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

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

Week 22

Strand	1 Structure and Life Processes
Sub Strand	1.5&1.6 Structure And Functions In Plants/Animals
Content Learning Outcome	Discuss tropisms and the effect of hormones in plant growth. Discuss the digestive organs and its role in digestion.

Patterns of Growth

Hormones

- chemical messengers are produced in one part of the organism and tells the other parts what to do
- controls flowering, fruiting, dropping of leaves, fruit ripening and reproduction
- also controls amount and direction of plant growth

Tropisms

- Plant growth response towards or away from an environmental stimulus.
- **Stimulus**- anything in an organism's environment that causes it to react.
- ➢ **Towards** – positive tropism
- ➢ **Away**- negative tropism

Types of Tropisms

1. **Phototropism**
   - Plant's response towards light
   - eg. Stems and leaves grow towards light

2. **Chemotropism**
   - Growth response towards chemicals
   - eg. Pollen tube growing towards ovule

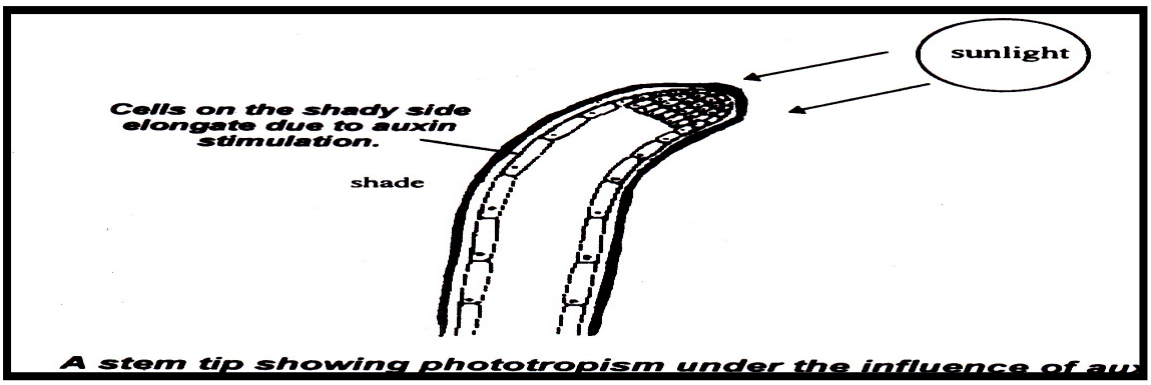
3. **Geotropism**
   - Plant's response towards gravity
   - eg. Roots grow towards gravity.

4. **Thigmotropism**
   - Response of a plant towards touch.
   - eg. Leaves of sensitive grass, tendrils of plants.

5. **Hydrotropism**
   - Plant's growth response towards water.
   - eg. Roots grow towards water

Control of Tropisms by Auxins

Auxin is a hormone which influences a plant's growth responses by making cells grow longer.



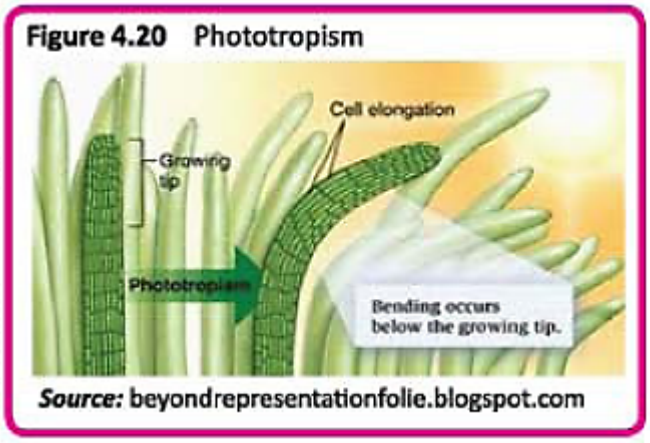
A stem tip showing phototropism under the influence of au

Auxin's Control of Phototropism

- Shade stimulates stem cells to produce auxins.
- This hormone makes the cells on the shady side to grow longer.
- No cell elongation occurs on the side of the stem that receives sunlight.
- The stem tip curves towards the sunlight.

