Virus Paper

I. Information on viruses, in general (as it applies to almost any virus)
   a. Non-cellular organisms
   b. Some scientists consider viruses “living” Dr. H does not
      i. Metabolize substances
      ii. Reproduce (on their own) (viruses hijack the host cell machinery)
      iii. Divide/Grow
      iv. Viruses can exist outside a host cell, but not “live.”
   c. Grouped based upon
      i. Genetic material (DNA or RNA; “mix”)
      ii. Capsid shape (general size)
      iii. Enveloped or non-enveloped
      iv. Host cells that they infect

II. Information on YOUR virus
   a. Family to which this virus belongs (Retroviridae)
   b. Retrovirus (important because of reverse transcriptase)
   c. Polyhedral capsid (shape of the “container” that holds the genetic material of the virus)
   d. Envelope with spikes
      i. gp: glycoprotein – use these to attach to host cells
      ii. gp120 and gp41 are used to attach to CD4 on a helper Tcell
      iii. CD4 is a protein on the surface of helper Tcells
   e. Host cell it infects (above)
      i. Mode of infection
      ii. Mode exit (bud form host cells—takes part of the plasma with it when leaving)
   f. Transmission
      i. Direct contact: blood and body fluids, sexual contact/sharing IV needles
      ii. Blood transfusions with HIV+ blood
      iii. Placental transmission
      iv. Latent period? Yep
   g. Diseases
      i. Knocks out human immune system – AIDS
      ii. Kaposi’s sarcoma
      iii. Cryptococcus neoformans; Cryptococcus pneumoniae; Pneumocystis pneumoniae – pneumonia caused by these organisms
      v. Mycobacterium tuberculosis—especially, if you have had tuberculosis. HIV will bring the tuberculosis out of latency.
      vi. Parasites: cryptosporidium, Ascaris lumbricoides
      vii. Become susceptible to normal flora that become opportunistic pathogens
         1. Candida albicans – yeast infections; thrush
         2. Staphylococcus aureus
         3. HSV I/II (Herpes); HPV (Human Papilloma Virus); VZV – Chicken pox
         4. More viruses, more bacteria, more fungi
   h. Treatment for HIV
      i. Protease inhibitors (block viral replication)
      ii. Block gp120 and gp41 with antibodies (Entry inhibitors)
      iii. Vaccines are in development
      iv. Interferon
      v. Anti-retrovirals (ARVs) – inhibit or block the activity of reverse transcriptase

HIV is a RETROVIRUS
Genetic material: RNA
Material to make: reverse transcriptase
Capsid:
Enveloped: