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1. According to Eichler's grouping of 1883, plants are classified as follows:

DIVISION	CLASS
Thallophyta	Phycotinae(Algae) Mycotinae(Fungi)
Bryophyta	Hepaticae(Liverworts) Musci(Mosses)
Pteridophyta	Psilotinate(Psilotum) Lycopodinae(Lycopodium, Selaginella) Equisetinae(Horsetails) Filicinae(Ferns)
Spermatophyta	Gymnospermae(Gymnosperms) Angiospermae(Angiosperms)

2. Importance of algae to man are:

- i. Algae have iodine content therefore they prevent goiter.
- ii. Brown algae yields Alginic acid which is used to stabilize emulsions and suspensions; found in products such as syrup, ice cream and paint.
- iii. Algae are nutritious due to their high protein content and high concentrations of minerals, trace elements and vitamins.
- iv. Species of red algae provide agar and carrageen used for the preparation of various gels used in scientific research.
- v. Algae has been used to cure or prevent illness especially in Asian countries e.g. cough, goiter, hypertension etc.

3. Unicellular Form in Algae: Chlamydomonas represents the unicellular and motile forms of green algae. They usually found in stagnant water. Flagella are the structures for mobility. The cell is bounded by a cellulose cell wall; contains organelles e.g. nucleus, mitochondria, stigma (eyespot), cup-shaped chloroplast etc. The nucleus carries the genetic program of the cell. The eyespot is used for photoreception. The mitochondria is

used for elaboration of energy molecules. Manufactured sugar is processed into starch on the pyrenoid.

4. Reproduction in Unicellular Algae (Chlamydomonas): Reproduction in this algae can either be vegetative (asexual) or sexual.

Vegetative reproduction: This results in the 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. Thus, if the amount of genetic material in the mother cell is n , the daughter cells also has n amount of genetic material. This kind of cell division is called mitotic division. In Chlamydomonas, when a cell is about to divide it loses its flagella. The cell undergoes mitotic division leading to two nuclei, cell walls are elaborated with 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: This involves the union of sex cells (gametes) and a cell division known as meiosis. In Chlamydomonas, aggregation of cells (clumping) in a colony occurs under favourable conditions. These cells pair by their posterior (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 process is the fertilization process so that the zygote is formed. In other words, the cells with n genetic material undergo karyogamy to produce a single cell with $2n$ (diploid) nuclear material and may remain dormant. After karyogamy sometimes, the zygote undergoes two successive cell divisions the first division restores the haploid condition by dividing 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 of nuclear material are together known as meiosis. The four products of meiosis are released as haploid zoospores.

5. The differences between the two types of colonial form of algae are:

Pandorina	Volvox
There are 16 cells in each colony.	There are more cells in the colony; as many as a thousand cells.
Sexual reproduction is achieved by anisogamous pairing (pairing by the flagella ends).	Sexual reproduction is oogamous (the male gamete is motile while the female gamete is not motile).
This carries out both vegetative and sexual reproduction.	This carries out sexual reproduction only.

6. Complex Forms of Algae: Fucus is a complex form of algae. 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, a vegetative apex (at maturity) and a multicellular disk (hold fast) with which plant is attached to rock surface. The plant body also air bladders which is believed to aid the plant to float on the water. They vary on size from a few centimeters to about 2 meters in length. They also vary in terms of whether the sex cells are found in the same sexual chamber or in different sexual chambers. Sexual reproduction is oogamous, sex cells are produced in conceptacles which have openings (ostioles) on the surface of the thallus. In the male conceptacles, one of the diploid cells from outgrowth of the wall of the conceptacles undergoes meiosis, the meiotic product undergo 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 ostiole. In the female conceptacle, similar to the situation in male conceptacle, leads to the production of a 8 celled oogonium – each becomes an egg which is the female sex cell. Motile sperm cell from the antheridium move through the ostiole into the female conceptacle where the eggs are fertilised and diploid zygote are produced. Apart from the antheridia and oogonia, sterile multicellular filaments (paraphyses) are also produced in the conceptacle which are dispersed among the

antheridia and oogonial outgrowth and at the entrance into the conceptacles. The diploid zygote germinates into a new diploid Fucus plant making the diploid the dominant generation.