth- Plant grows thicker
Secondary Growth in the Roots and Stems
-cells in the cambium divide to form new xylem and phloem
- increases the width of roots and stems

Activity
1.Name one adaptation expected in the fruit for each of the following dispersal methods:
a. by water- _____
b. by attaching to the passing animal- _____
c. by being eaten by animals- _____
d. by explosion- _____

2. Name two advantages of the plants seeds being dispersed.
_____
_____
3. What is the advantage of the seeds being able to remain dormant?
_____
4. Name two adaptations of the seed that make its embryo more likely to be able to eventually germinate and grow into a seedling.
_____
_____