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

Division	Class
Thallophyta	Phycotinae (algae) Mycotinae (fungi)
Bryophyta	Hepaticae (liver worts) Musci (mosses)
pteridophyta	Psilotinate (psilotum) Lycopodinae(lycopodium, selaginella) equisetinae (horsetails) filicinae (ferns)
Spermatophyta	Gymnospermae (gymnosperms) Angiospermae (Angiosperms)

2. How are algae of importance to man

- a. It serve as food for man
- b. It provide drugs which aid to ward off disease
- c. As source of vitamins
- d. As source of agar
- e. Used as fertilizers
- f. Ornamental uses
- g. Nitrogen fixation by blue green algae
- h. As a fodder for hens and milk cattle

3. Describe a unicellular form of algae:

Chlamydomonas represent the unicellular and motile forms of green algae.

- i. They are found in stagnant water and are usually along with other forms.
- ii. Flagella are the structures for mobility.
- iii. The cell is bounded by a cellulose cell wall: contains organelles e.g nucleus, mitochondria, stigma (eye spot) cup-shaped chloroplast, pyrenoid etc.
- iv. The nucleus carries the genetic programme of the cell.
- v. The stigma is for photoreception

- vi. The mitochondria mediate the elaboration of energy molecules. VII. Manufactured sugar is processed into starch on the pyrenoid.

4. The mode of reproduction in unicellular form of algae:

Reproduction can either be vegetative (asexual) or sexual.

VEGETATIVE REPRODUCTION: This results in production of daughter cells in which the amount and quality of genetic material in the nucleus of the mother cell is maintained in the daughter cells. If the amount of genetic material in the mother cell nucleus is n , the daughter cells also have n quantity of genetic material. Mitotic division is the kind of cell division which maintains the quantity and quality of genetic material. 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 divisions.

SEXUAL REPRODUCTION: It involves union of sex cells (gametes). In *Chlamydomonas*, aggregation of cells (clumping) in a colony occurs under favorable conditions. These cells pair by their posterior (flagellated) ends. The pairing is said to be isogamous because the pairing cells (gamete) are morphologically identical. The cytoplasm of the pairing cells fuses (plasmogamy) and the flagella are lost. The two nuclei fuse (karyogamy) this situation is essentially a fertilization process so that a zygote is formed. 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 (reduction division) while in the second division each haploid nucleus undergoes a normal mitotic division these two divisions which end up with four cells and with n quantity nuclear material are together known as meiosis. The four products of meiosis are released as haploid zoospores.

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

Pandorina	Volvox
sexual reproduction is anisogamous	Sexual reproduction is oogamous
Unicellular motile thallus	Multicellular motile thallus
It is a genus of green algae	It is a complex form of pandorina

6. Describe a named complex form of alga

FUCUS: It is a genus of brown algae whose species are often found on rocks in the intertidal zones of the sea shores. The plant body is flattened, dichotomously branched thallus with a mid-rib, the plant body has air bladders which aid the plant to float on the water. Various species of fucus exist; vary in size from a few centimeters to about 2 meter in length. Sexual reproduction is oogamous; sex cells are produced in conceptacles which have openings (ostioles) on the surface of the thallus. In male conceptacles, one of the diploid cells from outgrowth of the wall of the conceptacles undergoes meiosis, the meiotic product undergoes many mitotic divisions to produce antheridium having 64 cells of which each cell develops into a biflagellate sperm that swims out of the conceptacle through the ostioles. While in female conceptacle, similar to the situation in the female conceptacle, leads to the production of an 8 celled oogonium. Each

becomes an egg which is the female sex cell. Apart from the antheridia and oogonia, sterile multicellular filaments (paraphyses) are also produced in the conceptacles which are dispersed among the antheridial and oogonial outgrowths and at the entrance into the the conceptacle.