3055 BA SANGAM COLLEGE

PH: 6674003/9264117 E-mail: basangam@connect.com.fj

WORKSHEET 16

School: Ba Sangam College **Year:** 12

Subject: Biology **Name:**

Strand	**1 – Structure and Life Processes**
Sub strand	**1.4 – Comparative Form and Function in Plants and Animals**
Content Learning Outcome	**-Discuss the factors that affect support, protection and movement in plants and animals.**

Protection, Support and Movement

- Organisms have adaptive features that provide them with protection (dehydration, disease, predators) support from gravity and movement (to find food and escape predators).

Factors Affecting Protection, Support and Movement

Aquatic and Terrestrial Habitat

Aquatic Organisms (Water)	Terrestrial Organisms (Land)
➢ No need to protect itself from dehydration since it lives in water	➢ Needs to protect itself from dehydration
➢ In the water, the pull of gravity experienced by the organism is reduced due to the buoyant force in the opposite direction.	➢ Requires stronger support system to cater for the strong gravitational pull that is experienced by the body.
➢ Movement in water requires different structures to aid in movement (example, fins in fish to swim)	➢ Movement on land requires different structures (example, skeletal structure made of bones)

Plants: Protection, Support and Movement

Movement in Plants

- Plants are sessile but as they make their own food, they have limited movement capabilities.

Types of movement in plants

(1) Tropic
(2) Nastic movements.

Nastic Movement

- Are non-directional movement due to chages in turgor and growth.

Nyctinasty (sleep movement)

- movement in plant organ in response to the onset of darkness

Photonasty

- Movement of plant organs in response to light.

Chemonasty

- Movement of plant organs in response to chemical/nutrients.

Thigmonasty

- Movement of plant organs in response to vibration or touch.

Examples of Plants that Move

1. **Plants that Move to Capture and Consume Prey**
   Eg. Sundew, Venus Fly Trap, Waterwheel

2. **Plants that Move Leaves**
   Eg. Sensitive Grass, Partridge Pea, Yellow Neptunia
3. **Plants that Spread Seeds or Pollens by Rapid Explosion**
   Eg. Squirting Cucumber, Resurrection Plant

Protection In Plants

Protection in plants- from being eaten, pulled and /or torn

Ways in which plants protect themselves are:

1. **Thorns and spines** (stuctural defence)
   Eg. Rose plant, lemon tree, cacti
2. **Poisonous leaves** (chemical defence)
   (note : these leaves are not poisonous to all organisms but some specific ones)
   Eg. Neem leaves, lanatana, mother-in-law tongue
3. **Hairy leaves and stems** (stuctural defence)
   Eg. Tomato leaves and stem, egg plant leaves, pumpkin leaves
4. **Thick leaf cuticle** (Structural defence)
5. **Sharp leaf edges** (structural defence)
   Eg. Coriander family, Coconut Leaves, Conifers
6. **Bad Smell** (Chemical Defence)

Eg. Western Skunk Cabbage, Dead Horse
Arum Lily, Corpse Flower

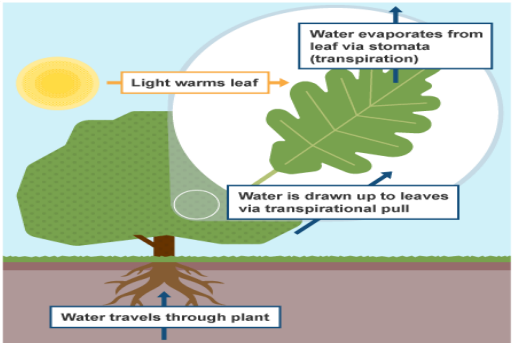
7. **Bark** (structural Defence)
8. **Sensitive grass** (behavioural defence)

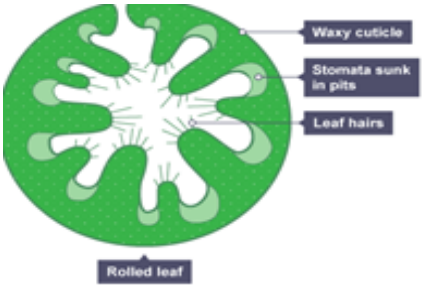
Protection in Plants- From Dehydration/ Desiccation

- **Transpiration -**movement of water through the plant and its evaporation from the aerial (top) parts especially through the leaves.
- When water is drawn up from the roots and lost through the leaves via stomata, the plant gets cooled.
- limited water available ----prolonged dry seasons and droughts---- plants close their stomata.

