

Name: _____ Block: __ Date: _____

Microbiology Chapters 1 and 2 Review

For the following description of the various microbiology fields indicate the name of the field on the line.

Protozoology Mycology Bioremediation
Epidemiology Phycology Immunology

1. Studies the biodegradation of toxic wastes. _____
2. Studies the causative agents of disease and their prevention. _____
3. Study of fungus. _____
4. Study of protozoa. _____
5. The study of immunity. _____
6. The study of algae. _____

Match the following scientists to their appropriate discovery.

___ 1. Robert Hooke	a. worked with chemotherapy
___ 2. Alexander Flemming	b. learned that cowpox could vaccinate against smallpox
___ 3. Edward Jenner	c. discovered "animacules"
___ 4. Fransesco Redi	d. developed a system of nomenclature for bacteria
___ 5. Paul Ehrlich	e. found that a weakened virus may be injected to work as a means of vaccination
___ 6. Robert Koch	f. demonstrated the error of spontaneous generation by proving maggots did not arise directly from meat
___ 7. Carolus Linnaeus	g. discovered penicillium
___ 8. Louis Pasteur	h. discovered cells by observing cork under a lens
___ 9. Joseph Lister	i. designed aspectic techniques for surgery
___ 10. Van Leeuwenhoek	j. confirmed that bacteria cause diseases

Complete the following short answer questions.

1. Define *microbiology*.
2. What are the six major groups of organisms studied in microbiology?
3. Describe at least four practical applications of microbiology to everyday life.

4. Explain how microorganisms are involved in the flow of energy and nutrients through the Earth's ecosystem.
5. List at least four products the production of which involves the activity of microorganisms.
6. What is *bioremediation*?
7. What is a *pathogen*? List at least four groups of organisms among which pathogens can be found.
8. Describe the key differences between a *prokaryotic* cell and a *eukaryotic* cell.
9. Is a virus a cell? Explain your answer.
10. What unit of measure would most commonly be used to describe the size of a bacterial cell?
11. Relate the invention of the microscope to the demise of the theory of spontaneous generation (a.k.a. abiogenesis).

12. Describe (using a flow diagram) the sequence of events that takes place during the process known as the *scientific method*.
13. Name the three principle subatomic particles that make up atoms. What are their respective charges and locations in an atom? What are the atomic masses of these particles, respectively?
14. What is an isotope? What is a *radioactive* isotope? What are some uses for radioactive isotopes?
15. What is a covalent bond? What are the conditions necessary for the formation of a covalent bond? Give an example.
16. What is a *polar covalent* bond?
17. What is a *nonpolar covalent* bond? Give an example.
18. What is an ionic bond? What are the conditions necessary for the formation of an ionic bond? Give an example.
19. What is a hydrogen bond? What are the conditions necessary for the formation of a hydrogen bond? Give an example.

20. Explain why water has a polar molecule. What is the relationship between the polarity of the molecule and the hydrogen bonding between water molecules?

21. Name a few properties of water, and relate them to the structure of water, including its polarity and hydrogen bonding between molecules.

22. Define an acid and a base. On the pH scale, which numbers indicate a solution is acidic? Basic? Neutral?

23. What are buffers, and why are they important to life?

24. Draw structural formulas for the seven functional groups presented in chapter 2 of the textbook. Beside each functional group briefly describe its significance.

Functional Group	Structure	Significance
Alcohol		
Aldehyde		
Ketone		
Ester		
Ether		
Carboxylic acid		
Amino		

25. List the four major *groups of organic macromolecules* described in the textbook. Which three of the groups are *polymers*? What are the *monomers* making up each of the polymeric groups, respectively?

26. What is the general chemical process (reaction) that joins monomers together to make polymers? What is the general chemical process (reaction) that breaks down polymers into monomers?
27. List several examples of monosaccharides, disaccharides, and polysaccharides.
28. How does the structure of a *phospholipid* differ from that of a *fat*? Explain how/why phospholipids form a *bilayer* in the presence of water. Use labeled diagrams to illustrate your explanation.
29. Draw the structure of an amino acid. Draw the structure of a dipeptide, and label the peptide bond.
30. Describe the four possible levels of a protein structure, and note the chemical bonding patterns associated with each level of structure.
31. How do nucleotides bond to form nucleic acids (polynucleotides, e.g. DNA and RNA)? Describe at least three differences between the structures of RNA and DNA.
32. Draw and label a simple diagram of a molecule of ATP (adenosine triphosphate). What is the *function* of ATP?