Microbiology Semester Review Guid Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_

**Chapter 1 The Microbial World and You**

1. What is the proper way to write the scientific name of a microbe? What are the terms for the 2 parts of the scientific name?
2. For each of the following groups: bacteria, archaea (where find? Unusual metabolism?), fungus, protozoa, virus, prion, multicellular animal parasite (worm/helminth)contrast:
   1. Multicellular vs. unicellular vs. no cells
   2. Sexual/asexual reproduction
   3. Absence of vs. composition of cell wall
   4. Genetic material – DNA vs. RNA
   5. Eukaryotic vs. prokaryotic. In addition, what are differences between eukaryotic & prokaryotic cells?
   6. Other unique characteristics
3. Spontaneous Generation: Person credited with proving the theory false. Description of experiment disproving the theory.
4. Contributions (major ones only) to Microbiology of the following: Pasteur, Hooke, Koch, Fleming, Jenner.
5. Koch’s Postulates. List the 4 postulates and an exception to the use of each postulate. For what 2 diseases did Koch find the causative microbe by using these postulates?
6. *E.coli O157* vs. Mad Cow – original source of organism, usual food contaminated & how, prevention, severity of disease
7. Identify given scenario as an emerging disease, reemerging disease, endemic disease, epidemic, pandemic.
8. Miscellaneous vocabulary terms: pathogen, normal microbiota, antibiotic, biotechnology, pasteurization, vaccine (passive/active, natural/artificial), mycelia, halophile, thermophile, buffer, mycology,

**Chapter 3 & 4**

1. Microscopy. Types of scopes: Fluorescence, transmission electron, light, scanning electron, darkfield.
   1. Which has the best resolution? Best magnification?
   2. Use regular visible light or something else?
   3. Unique characteristics – 3D, internal detail, etc.
   4. Parts of a scope: Ocular lens, objective lens, stage, diaphragm…
   5. Calculation of total magnification.
   6. Improvement of resolution
2. Stains:
   1. Positive vs. negative stains vs. differential.
      1. Example reagents. Uses. Appearance.
   2. Endospore staining – How are they stained? When is an endospore stain appropriate (based on gram stain)?
   3. Acid Fast staining. When appropriate to use (based on gram stain)? What does a positive result mean?
   4. Gram stain: KNOW THIS!!! Steps and reagents in order. Purpose of each step. How both GN & GP look after each step.
3. Prokaryotes:
   1. Comparison prokaryotic to eukaryotic cells:
      1. How DNA and ribosomes differ.
      2. How cell wall & other internal cell components differ.
   2. Composition of special cell walls of prokaryotes: archea, bacteria, mycoplasma, mycobacteria
   3. Cell components internal to cell wall, identify function of: endospore, chromatophores
   4. Cell components external to cell wall, identify function of: glycocalyx/capsule, flagella (know terms for # and location), axial filament, fimbrae, sex pilus (pili),
   5. Reproduction/ Binary Fission
   6. Difference between archea & bacteria
   7. 3 shapes/morphology of bacteria
4. Plasmids:
   1. What are they?
   2. Clinical significance: Specific concerns & how we use them for our benefit.
5. Cell walls of GN vs. GP.
   1. Composition differences. Recognize diagrams.
   2. Endotoxin? Protect from osmotic lysis? Penicillin affect? Lysozyme affect? Teichoic acids? Porins?
6. Movement through cell wall; passive transport, active transport, osmosis, diffusion, facilitated diffusion
   1. Concentration gradient? Is energy used? Is protein transporter needed?
   2. Identify type of transport in given diagram.
   3. Terms: Hypertonic/hyperosmotic, hypotonic/hypoosmotic, isotonic /isoosmotic
7. Endosymbiotic theory. Multiple SPECIFIC pieces of evidence supporting it.

**Chapter 6: Growth**

1. Growth graph comparing #cells to time. Know the 4 sections of the graph (example: lag phase is one) and what each section means, when antibiotics/radiation most effective.
2. Calculations of number of organisms based on number of original microbes, generation time, amount of time that has passed, etc.
3. Oxygen requirements for 5 classifications based on oxygen requirements/survival: Obligate aerobe, microaerophile, facultative anaerobe, aerotolerant anaerobe, obligate anaerobe
   1. Know required/optimal conditions
   2. Presence & function & equation for SOD & catalase
   3. Generation time/amount ATP produced in different environments
   4. End products –stopped at alcohol/acid?
   5. Growth in candle jar & thioglycollate
4. Temperature requirements – approximate optimal temp, cause of refrigerator spoilage, animal pathogen… for the following: psychrophile, psychrotroph, mesophile, thermophile, extreme thermophile.
5. Media: Purpose, ingredients, mechanism, how correlate with gram stain (if applicable)
   1. Complex vs. defined
   2. General vs. selective vs. differential
   3. OF-G tubes, TSI, EMB, PEA, Nutrient, Starch plates
6. Archea: Group names & specific locations where they can be found.
7. CHONPS: What elements? What compounds or parts of the cell are they needed for?
8. Graphs w/3 lines showing no growth, growth, optimal growth. Be able to select the appropriate growth line when given a specific type of organism and the environmental conditions it is in.
9. Miscellaneous terms: anabolism, catabolism, halophile, amylase

**Chap 7 & 20: Control**

1. Antibiotics:
   1. What are the main targets in bacteria and how those targets in prokaryotes are different from eukaryotic cells (why doesn’t affect human cells)
   2. MBC vs. MIC
   3. Broad Spectrum vs. narrow spectrum
   4. Synergism & an example
   5. Disk diffusion testing: Antibiotic vs. disinfectant.
   6. Human activities that have caused an increase in antibiotic resistance
2. Chemical control:
3. Rank main groups/organisms in order of ease/difficulty of killing with disinfectants.
4. Halogens – specific uses as disinfectants vs. antiseptics
5. Methods of control – pasteurization, boiling, ionizing vs. non-ionizing radiation, refrigeration, freezing, autoclaving, freeze-drying, filtration, etc,
6. Do they sterilize?
7. What sterilization methods should you use if the object is heat labile?
8. Osmotic environments: hypo vs. hyper environments.
9. Are they both equally effective in controlling growth? Why or why not?
10. Simple diffusion, facilitated diffusion, active transport.
11. pH. Buffers - definition. What range of pH do bacteria prefer?
12. UV Radiation – specifically how does UV radiation damage?, light vs. dark repair – how does each work & where does each occur?, photolyases, DNA ligase
13. Miscellaneous vocab: disinfectant vs. antisepsis vs. sterilization, bactericidal, bacteriostatic

**Chapter 8&9: Biotechnology:**

1. 3 means of horizontal gene transfer in bacteria.
   1. Names of the 3 means and how each is accomplished.
   2. Analyze diagrams to determine which horizontal process used and resulting product.
2. Plasmids:
   1. 3 categories of genes commonly found in plasmids, their function, and an example of each
   2. In a diagram: Identify restriction sites, count base pairs in resulting segments, determine resulting plasmid when combining gene of interest with plasmid segment
3. Miscellaneous Vocab: sticky vs. blunt ends, vector, plasmid, restriction enzyme(use & natural function), DNA ligase, read diagrams, competent, induced competency, marker, selective marker, clone, F+, F-, bacteriophage, naked DNA, Ti plasmid