Adaptive features of land plants --desiccation are:

(1) Stomata present on the lower surface of the leaf than on the upper surface
(2) Stomata have guard cells which open and close the stomata as per need.
(3) Waxy cuticle on the upper surface of the leaves reduce the water loss via transpiration from the top surface.
(4) Presence of tiny hair-like structures on the leaves also helps reduce transpiration.





Aquatic Plants

- Aquatic plants ---do not conserve water.
- Some aquatic plants---floats---- lack guard cells on the stomata and some do not have any stomata at all (submerged plants).
- Floating plants----stomata present on the upper surface of the leaves to enable exchange gases with the air.
- submerged plants ---lack waxy cuticles or have a very thin layer of the waxy cuticle to aid in efficient gas exchange while some floating aquatic plants have the thick waxy layer to repel water and keep the stomata clear.

Support in Plants

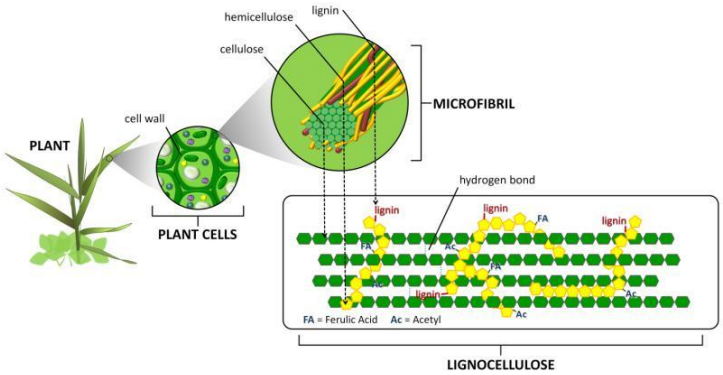
- Main role of the plants as producers ----- photosynthesis
- Key ingredients required for photosynthesis are: water, carbon dioxide and sunlight.

Support in Plants to Acquire Adequate Sunlight

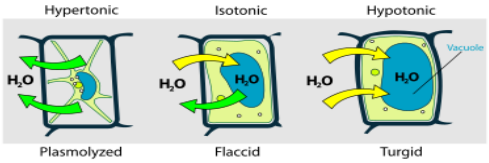
- to maximise the amount of the sunlight received, many plants grow upwards and outwards

Support in Herbaceous Plants

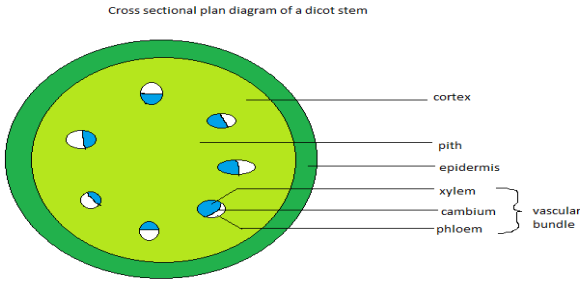
1. **Cellulose in plant cell walls**



2. **Turgor Pressure**



3. **Cortex tissue**



Exercise

1. How are the support needs of aquatic organism different from those of terrestrial organisms? What are the reasons for these differences? **(2 marks)**

_____

_____

_____

2. Why do plants have limited movement abilities in comparison to active animals? **(2 marks)**

_____

_____

3. Plants produce more food than they consume. What may have selected for this over production? **(2 marks)**

_____

_____

4. Compare and contrast the support systems of herbaceous and woody plants. Explain the adaptive value of their differences? **(4 marks)**