AP Biology Notes: Plant Structure and Systems

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Four Things to Know about Plant Structure and Systems:

1. Plants with vascular tissues usually have three types of structures: leaves, roots, and branches.
2. Plants have specialized structures to deal with water and nutrients. These include stomata controlled by guard cells, a loosely packed spongy layer, the palisade layer, xylem, and phloem.
3. Plants produce energy through photosynthesis and lose water via transpiration. As water evaporates from the leaves, it pulls water up through channels in the xylem. The phloem carries nutrients throughout the plant.
4. Plants can reproduce asexually via vegetative propagation. Sexual reproduction in plants takes place in the flower.

Key Topics: Plant Structure and Systems

Remember that the AP Biology exam tests you on the depth of your knowledge, not just your ability to recall facts. While we have provided brief definitions here, you will need to know these terms in even more depth for the AP Biology exam.

Plant Vascular and Leaf Systems

- **Minerals:** Naturally occurring inorganic elements essential in the nutrition of organisms
- **Terrestrial plants:** Plants that live and grow on land
- **Epidermis:** The outermost surface of an organism
- **Stomata:** Pores in a leaf through which gas and water vapor pass; a small opening on the surface of a membrane; a mouthlike opening in an organism
- **Transpiration:** The evaporation of water from leaves or other exposed surfaces of plants
- **Adaptation:** A behavioral or biological change that enables an organism to adjust to its environment
- **Xylem:** Vascular tissue of the plant that aids in support and carries water

- **Phloem:** The vascular tissue of a plant that transports organic materials (photosynthetic products) from the leaves to other parts of the plant
- **Cell wall:** A wall composed of cellulose that is external to the cell membrane in plants; it is primarily involved in support and in the maintenance of proper internal pressure; fungi have cell walls made of chitin, and some protists also have cell walls
- **Osmotic pressure:** Pressure exerted by the flow of water through a semipermeable membrane, which separates a solution into two concentrations of solute

Plant Reproduction and Development

- **Phototropism:** Plant growth stimulated by light (stem: +, toward light; root: -, away from light)
- **Photoperiodism:** Response to seasonal changes in the length of day or night
- **Circadian rhythms:** Daily cycles of behavior
- **Reproduce vegetatively/vegetative reproduction:** Asexual reproduction
- **Ingestion:** The intake of food from the environment into the alimentary canal
- **Indeterminate growth:** Growth without a termination point
- **Sexual reproduction:** Reproduction by the fusion of a male and female gamete to form a zygote
- **Alternation of generations:** The description of a plant life cycle that consists of a diploid, asexual, sporophyte generation and a haploid, sexual, gametophyte generation
- **Sporophyte:** An organism that produces spores; a phase in the diploid-haploid life cycle that alternates with a gametophyte phase
- **Pollen (gametophyte):** The microspore of a seed plant, the haploid sexual stage in the life cycle of plants (alternation of generations)
- **Spore:** A reproductive cell that is capable of developing directly into an adult
- **Novel structures:** Cellular structures used primarily for reproduction
- **Polyploidy:** A condition in which an organism may have a multiple of the normal number of chromosomes (4N, 6N, etc.)
- **Hybrid:** An offspring that is heterozygous for one or more gene pairs
- **Asexual reproduction:** The production of daughter cells by means other than the sexual union of gametes (as in budding and binary fission)