

***Microbiology Fundamentals: A Clinical Approach, 3e (Cowan)***  
**Chapter 1 Introduction to Microbes and Their Building Blocks**

1) When humans manipulate the genes of microorganisms, the process is called \_\_\_\_\_.

- A) bioremediation
- B) genetic engineering
- C) epidemiology
- D) immunology
- E) taxonomy

Answer: B

Section: 01.01

Topic: Microbial Roles; Basics of Genetic Engineering

Bloom's: 01. Remember

ASM Topic: Module 04 Information Flow

ASM Objective: 04.05 Cell genomes can be manipulated to alter cell function.

2) Which of the following is not considered a microorganism?

- A) Mosquito
- B) Protozoan
- C) Bacterium
- D) Virus
- E) Fungus

Answer: A

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

3) All microorganisms are best defined as organisms that \_\_\_\_\_.

- A) cause human disease
- B) lack a cell nucleus
- C) are infectious particles
- D) are too small to be seen with the unaided eye
- E) can only be found growing in laboratories

Answer: D

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

- 4) Which activity is an example of biotechnology?
- A) Bacteria in the soil secreting an antibiotic to kill competitors
  - B) A microbiologist using the microscope to study bacteria
  - C) Egyptians using moldy bread on wounds
  - D) *Escherichia coli* producing human insulin
  - E) Public health officials monitoring diseases in a community

Answer: D

Section: 01.01

Topic: Basics of Genetic Engineering

Bloom's: 02. Understand

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.

- 5) Living things ordinarily too small to be seen with the unaided eye are termed \_\_\_\_\_.
- A) bacteria
  - B) viruses
  - C) parasites
  - D) microorganisms
  - E) prokaryotes

Answer: D

Section: 01.01

Topic: Cellular Organization

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

- 6) The microorganisms that recycle nutrients by breaking down dead matter and wastes are called \_\_\_\_\_.
- A) decomposers
  - B) prokaryotes
  - C) pathogens
  - D) eukaryotes
  - E) fermenters

Answer: A

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 06.01 Microbes are essential for life, as we know it, and the processes that support life (e.g. in biogeochemical cycles and plant/animal microflora).

7) Cells, like bacteria and archaea, that do not have a nucleus in their cells have traditionally been called \_\_\_\_\_.

- A) decomposers
- B) prokaryotes
- C) pathogens
- D) eukaryotes
- E) fermenters

Answer: B

Section: 01.01

Topic: Cellular Organization

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.

8) The first cells appeared about \_\_\_\_\_ billion years ago.

- A) 5.2
- B) 4.6
- C) 3.8
- D) 2.9
- E) 1.5

Answer: C

Section: 01.01

Topic: History of Microbiology

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.

9) Which of the following is not a human use of microorganisms?

- A) Making bread
- B) Treating water and sewage
- C) Manufacturing copper wire
- D) Mass producing antibiotics
- E) Cleaning up oil spills

Answer: C

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.

- 10) Using microbes to detoxify a site contaminated with heavy metals is an example of \_\_\_\_\_.
- A) biotechnology
  - B) bioremediation
  - C) decomposition
  - D) immunology
  - E) epidemiology

Answer: B

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.

- 11) Disease-causing microorganisms are called \_\_\_\_\_.
- A) decomposers
  - B) prokaryotes
  - C) pathogens
  - D) eukaryotes
  - E) fermenters

Answer: C

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

- 12) The most prevalent worldwide infectious diseases are \_\_\_\_\_.
- A) AIDS-related diseases
  - B) diarrheal diseases
  - C) malaria diseases
  - D) measles
  - E) respiratory diseases

Answer: E

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

13) Which of the following is a unique characteristic of viruses that distinguishes them from the other major groups of microorganisms?

- A) Cause human disease
- B) Lack a nucleus
- C) Cannot be seen without a microscope
- D) Contain genetic material
- E) Lack cell structure

Answer: E

Section: 01.01

Topic: General Viral Properties

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

14) Helminths are \_\_\_\_\_.

- A) bacteria
- B) protozoa
- C) molds
- D) parasitic worms
- E) infectious particles

Answer: D

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

15) Which group of microorganisms is composed only of hereditary material wrapped in a protein covering?

- A) Viruses
- B) Bacteria
- C) Parasites
- D) Fungi
- E) Helminths

Answer: A

Section: 01.01

Topic: General Viral Properties

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

16) Which statement correctly compares the sizes of different microorganisms?

- A) Bacteria are larger than viruses
- B) Bacteria are larger than eukaryotic microorganisms
- C) Eukaryotic microorganisms are smaller than viruses
- D) Archaea are larger than eukaryotic microorganisms but smaller than bacteria

Answer: A

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 03. Apply

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

17) The Dutch merchant who made and used quality magnifying lenses to see and record microorganisms was \_\_\_\_\_.

- A) Francesco Redi
- B) Antonie van Leeuwenhoek
- C) Louis Pasteur
- D) Joseph Lister
- E) Robert Koch

Answer: B

Section: 01.02

Topic: History of Microbiology

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 02.01 The structure and function of microorganisms have been revealed by the use of microscopy (including bright field, phase contrast, fluorescent, and electron).

18) Koch's postulates are criteria used to establish that

- A) microbes are found on dust particles.
- B) a specific microbe is the cause of a specific disease.
- C) life forms can only arise from preexisting life forms.
- D) a specific microbe should be classified in a specific kingdom.
- E) microbes can be used to clean up toxic spills.

Answer: B

Section: 01.02

Topic: History of Microbiology

Bloom's: 02. Understand

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

19) The surgeon who advocated using disinfectants on hands and in the air prior to surgery was \_\_\_\_\_.

- A) Joseph Lister
- B) Ignaz Semmelweis
- C) Robert Koch
- D) Louis Pasteur
- E) Antonie van Leeuwenhoek

Answer: A

Section: 01.02

Topic: History of Microbiology; Basics of Microbial Control

Bloom's: 01. Remember

ASM Topic: Module 03 Metabolic Pathways

ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, and biological methods.

20) Sterility refers to

- A) being pathogen free.
- B) having an absence of spores.
- C) having an absence of any life forms and viral particles.
- D) being pasteurized.
- E) being homogenized.

Answer: C

Section: 01.02

Topic: Basics of Microbial Control

Bloom's: 01. Remember

ASM Topic: Module 08 Microbiology Skills

ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, and biological methods.

21) Which scientist showed that anthrax was caused by the bacterium, *Bacillus anthracis*?

- A) Joseph Lister
- B) Ignaz Semmelweis
- C) Robert Koch
- D) Louis Pasteur
- E) Antonie van Leeuwenhoek

Answer: C

Section: 01.02

Topic: History of Microbiology

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

22) If you were a microbiologist in 1950, which of the following scientific principles would you already know?

- A) Aseptic techniques could reduce the number of wound infections in the surgical setting.
- B) Biofilms can form on implanted objects in the human body and be responsible for infection.
- C) Enzymes found in bacteria can be used to cut DNA.
- D) Very little DNA is transcribed into RNA that is then translated into proteins.

Answer: A

Section: 01.02

Topic: History of Microbiology

Bloom's: 03. Apply

ASM Topic: Module 04 Information Flow

ASM Objective: 04.03 The regulation of gene expression is influenced by external and internal molecular cues and/or signals.

23) Taxonomy does not involve \_\_\_\_\_.

- A) nomenclature
- B) classification
- C) taxa
- D) identification
- E) common name

Answer: E

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

24) Which scientific field is involved in the identification, classification, and naming of organisms?

- A) Nomenclature
- B) Taxonomy
- C) Phylogeny
- D) Woesean classification
- E) None of the choices are correct.

Answer: B

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.



- 25) The orderly arrangement of organisms into a hierarchy of taxa is called \_\_\_\_\_.
- A) classification
  - B) identification
  - C) nomenclature
  - D) experimentation
  - E) biotechnology

Answer: A

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

- 26) Which of the following is a taxon that contains all the other taxa listed?
- A) Species
  - B) Phylum
  - C) Kingdom
  - D) Genus
  - E) Family

Answer: C

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 02. Understand

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

- 27) The smallest and most significant taxon is \_\_\_\_\_.
- A) genus
  - B) species
  - C) kingdom
  - D) family
  - E) phylum

Answer: B

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 02. Understand

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

28) Select the correct descending taxonomic hierarchy:

- A) family, order, class
- B) family, genus, species
- C) genus, species, family
- D) class, phylum, order
- E) kingdom, domain, phylum

Answer: B

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

29) Which of the following is a scientific name?

- A) Gram-positive streptococcus
- B) *Staphylococcus*
- C) *Streptococcus pyogenes*
- D) Anthrax
- E) *Streptobacilli*

Answer: C

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

30) When assigning a scientific name to an organism,

- A) the species name is capitalized.
- B) the species name is placed first.
- C) the species name can be abbreviated.
- D) both genus and species names are capitalized.
- E) both genus and species names are italicized or underlined.

