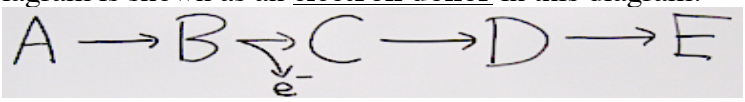
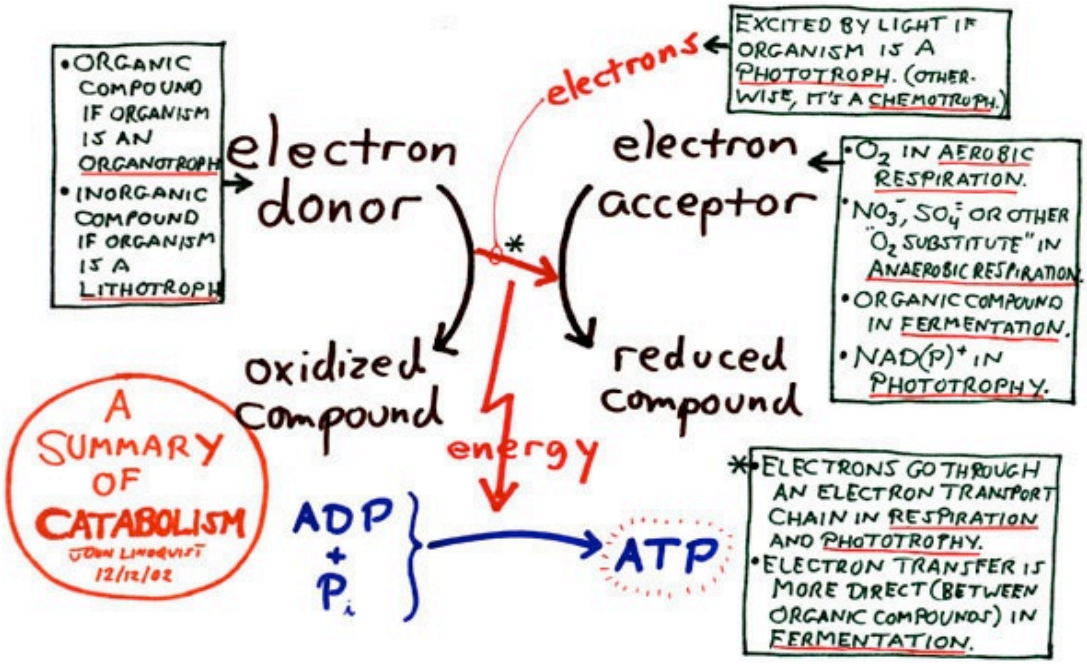
BRIEF SUMMARY OF CATABOLISM

In a catabolic pathway, a substrate is "broken down" sequentially, such as A being broken down to B (and so on) in the following diagram. Compounds **lose electrons** when they are **oxidized**. Compound B in this diagram is shown as an **electron donor** in this diagram.



Electrons are taken up by **electron acceptors** which are then **reduced**. The following over-simplified diagram leaves out a lot of intermediate steps between the initial electron donor and the ultimate electron acceptor. During these steps, the electrons can give off energy which assists in the production of ATP. (An example of this occurance is in "oxidative phosphorylation" which is associated with respiration.)

The following general diagram attempts to fit the different types of catabolism into a general scheme. During the course of Microbiology 102 we will first consider aerobic respiration and fermentation. Anaerobic respiration is introduced in Experiment 7, and anoxygenic phototrophy (which does not produce O_2) is featured in Exp. 11B. We will mention oxygenic phototrophy along the way; this is where the electron donor is H_2O which is oxidized to O_2.



BRIEF SUMMARY OF OXYGEN RELATIONSHIPS (with an example)

From Virtual Expriment 5A: When a bacteriologist labels an organism with a certain "oxygen relationship" designation, this label is ultimately based on the ability of the organism to do **one or more of the following**: (1) grow in the presence of air, (2) perform aerobic respiration, (3) perform fermentation.

A certain growth pattern shows up in a tube of a standard agar-containing test medium. As respiration is a more efficient means of generating energy and cell mass than fermentation, **relatively heavy growth of a respirer** will occur at the **top** of the medium. **A fermenter can grow anaerobically**; thus the test medium must contain a fermentable compound which is generally satisfied by the inclusion of glucose. (Nothing is in the medium that some respirers can utilize as an "oxygen substitute" which allows for anaerobic respiration – such as nitrate.)

A "facultatively anaerobic" organism is shown on the right.

The oxygen relationship designation can be inferred without the use of the test medium (which certainly does not support growth of all species**!**) by simply testing for processes that are associated with respiration (the catalase test) and fermentation (the glucose fermentation test) and also seeing whether or not the organism can grow aerobically.