4) **Plantae**. It includes classes of organisms such as mosses and liverworts, ferns, gymnosperms (conifers) and angiosperms (flowering plants).

This kingdom has organisms which are multi-cellular and mainly reproduce sexually. They are photo-autotrophs (use sunlight for energy) and have chloroplasts in their cells (containing pigments for photosynthesis). <u>Plants are one of the main sources for primary producers</u>. Algae can be either aquatic – non Plantae, or terrestrial – Plantae. Plants are also important as they produce oxygen through photosynthesis. Members are usually divided into two major subgroups

1. Non Vascular Plants (Mosses and Liverworts)

2. Vascular Plants (Tracheophytes – Ferns, Gymnosperms and Angiosperms) Vascular tissue are conducting vessels which transport nutrients and water to the plant. <u>Xylem tissue carries water whilst phloem tissue carries nutrients</u>. Xylem also gives support to the plant which is very important as the plant needs to stay upright to be able to absorb sunlight.

Plants are said to have evolved from the protoctista group (mainly green algae). Non vascular plants are quite primitive as plants and are quite small. The first plants were rootless, had no proper stems or leaves. When plants evolved roots, they could grow larger.

Angiosperms are the most recently evolved (young). With this evolution many organisms (including man) found places where they could be office of the evolution of insects (co-evolution).

Angiosperms produce gametes from lowers (sexual crgan). Male gametes are found in pollen and made in anthem, female gametes are valled ovules and are contained in structures called overes.

Plants have a particular life cycle as they show alternation of generations. Plants spend part of their life in the haploid stage and part in the diploid stage and alternate regularly. The haploid stage is known as the gametophyte whilst the diploid stage is known as the sporophyte. Mosses and liverworts have a dominative haploid stage. As they kept evolving, the diploid stage dominated. Strong haploid stages require a stronger connection with water, strong diploid can live less and less without water. Water is still needed though for plants to grow. For example, flowering plants can be found in deserts.

Plants nourish and protect the next generation. They produce spores which are held by the plant until conditions favour the new plant to develop. This is not found in algae. Ferns are known as seedless plants. Gymnosperms produce naked seeds (not protected). Angiosperms are flowering plants.

Angiosperm ex: Lilium (lily).

5) Animalia. Multi-cellular organisms. Cells lack cell walls. They have organised cells which form tissues which form organs which in turn form organ systems.