Answer: E

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

- 31) The study of evolutionary relationships among organisms is called \_\_\_\_\_,
- A) biotechnology
  - B) genetics
  - C) recombinant DNA
  - D) phylogeny
  - E) taxonomy

Answer: D

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

- 32) Which area of biology states that living things undergo gradual, structural, and functional changes over long periods of time?
- A) Morphology
  - B) Phylogeny
  - C) Evolution
  - D) Genetics
  - E) None of the choices is correct.

Answer: C

Section: 01.01

Topic: History of Microbiology

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.

- 33) A scientist studying the sequence of nucleotides in the rRNA of a bacterial species is working on \_\_\_\_\_.
- A) determining evolutionary relatedness
  - B) bioremediation
  - C) recombinant DNA
  - D) nomenclature
  - E) determining if that species is the cause of a new disease

Answer: A

Section: 01.04

Topic: Genetic Analyses

Bloom's: 03. Apply

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

34) The scientist(s) who proposed organisms be assigned to one of three domains is(are)

- \_\_\_\_\_.
- A) Robert Koch and Louis Pasteur
  - B) Antonie van Leeuwenhoek
  - C) Carl Woese and George Fox
  - D) Robert Whittaker
  - E) Francesco Redi

Answer: C

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

35) Which scientific name is written correctly?

- A) *Staphylococcus aureus*
- B) *staphylococcus aureus*
- C) *Staphylococcus Aureus*
- D) Staphylococcus aureus
- E) STAPHYLOCOCCUS AUREUS

Answer: A

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

36) A scientist studying helminths is working with bacteria.

Answer: FALSE

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.02 Mutations and horizontal gene transfer, along with the immense variety of microenvironments, have resulted in a vast diversity of microorganisms.

37) Current evidence indicates that bacteria and archaea existed on earth for approximately 2 billion years before eukaryotes appeared.

Answer: FALSE

Section: 01.01

Topic: History of Microbiology

Bloom's: 02. Understand

ASM Topic: Module 01 Evolution

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.

38) A scientific theory, like the theory of evolution, is just our best guess at explaining a scientific phenomenon, but a theory cannot be considered fact.

Answer: FALSE

Section: 01.01

Topic: History of Microbiology

Bloom's: 02. Understand

ASM Topic: Module 01 Evolution

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.

39) Many chronic conditions are found to be associated with microbial agents.

Answer: TRUE

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

40) All microorganisms are considered pathogens.

Answer: FALSE

Section: 01.01

Topic: Microbial Roles

Bloom's: 02. Understand

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

41) The term *sterile* means free of all life forms.

Answer: TRUE

Section: 01.01

Topic: Basics of Microbial Control

Bloom's: 01. Remember

ASM Topic: Module 08 Microbiology Skills

ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, and biological methods.

42) Members of the same species share many more characteristics compared to those shared by members of the same kingdom.

Answer: TRUE

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

43) Once an organism is assigned to a particular taxonomic hierarchy, it is permanent and cannot be revised.

Answer: FALSE

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

44) Viruses are not classified in any of Whittaker's five kingdoms.

Answer: TRUE

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

45) The names of the three domains are: Bacteria, Protista, and Eukarya (Eukaryota).

Answer: FALSE

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

46) One distinguishing characteristic of the archaebacteria is that they live in extreme environments.

Answer: TRUE

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 01. Remember

ASM Topic: Module 03 Metabolic Pathways

ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.

47) Microbes have been found existing in salty, acidic lakes.

Answer: TRUE

Section: 01.01

Topic: Microbial Roles

Bloom's: 01. Remember

ASM Topic: Module 03 Metabolic Pathways

ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.

48) Organic chemicals always have a basic framework of the element \_\_\_\_\_ bonded to other atoms.

A) carbon

B) nitrogen

C) oxygen

D) hydrogen

E) phosphorous

Answer: A

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

49) Most biochemical macromolecules are polymers, which are chains of \_\_\_\_\_.

- A) hydrophobic molecules
- B) electrolytic molecules
- C) repeating monomers
- D) repeating carbohydrates
- E) hydrogen bonds

Answer: C

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

50) All of the following are monosaccharides except \_\_\_\_\_.

- A) glucose
- B) glycogen
- C) fructose
- D) ribose
- E) deoxyribose

Answer: B

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

51) All of the following are polysaccharides except

- A) glycogen in liver and muscle.
- B) agar used to make solid culture media.
- C) a cell's glycocalyx.
- D) cellulose in certain cell walls.
- E) prostaglandins in inflammation.

Answer: E

Section: 01.03

Topic: Biochemistry

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.



52) All of the following are lipids except \_\_\_\_\_.

- A) cholesterol
- B) starch
- C) phospholipid
- D) wax
- E) triglyceride

Answer: B

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

53) What part of a phospholipid forms hydrophobic tails?

- A) Fatty acids
- B) Glycerol
- C) Phosphate
- D) Alcohol
- E) All of the choices are correct.

Answer: A

Section: 01.03

Topic: Biochemistry

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

54) A fat is called \_\_\_\_\_ if all carbons of the fatty acid chain are single bonded to two other carbons and two hydrogens.

- A) unsaturated
- B) polyunsaturated
- C) monounsaturated
- D) saturated
- E) None of the choices are correct.

Answer: D

Section: 01.03

Topic: Biochemistry

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

55) The lipid group that serves as energy storage molecules is \_\_\_\_\_.

- A) prostaglandins
- B) waxes
- C) phospholipids
- D) steroids
- E) triglycerides

Answer: E

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

56) The lipid group that is the major component of cell membranes is the \_\_\_\_\_.

- A) prostaglandins
- B) waxes
- C) phospholipids
- D) steroids
- E) triglycerides

Answer: C

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

57) The building blocks of an enzyme are \_\_\_\_\_.

- A) nucleotides
- B) glycerol and fatty acids
- C) monosaccharides
- D) phosphate, glycerol, and fatty acids
- E) amino acids

Answer: E

Section: 01.03

Topic: Biochemistry; Enzymes

Bloom's: 03. Apply

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

58) Which is not true about enzymes?

- A) They are found in all cells.
- B) They are catalysts.
- C) Their shape determines their function.
- D) They can be denatured by heat and other agents.
- E) They have high-energy bonds between phosphates.

Answer: E

Section: 01.03

Topic: Biochemistry; Enzymes

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

59) Which amino acid contains sulfur atoms that form covalent disulfide bonds in its tertiary structure?

- A) Valine
- B) Cysteine
- C) Serine
- D) Alanine
- E) Tyrosine

Answer: B

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

60) What type of bonds are formed between adjacent amino acids?

- A) Glycosilic
- B) Ester
- C) Peptide
- D) Disulfide
- E) Phosphate

Answer: C

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

- 61) The alpha helix is a type of \_\_\_\_\_ protein structure.
- A) primary
  - B) secondary
  - C) tertiary
  - D) quaternary
  - E) None of the choices is correct.

Answer: B

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:  
Effectively communicate fundamental concepts of microbiology, in written and oral format.

- 62) One nucleotide contains \_\_\_\_\_.
- A) one phosphate
  - B) one pentose sugar
  - C) one nitrogen base
  - D) All of the choices are correct
  - E) None of the choices are correct.

Answer: D

Section: 01.03

Topic: Nucleic Acid Structure/Function

Bloom's: 01. Remember

ASM Topic: Module 04 Information Flow

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.

- 63) Which pertains to DNA but not to RNA?
- A) Contains ribose
  - B) Contains adenine
  - C) Contains thymine
  - D) Contains uracil
  - E) Contains nucleotides

Answer: C

Section: 01.03

Topic: Nucleic Acid Structure/Function

Bloom's: 02. Understand

ASM Topic: Module 04 Information Flow

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.

64) ATP is best described as \_\_\_\_\_.

- A) an enzyme
- B) a double helix
- C) an electron carrier
- D) the energy molecule of cells
- E) All of the choices are correct.

Answer: D

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 03 Metabolic Pathways

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.

65) You are trying to identify a chemical that consists of adenine, ribose, and three phosphates. What is this chemical?

- A) DNA
- B) RNA
- C) ATP
- D) Phospholipid

Answer: C

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 03 Metabolic Pathways

ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.

66) A student forgot to label a beaker containing a DNA solution and a beaker containing a glucose solution. If chemical analysis was performed to identify the contents of each beaker, which of the following would be found in the beaker of DNA but not in the beaker with glucose?

- A) Amino acids
- B) Hydrogen and oxygen atoms
- C) Nitrogen and phosphorus
- D) Fatty acids
- E) Carbon atoms

Answer: C

Section: 01.03

Topic: Nucleic Acid Structure/Function; Biochemistry

Bloom's: 03. Apply

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.01b Ability to apply the process of science: Analyze and interpret results from a variety of microbiological methods, and apply these methods to analogous situations.

