Using the following list of words, fill in the blanks with the correct term. Some terms may be used more than once.

Glycolysis, Krebs cycle, electron transport chain, pyruvate, ATP, $NADH/H^+$, cytoplasm, oxygen, carbon dioxide (CO_2), matrix of mitochondria, $FADH_2$, proton (H^+), gradient, mitochondria, inner membrane, electron carriers, proton (H^+) pumps, protons (H^+), intermembrane space, matrix, electron transport chain, glucose, ATP synthase, phosphate, ADP, greater, diffuse, electrons, chemiosmosis, water.

Aerobic cellular respiration is composed of three steps. The steps, in order, are _____, _____ and _____. During _____, some of the potential energy of a primary foodstuff, e.g., the sugar _____, is released during a series of chemical reactions that occur in the _____ of the cell. Glucose, a six-carbon sugar molecule, is converted to two molecules of _____, a three-carbon molecule. In addition, a small amount of the total energy in glucose is stored in a few molecules of _____, the energy carrier of the cell, and some high-energy, electron carriers _____. Glycolysis does not require _____ and does not generate the gas _____.

_____, the end product of glycolysis is converted to acetyl CoA, with the release of one molecule of carbon dioxide, for further processing by the _____ that occurs in the _____. In the Krebs cycle some high energy, electron carriers _____ and _____, and _____, energy carrier, are generated. Two _____ molecules are released for each cycle of the Krebs cycle.

Glycolysis and the Krebs cycle generate only a small amount of _____ – only 4 molecules per molecule of glucose. A large amount of the chemical energy from glucose is stored in the form of the electron carriers $NADH/H^+$ generated during _____ and _____ and $FADH_2$ generated **only** during the _____.

The _____ converts the energy stored in $NADH/H^+$ and $FADH_2$ into potential energy in the form of a _____. The electron transport chain is a series of proteins located in the _____. The proteins act as _____ and some of them are _____. The first protein of the electron transport chain accepts _____ from _____ regenerating NAD^+ that returns to function in either glycolysis or the Krebs cycle. Electrons are then transferred sequentially down the _____. The final electron acceptor is _____ which combines with hydrogen ions (H^+) to form _____. The energy released as the electrons move through certain electron carriers is used to pump _____ from the _____ of mitochondria into the _____ of mitochondria. This results in the _____ that serves as a potential energy source. The concentration of protons is _____ in the intermembrane space than in the matrix of the mitochondria. The protons cannot freely _____ across the inner membrane of the mitochondria. Protons move across the inner membrane via a large protein called _____; the energy released by the movement of _____ through the protein is used to add a _____ group to _____ to create _____. This process is called _____.

Rotenone inhibits the transfer of _____ to the first electron carrier of the _____. Therefore there is no electron transport chain activity to generate a _____. Without the proton gradient, no _____ can be made via chemiosmosis. Other inhibitory compounds like dintrophenol that make the _____ of the mitochondria leaky (permeable), block the formation of the _____ necessary to drive ATP synthesis via chemiosmosis.

Extra Credit:

The synthesis of ATP via chemiosmosis is a theory first proposed by _____.