Mechanism of Phototropism

- Roots and shoots are both sensitive to light. Light causes shoots to grow towards it (positive response) while it also causes the roots to grow away from it (negative response).
- Advantage of shoots and leaves growing towards light is that the leaves get maximum light for photosynthesis process which is vital.
- The chemical responsible for phototropic growth is **Auxin.**
- **IAA (Indole Acetic Acid)** is the auxin responsible for cell elongation.
- Auxin is present in the shoot of plants and is very sensitive to sunlight.
- When shoot is exposed to sunlight the auxin migrates to the darker side (side of the shoot not receiving sunlight).
- Since the concentration of auxin increases on the dark side, the cells elongate faster than the elongation of cells on the side receiving sunlight.
- **This unequal growth rate results in the shoot bending towards light.**



Other Plant Hormones Include:

- **Gibberellins**- cause the embryo plant to start processing stored food in the seed and begin growing.
- **Cytokinins** – to control and promote cell division in plants.
- **Abscisic Acid**- controls the actions of a plant as it prepares for dormancy.
- **Ethylene** – promotes ripening of fruits by stimulating the production of sugar and causing the fruit tissues to soften.

SUPPORT IN PLANTS

A. Herbaceous Plants

- **Turgor Pressure**- the pressure of water filling the cells, like water in a balloon.
- **Tough Cell Walls**-made of a tough carbohydrate called cellulose.

Climbing Plants

- Attach to taller trees using tendrils and winding stems to reach out for sunlight.

Epiphytes

- Root themselves up on branches of trees

B. Woody Plants

- **Turgor Pressure**
- **Cellulose in cell walls**
- **Heartwood**
- **Lignin**

STRUCTURE AND FUNCTIONS IN ANIMALS

The Organ Systems of Vertebrate Animals

System	Parts	Function
Digestive	Mouth, eosophagus, stomach, pancrease, liver, ileum, colon	Ingestion, digestion, absorption, assimilation and egestion
Circulatory	Heart, vessels, blood	Transporting materials and antibodies
Respiratory	Nose, trachea, lungs,	Gaseous exchange
Excretory	Kidneys, bladder,	Removal of metabolic wastes
Muscular & Support	Muscle, skeleton	Support, movement and protection
Nervous & Endocrine	Brain, nerves, glands, hormones	Control of homeostasis

- All these systems work together to keep **homeostasis** (**Homeostasis**- maintaining a constant internal environment.

The Digestive System

- Also known as the gut/ alimentary canal.
- All organisms require energy to function.
- The energy is applied in the food they it.

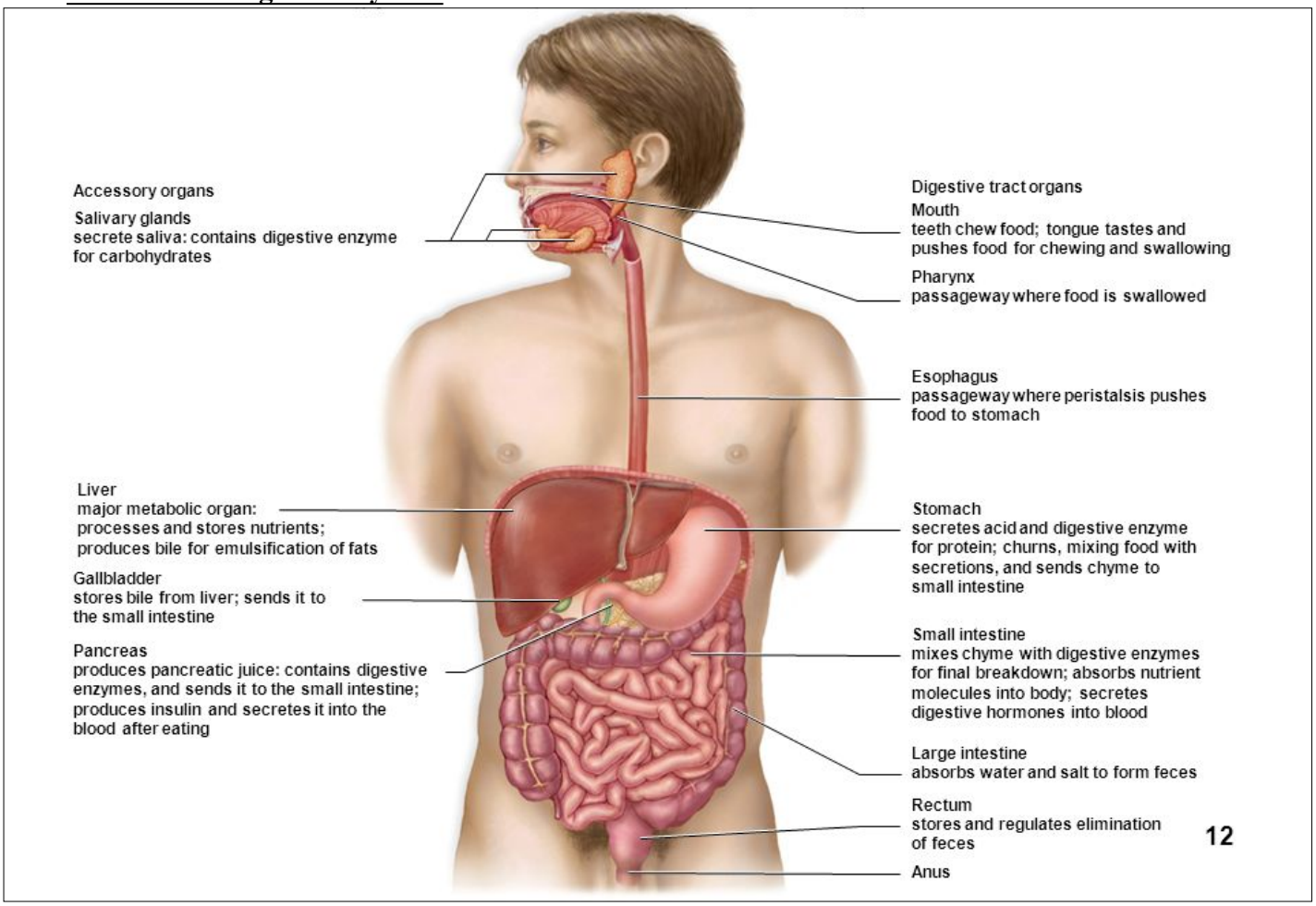
i. Autotrophs - organisms that manufacture their own food. Example: Plants
ii. Heterotrophs -organisms that obtain their food from other organisms. Example: All vertebrates