- 67) Purines and pyrimidines are components in the building block units of all \_\_\_\_\_.
- A) nucleic acids
  - B) carbohydrates
  - C) polysaccharides
  - D) amino acids
  - E) enzymes

Answer: A

Section: 01.03

Topic: Nucleic Acid Structure/Function

Bloom's: 01. Remember

ASM Topic: Module 04 Information Flow

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.

- 68) Which of the following is not a pyrimidine?
- A) Uracil
  - B) Adenine
  - C) Thymine
  - D) Cytosine
  - E) All of these are pyrimidines.

Answer: B

Section: 01.03

Topic: Nucleic Acid Structure/Function

Bloom's: 01. Remember

ASM Topic: Module 04 Information Flow

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.

- 69) During protein synthesis, \_\_\_\_\_ RNA is made as a copy of a gene from DNA.
- A) transfer
  - B) messenger
  - C) ribosomal
  - D) All of the choices are correct.

Answer: B

Section: 01.03

Topic: Nucleic Acid Structure/Function

Bloom's: 01. Remember

ASM Topic: Module 04 Information Flow

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.

70) Characteristics shared by all cells include

- A) a membrane serving as a cell boundary.
- B) the possession of genetic information.
- C) the presence of cellular fluid.
- D) All of these choices are correct.

Answer: D

Section: 01.03

Topic: Cellular Organization

Bloom's: 01. Remember

ASM Topic: Module 01 Evolution

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.

71) The purine\_\_\_\_\_ always binds with the pyrimidine\_\_\_\_\_ in DNA and RNA.

- A) guanine, cytosine
- B) cytosine, guanine
- C) adenine, guanine
- D) thymine, guanine

Answer: A

Section: 01.03

Topic: Nucleic Acid Structure/Function

Bloom's: 01. Remember

ASM Topic: Module 04 Information Flow

ASM Objective: 04.02 Although the central dogma is universal in all cells, the processes of replication, transcription, and translation differ in Bacteria, Archaea, and Eukaryotes.

72) All proteins are enzymes.

Answer: FALSE

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

73) The most important outcome of polypeptide intrachain bonding and folding is the unique shape of the protein.

Answer: TRUE

Section: 01.03

Topic: Biochemistry

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

74) Nucleic acids have primary, secondary, tertiary, and quaternary levels of organization.

Answer: FALSE

Section: 01.03

Topic: Biochemistry

Bloom's: 01. Remember

ASM Topic: Module 02 Structure and Function

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.

75) Which of the following statements is incorrect regarding the relationship between humans and microbes?

A) The majority of microorganisms that colonize humans are pathogenic

B) Microorganisms are benefited from their colonization of humans, whereas humans are unaffected by the relationship

C) Humans are colonized by bacteria and fungi, but not viruses

D) Not only do the majority of colonizing bacteria cause no harm to humans, the relationship is beneficial for both microbe and human host

Answer: D

Section: 01.01

Topic: Microbial Roles

Bloom's: 03. Apply

ASM Topic: Module 05 Systems

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

76) Which list correctly ranks the microorganisms from largest to smallest?

A) Zika virus, *Bacillus anthracis*, *Aspergillus sp.*, Helminth

B) *Aspergillus sp.*, Zika virus, *Bacillus anthracis*, Helminth

C) *Bacillus anthracis*, Helminth, *Aspergillus sp.*, Zika virus

D) Helminth, *Aspergillus sp.*, *Bacillus anthracis*, Zika virus

E) Helminth, *Aspergillus sp.*, Zika virus, *Bacillus anthracis*,

Answer: D

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 03. Apply

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.



77) The Nobel Prize was awarded to Kary Mullis in 1993 for inventing what technique to amplify and subsequently analyze DNA?

- A) Polymerase chain reaction
- B) The central dogma of biology
- C) Restriction enzyme analysis
- D) Human microbiome project
- E) Small RNA analysis

Answer: A

Section: 01.02

Topic: History of Microbiology

Bloom's: 01. Remember

ASM Topic: Module 06 Impact of Microorganisms

ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.

78) Which of the following statements correctly determines the process when following the scientific method?

- A) Formulate question, conduct research, propose hypothesis, test hypothesis
- B) Propose hypothesis, test hypothesis, formulate question, conduct research
- C) Formulate question, propose hypothesis, test hypothesis, conduct research
- D) Conduct research, formulate question, propose hypothesis, test hypothesis

Answer: A

Section: 01.02

Topic: History of Microbiology

Bloom's: 03. Apply

ASM Topic: Module 07 Scientific Thinking

ASM Objective: 07.01a Ability to apply the process of science: Demonstrate an ability to formulate hypotheses and design experiments, based on the scientific method.

