**Systems of Plants and Animals**

Plants and animals have systems, which contain organs/structures that assist in the acquisition, delivery and removal of the requirements and products of cellular respiration and photosynthesis.

Complete the tables below for plants and animals.

**PLANTS**

|  |  |  |  |
| --- | --- | --- | --- |
| REQUIREMENTS | SYSTEMS/STRUCTURES FOR ACQUISITION | SYSTEMS/STRUCTURES FOR DELIVERY | SYSTEMS/STRUCTURES FOR REMOVAL |
| Carbon Dioxide | Plants get carbon dioxide from the air through their **leaves**. The carbon dioxide diffuses through small holes in the underside of the leaf called **stomata.** | Carbon dioxide **diffuse**s from the **stomata** to the photosynthesising cells. | The carbon dioxide produced during respiration gets utilized during photosynthesis. **Lenticels** are non-suberized **pores**, which enable carbon dioxide to be released into the atmosphere. |
| Oxygen | Plants get oxygen from the air through their leaves. The oxygen diffuses through small holes in the **underside of the leaf** called **stomata.** | **Lenticels** are non-suberized **pores,** which enable oxygen to reach the intercellular spaces of the interior tissues. | As oxygen is a by-product of photosynthesis it **exits** through **stomata, root cell walls,** and other routes. |
| Water | Plants **absorb water** from the soil by **osmosis**. | The water is transported through the **roots** where it is used for different purposes such as photosynthesis, keeping the cell rigid and transports minerals around the plant. | The cells inside the leaf have water on their surface. Some of this water evaporates, and the **water vapour can then escaped from inside the leaf by diffusion.**  **Transpiration and guttation.** |
| Glucose | **Glucose is obtained as a product from photosynthesis**. Sunlight + carbon dioxide + water produce glucose and oxygen. | Glucose gets converted into sucrose. It is then **transported** through the plant by means of a special layer of tissue called **phloem.** Phloem composed of living cells that transport a water solution of sugars (sap). | The **glucose is used in respiration or converted to starch and stored.** |
| Other Nutrients | Plants **absorb nutrients** through their roots.  **Root system.** | The **xylem** is a vascular tissue, which transports water and minerals up from the roots to the leaves. | Plants use the nutrients for plant growth, metabolism and external supply. |
| Removal of Metabolic Wastes | The major excretory products in plants are **carbon dioxide, excess water produced during respiration and nitrogenous compounds produced during protein metabolism.** | Some of the waste products are **stored in special cells or cellular vacuoles,** as plants don’t have an excretory system. | The **leaf** acts as an “excretophore” and is used as a method of **excreting toxic wastes via diffusion.** |

**ANIMALS**

|  |  |  |  |
| --- | --- | --- | --- |
| REQUIREMENTS | SYSTEMS/STRUCTURES FOR ACQUISITION | SYSTEMS/STRUCTURES FOR DELIVERY | SYSTEMS/STRUCTURES FOR REMOVAL |
| Carbon Dioxide | As a result of cellular respiration. | **Red blood cells** carry carbon dioxide back to the **lungs**.  **Circulatory system.** | Pulmonary **artery** carries blood containing carbon dioxide to the air sacs, where the gas moves from the blood to the air and is expelled through exhalation.  **Respiratory/Circulatory systems work together.** |
| Oxygen | Oxygen enters the body through the **nose or mouth**, passes through the sinus, down the **trachea, into the bronchi** which then connects to the **lungs.**  **Respiratory system.** | **Red blood** cells carry oxygen from the lungs to the area where it is needed.  **Circulatory system**. | The oxygen gets used **in cellular respiration.** |
| Water | Water is acquired through drinking and goes down through the **digestive system.** | Water is absorbed in the **small intestine, the duodenum and jejunum and the rest passes to the colon.** It crosses the intestinal mucous membrane into the bloodstream, then into the interstitial tissues that make up the framework of every organ to arrive in the cells.  Digestive/circulatory systems. | Water is excreted through the **kidneys** where it joins with other waste products to form **urine.**  **Excretory system**. |
| Glucose | Acquired through the foods eaten. The body digests the food by mixing it with other fluids **and breaking it down to glucose**. | Glucose can be absorbed across the wall of the small intestine into the bloodstream. Glucose is **carried round the body dissolved in blood plasma.** | The **liver will store glucose when it is not required and will release it when it is.** |
| Other Nutrients | Acquired from food that has been digested and absorbed. | Nutrients a broken down into smaller molecules and absorbed across the wall of the small intestine**. The nutrients are carried around the body by blood.** | Digestive waste is solid and is **excreted through the colon for ultimate elimination out of the anus.** |
| Removal of Metabolic Wastes | Metabolic wastes **are products** of metabolic processes, which **cannot be used by the organism**. | **Continues through the excretory system until it gets expelled from the body.** | All metabolic wastes are excreted in the form of water solutes through the excretory organs with the exception of carbon dioxide, which is excreted through the lungs along with water vapour.  Primary organs used in **excretion of metabolic wastes: liver, kidneys, lungs, intestines and skin. Wastes removed through either the skin, urinary, respiratory or gastrointestinal system.** |