

8. mitochondria - energy production
 nucleus - reproduction, protein synthesis
 vacuole - storage
 cell membrane - protection / support
 endoplasmic reticulum - support, protein synthesis, transport
 ribosomes - protein synthesis
 centrioles - reproduction
 cytoplasm - support, transport
 nucleolus - reproduction
 golgi apparatus - storage, protein synthesis

Lab 4: Cellular Reproduction

1. The chromosomes are doubled so that there will be enough for each daughter cell to have a full set. 2x
2. See the answer above. Each chromosome is duplicated by acting as a template for itself.
3. RNA and DNA are made up of amino acids which are made from raw nutrients taken from the air. The nitrogen compounds are made from the nitrogen from the air and fertilizer; carbon compounds are made from the air. Without water these things still would be of little use to the plant for reproduction. Factors in the environment which would affect these things are the amount of rainfall, nitrogen in the soil, and light supply.

Lab 5: Protista: The Protozoans

Critical Thinking I

1. The amoeba causes a dangerous dysentery which is easier to prevent than to cure. Boiling water is the most common prevention but it does not destroy the encysted parasite. Treating the water with a poison like iodine tablets or chlorine is also used. Where the water is untreated, it should not be trusted.
2. The exchange of genetic material in the paramecium allows for the recombination of genes, some of which may be beneficial. If no recombination of genes is possible, some of the protists may not be able to survive environmental changes.

Critical Thinking II

1. A multinucleated organism may use the nuclei for redundant systems, that is, they would all be identical with the same type of job, or they might be specialized according to function.

2. A paramecium feeds on particles trapped in its gullet or oral groove. Its motion is a spin, as you could probably see, and so the organism covers a significant volume of space in its search for food. The cilia which line the oral groove help to trap the food particles in the gut.

3. The amoeba uses a different technique. The pseudopodia entrap the food, a paramecium perhaps, and engulf it. The pocket formed when this happens becomes a food vacuole and the digestion of the food takes place within it.

4. The amoeba is a predator, but you may have other predators in the mixed culture.

5. The amoeba can move by cytoplasmic streaming, by using pseudopodia as anchors to facilitate motion, and by flagella, if present.

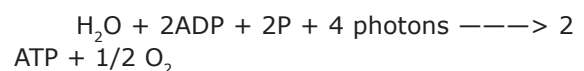
Lab 6: Cell Structure: Plant

1. This is a thinking question. It should be clear that strong cell walls would increase the strength of the plant stem.
2. The chloroplasts of the corn plant are around the outer edge inside of the epidermis.
3. There is no cuticle over the stomata on the leaf as that would keep the gases from the spongy layer. This cuticle layer helps conserve the water in the leaf because it serves to keep water vapor from leaving the plant.

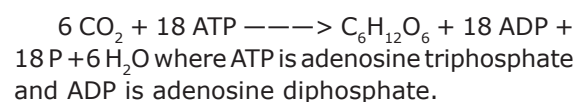
Lab 7: Internal Leaf Structure

1. $6 \text{ H}_2\text{O} + 6 \text{ CO}_2 \xrightarrow{\text{light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$ in the presence of light.
2. The nutrients of the leaf (like in spinach) are within the cell membranes of the cells in the cytoplasm. The cell membrane, as well as the cytoplasm, is within the cell wall which needs to be ground to be broken.
3. An herbivore must have grinding teeth which can grind the cell walls. These teeth must have broad, flat surfaces.

4. Light reaction:



Dark reaction:



5. Oxygen is produced during the day in the light reaction. During the night, the gas produced is carbon dioxide.