Food we take in is macromolecules so it cannot be absorbed directly by the body. Therefore, it has to be changed in the simple forms in order to get absorbed into the bloodstream.

Food Types	Simple Form
Starch	Glucose
Protein	Amino acids
Fats	Fatty acids and glycerol

Two Types of Digestion	
1. Mechanical digestion	- The breakdown of large food particles into small particles by physical means such as grinding by teeth and peristalsis/ churning.
2. Chemical digestion	- Breakdown of large molecules such as starch into smaller molecules (glucose) by enzymes.

The Human Digestive System



Parts and Functions of the Human Digestive System

Part	Function
Mouth Teeth Tongue	Beginning of the alimentary canal where food enters Physically breaks down food to smaller pieces Manipulates food in the mouth as it is broken down, helps to roll food into a round bolus making it easier to swallow
Salivary gland	Three pairs of glands produces saliva which moistens and softens food making it easier to swallow, the enzyme amylase in the saliva begins starch digestion
Saliva	Liquid substance secreted by the salivary glands containing enzyme amylase
Epiglottis	Located on the top of the oesophagus. Prevents food from entering the trachea during swallowing
Oesophagus	A long tube-like structure connecting the mouth to the stomach. Bolus of food travels through this tube by a wavelike action called peristalsis

Stomach	A sac-like chamber through which food enters and is stored temporarily to be released to the rest of the gut when necessary
Gastric glands	Secretes gastric juice containing pepsin, for protein digestion in the stomach; hydrochloric acid, for killing any bacteria in the food
Small intestine Pancreas	Divided into the duodenum and the ileum Secretes pancreatic juice which contains amylase, for further starch digestion, lipase for lipids/fats digestion and trypsin, for protein digestion
Bile	Green liquid produced by the liver and stored in the gall bladder. It has two functions: • To neutralize the acidic nature of the chyme in duodenum so enzymes can continue digestion • To break up fats and lipids into smaller molecules so that there is greater surface area for enzymes to act – a process called emulsification and is not the same as digestion
Villi	These a small finger-like projections in the wall of the ileum through which digested food is absorbed
Large intestine (or colon)	Receives undigested material that remains after the digested food is absorbed. Water is reabsorbed from this material, now called faeces, which passes into the rectum
Rectum	Located at the end of the colon, holds faeces until it is expelled from the colon
Anus	The end of the alimentary canal. Opening through which faeces is discharged

The digestive process includes the following:

Process	Explanation
1. Ingestion	Process of taking food into the gut at the mouth
2. Digestion	Involves mechanical and chemical digestion
3. Absorption	The taking in of digested food into the bloodstream at the ileum
4. Assimilation	The use of absorbed materials by the cells
5. Egestion	The removal of undigested food through the anus.

Activity

1. a). Describe what makes a plant grow towards light? _____
_____

b). What is this growth called? _____

2. What is the adaptive vale of the roots showing positive geotropism?
_____

3. Name three environmental factors that influence the growth patterns of plants.
_____

4. Name four ways that trees support their height. _____
_____

5. What is the advantage of the plants growing tall? _____

6. What is the advantage and disadvantage of being an epiphyte?
_____
_____