Study guide for Bacteriophage

I. Concepts to understand
   A. basic phage structure - spectrum of size and complexity
   B. life cycle - virulent vs. temperate phage (lytic vs. lysogenic cycles)
   C. early vs. late gene expression (what types of genes generally fall into each category) - Fig. 7.2
   D. Phage T7 as a model for a phage-encoded RNA polymerase
   E. Phage T4 as a model for a phage-encoded sigma factor (skip the coupling to DNA replication)

II. Lambda Phage
   A. Particle structure and genome
   B. Receptor
   C. See the figure on the web (Lambda phage survival guide). You should know the roles of every genetic element in the figure.
   D. Circularization by *cos*
   E. Lytic vs. lysogenic cycles
   F. Gene expression for determining lytic vs. lysogenic cycle (see my figure and Fig. 7.24)
   G. What is the role of RecA in lysogeny?
   H. What is immunity related to lysogeny (as opposed to resistance)?
   I. Role of anti-termination (N protein) - Fig. 7.10
   J. Theta vs. rolling circle replication and concatamers (O and P proteins)
   K. Role of *cos* site again for packaging
   L. How do cosmids work and what is their usefulness?

III. Phage M13
   A. Particle structure and genome
   B. Receptor
   C. Life cycle - Fig. 7.12
      1. Early events - complementary DNA replication (RF)
      2. role of Gene II
      3. Rolling circle replication - Gene V
   D. Usefulness of single-stranded DNA phages such as M13 and F1
      1. Which sites are cis active or trans active
      2. Which genes can be/are provided by host cell for cloning and packaging

IV. Transduction

A. We have already discussed transduction in our general introduction to genetics. Look over this section for clarity/review.

B. You should have a clear idea of how generalized vs. specialized occur and what the requirements for the phage are that can perform either or both.