**BIO 102 ASSIGNMENT**

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**DEPARTMENT:** Pre-Medicine and Surgery

**COLLEGE:** Medicine and Health Sciences

**LEVEL:** 100

Assignment

1. Classify plants according to Eichler’s grouping of 1883.

Eichler’s grouping of plants in 1883

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| S/N | DIVISION | CLASS |
| 1. | Thallophyta | Phycotinae (algae)  Mycotinae (fungi) |
| 2. | Bryophyta | Hepaticae (liverworts)  Musci (mosses) |
| 3. | Pteridophyta | Psilotinate (psilotum)  Lycopodinae (lycopodium, selaginella)  Equisetinae ( Horsetails)  Filicinae (Ferns) |
| 4. | Spermatophyta | Gymnospermae (gymnosperms)  Angiospermae (angiosperms) |

1. How are algae of importance to man?
2. Algae serves as food for people and livestock, thickening agents in ice cream and shampoo, drugs to ward off diseases.
3. Algae have high Iodine content therefore preventing goiter.
4. Algae are considered nutritious because of high protein content and high concentrations of minerals, trace elements and vitamins.
5. Brown algae yield Alginic acid which is used to stabilize emulsions and suspensions found in products such as syrup, ice cream and paint.
6. Different species of red algae provide agar and carrageen used for preparation of various gels used in scientific research.
7. Describe a unicellular form of algae.

Unicellular algae are plant-like autotrophs and contain chlorophyll. Chlamydomynas represents the unicellular and motile forms of green algae, found in stagnant water usually along with other forms. Flagella are the structure for mobility. The cell is bounded by a cellulose cell wall; contains organelles e.g. nucleus, mitochondria, stigma (eyespot), cup-shaped chloroplast, pyrenoid etc. The nucleus carries the genetic programme of the cell. The stigma is for photoreception. The mitochondria mediate the elaboration of energy molecules. Manufactured sugar is processed into starch on pyrenoid.

1. How does this unicellular algae, described in question 3, carry out its reproduction?

In chlamydomonas, reproduction can either be vegetative (asexual) or sexual.

**Vegetative reproduction**: in chlamydomonas, a cell about to divide loses its flagella. The cell undergoes mitotic division leading to two nuclei, cell walls are elaborated which delimit cytoplasm around each nucleus i.e. two daughter cells (zoospores) are released. Increase in the population of cells in a colony is achieved by repeated mitotic division.

**Sexual reproduction;** certain conditions e.g. lack of nutrients or moisture may trigger the haploid daughter cells to undergo sexual reproduction. Though in chlamydomonas, aggregation of cells in a colony occurs under favourable conditions. These cells pair by their positive (flagellated) ends. This pairing is said to be isogamous because the pairing cells (gametes) are morphologically identical. The cytoplasm of the pairing cells fuse (plasmogamy) and the flagella are lost. The two nuclei fuse (karyogamy): this situation is essentially a fertilization process so that a zygote is formed. In other words, two cells each with n quantity of genetic materials (haploid nuclear materials) under karyogamy (fusion of nuclei) to produce a single cell with 2n (diploid) nuclear materials. The zygote secretes a thick cell wall called a zygospore and may remain dormant in that state for some time. After karyogamy, sometimes, the zygote undergoes two successive cell divisions. The first division restores the haploid condition by halving the nuclear material in the two resulting nuclei. While the second division each haploid nucleus undergoes a normal mitotic division. These two divisions which end up with four cells and with n quantity of nuclear materials.

1. Differentiate between the two types of colonial form of algae.

The colonial forms in algae are the Pandorina and Volvox

**Pandorina**; usually occurs in water bloom. The colony consist of 16 cells attached to one another. Each cell has many attributes/features in common with chlamydomonas e.g. nucleus, large chloroplast, pyranoid, flagella and stigma. Asexual reproduction is by simultaneous division of all cells of the colony to form auto colonies that are liberated by a gelatniziation of colonial envelop. Sexual reproduction occurs by division of each cell of the colony into 16-32 zoogamates.

**Volvox**; The genus volvox (also green colonial form) shows more complex form than pandorina. There more cells in colony, number may run into thousands and connected with cytoplasmic strands that runs through the cells. Not all cells form new colonies; but the larger cells at the posterior ends (gonidia) are the only ones that divides to form new colonies. Other cells remain vegetative throughout the life of the colony. Sexual reproduction is oogamous.

1. Describe a named complex form of alga.

**FUCUS**; A genus of brown algae whose species are often found on rocks in the in the intertidal zones of the sea shores. The plant body is flattened. The plant body also have air bladders which is believe to aid the plant float on water. Various species of focus exist; vary in size from centimeters to about 2meters in length. They also vary in terms of whether sex cells are found in the same sexual chamber or in different sexual chambers on different plant bodies. Sexual reproduction is oogamous, sex cells are produced in conceptacles which have openings (ostioles) on the surface of the thallus.