

Neither plants nor animals can live without air and water. The former derives much of their food from the atmosphere by means of their leaves; while water is necessary to dissolve the manuring substances in the soil that they may enter the plant in a fluid state by its roots. Air is essential to the breathing of animals; the nitrogen properly diluting the otherwise too powerful action of oxygen, while the carbonic acid exhaled in breathing forms the principal organic food of plants.

*Question 6.*—Give a brief description of the general structure and functions of plants and animals, and their relation to the soil.

*Answer.*—Plants consist of various kinds of matter held together by the chemical and vital forces, and arranged into what are termed cellular and vascular tissue. The principal parts are the root, stem and leaves. The root fixes the plant in the soil, and supplies it with inorganic food from the surrounding medium. The leaves expand, and catch and absorb, by means of their numerous and minute pores, organic food, consisting of gaseous matter floating in the atmosphere. Every part of a plant is endowed with tubes, vessels, and cells, for the circulation and elaboration of the sap, which by a power and process, as yet but imperfectly understood, converts these fluids into the different parts of its own solid structure.

Animals are very differently constituted, having the power of locomotion, they can go in search of their food, if need be, and they digest it in their stomachs. Their structure and functions are exceedingly interesting; the blood, like sap to the plant, derived from food, freely circulates through the system and repairs its waste and increases its bulk. Vegetables constitute the connecting medium between the mineral and animal kingdoms. Animals cannot obtain nourishment directly from the earth. The plant lives upon the mineral, converts dead matter into living organisms, and the animal subsists directly on the vegetable, a simple yet truly wonderful arrangement.

*Question 7.*—What are the essential conditions in the germination, growth and maturity of plants? What is plant-food, and how is it assimilated? When is the proper time of cutting grass for hay, and also grain? With reasons.

*Answer.*—Warmth, moisture and air are each essential to the germination and growth of plants. Seeds, when thoroughly secured against these agents, by being buried deeply in the earth or otherwise, will remain for ages, but as soon as exposed to them will show signs of vitality and germinate. Wild mustard in our fields is an illustration in point.

Plant-food consists of the matter of which the structure of vegetables is composed; they get gaseous matters, such as carbonic acid, oxygen, and ammonia, by means of their leaves, from the air; and inorganic materials, such as lime, potash, soda, &c., through their roots from the soil, in a state of solution by water.

The grasses should be mown for hay as soon as in full blossom, when they contain the largest amount of saccharine and other nutritious substances. And