**10.1 Storage Lipids.** Know the fatty acids in Table 10.1, both common names and "Carbon skeleton" (i.e. numbers). Notice the melting points in the table. Saturated fats, with no double bonds, are easily "stacked" and hence remain solid until high temperatures. Unsaturated fats, with cis double bonds, are V shaped and unstackable, hence they remain liquid. See Fig 10-2. Triglycerides have 3 fatty acids esterified to glycerol. Body fat (or oil) is mostly composed of TG. In colloquial usage, liquid TG are "oils" and solid TG are "fats." Saponification – soap making – is simply the hydrolysis of TG to glycerol and fatty acid salts.

**10.2 Structural Lipids in Membranes.** If the third fatty acid of a TG is replaced by phosphate, the resulting compound is phosphatidic acid (Fig 10-9, top). Many biological membranes are composed of various phosphatidates, generally with a "head group" attached to the phosphate (Fig 10-9, lower). You should be familiar with all the lipid types represented in Fig 10-7, and you should know the structures in Fig 10-9. Phosphatidyl choline ("Lecithin") is generally the "default" eukaryotic lipid. Cardiolipin is a prokaryotic lipid. We omit the lipids in Fig 10-10, and simply note that the lipids in Fig 10-11 occur in chloroplasts (not in animals), and that the direct attachment of sugar to the diacylglycerol (DAG) backbone is reminiscent of certain sphingolipids (Fig 10-13). The strangeness of Archaeal lipids (Fig 10-12) is worth some attention. Instead of fatty acids, the Archaea use a double length terpenoid dialcohol connected using ether, not ester linkages. This monolayer could be seen as an adaptation to extreme conditions like heat and low pH.

Sphingolipids are very important in animal cells. You should know the structure of sphingosine, of ceramide, of sphingomyelin (an analog of lecithin), and glucosyl cerebroside (an analog of galactolipids in chloroplasts). Globosides and gangliosides have multiple sugars attached with no phosphate. Fig 10-14 compares lecithin and sphingomyelin, and Fig 10-15 represents the ABO blood group substances. Know the actions of phospholipase enzymes as shown in Fig 10-16, and the structure of cholesterol in Fig 10-17. Box 10-2 shows a variety of genetic diseases in which gangliosides and globosides can't break down properly. Know that Tay-Sachs and Niemann-Pick are two examples of these hereditary diseases (you don't need to know more than that).

**10.3 Lipids as Signals, Cofactors, and Pigments.** Section omitted for now.

**10.4 Working With Lipids.** Section omitted for now.