79) If a hypothesis is accepted, then the findings become a scientific law.

Answer: FALSE

Section: 01.02

Topic: History of Microbiology

Bloom's: 02. Understand

ASM Topic: Module 07 Scientific Thinking

ASM Objective: 07.01a Ability to apply the process of science: Demonstrate an ability to formulate hypotheses and design experiments, based on the scientific method.

80) The acceptance or rejection of a hypothesis is based on a series of educated guesses and opinions. Once the opinion is widely accepted it becomes a theory.

Answer: FALSE

Section: 01.02

Topic: History of Microbiology

Bloom's: 02. Understand

ASM Topic: Module 07 Scientific Thinking

ASM Objective: 07.01b Ability to apply the process of science: Analyze and interpret results from a variety of microbiological methods, and apply these methods to analogous situations.

81) Which of the features listed below is *not* found in all cells?

A) Cytoplasmic membrane

B) Ribosomes

C) DNA

D) Nucleus

Answer: D

Section: 01.03

Topic: Cellular Organization

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

82) Despite the lack of a membrane-bound nucleus, bacteria and archaea are cells with a complex organizational structure.

Answer: TRUE

Section: 01.03

Topic: Cellular Organization

Bloom's: 02. Understand

ASM Topic: Module 02 Structure and Function

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

83) Organisms were classified into kingdoms as they were defined. Which list reflects the order of discovery of the kingdoms as we know them today?

- A) Monera, protista, fungi, plants and animals
- B) Plants and animals, protista, monera, fungi
- C) Fungi, monera, plants and animals, protista
- D) Protista, fungi, monera, plants and animals,
- E) Monera, plants and animals, protista, fungi

Answer: B

Section: 01.01

Topic: Taxonomy of Microorganisms

Bloom's: 02. Understand

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

84) Carl Woese and George Fox developed the three-domain system of taxonomy based on what molecular discovery?

- A) Variations in the ribonucleic acid of the small ribosomal subunit of organisms
- B) Mutations in enzyme proteins
- C) Genetic analysis showing that bacteria and archaea are identical
- D) Molecular analysis of genes showing that eukaryotes evolved from bacteria, and bacteria evolved from archaea

Answer: A

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 03. Apply

ASM Topic: Module 01 Evolution

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.

NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

Ms. Smith is a 29-year-old patient at the outpatient psychiatric clinic. While completing her assessment you notice her hands are red, raw, and show signs of recent bleeding. She explains that she washes all her clothes in bleach, and uses the chemical to clean her hands several times a day. She states "I need to sterilize myself and my environment of all germs so I do not get sick." While developing her nursing plan of care, you educate her about the importance of bacteria to the health and well being of not only humans, but also our planet.

85) Microorganisms have inhabited the Earth for billions of years, and can be found inhabiting a variety of environments. In fact, microbes performing anoxygenic photosynthesis led to the oxygenation of early Earth's atmosphere. These ancient organisms were \_\_\_\_\_.

- A) bacteria
- B) eukaryotes
- C) viruses
- D) prions

Answer: A

Section: 01.01

Topic: Cellular Organization; History of Microbiology

Bloom's: 03. Apply

ASM Topic: Module 01 Evolution; Module 05 Systems

ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.; 05.03 Microorganisms and their environment interact with and modify each other.

86) The RN applies therapeutic communication techniques to assess of Ms. Smith's understanding of the principle of sterility. Her statement of "I need to sterilize myself and my environment of all germs so I do not get sick" would be best followed by which of the following questions by the RN?

- A) How does being in an unsterile environment make you feel?
- B) Can you tell me more about what sterility means to you?
- C) How does washing your hands with bleach make you sterile?
- D) Can you tell me more about why you are afraid of germs?

Answer: B

Section: 01.01

Topic: Microbial Roles

Bloom's: 03. Apply

ASM Topic: Module 05 Systems; Module 06 Impact of Microorganisms

ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.; 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

87) As Ms. Smith progresses with her plan of care, the RN provides education regarding beneficial applications of microbes. Scientists use microbes to produce drugs, hormones, and enzymes. This type of biotechnology involves the transfer of foreign genetic material into a microbe, a process called \_\_\_\_\_.

- A) recombinant DNA technology
- B) gene therapy
- C) bioremediation
- D) polymerase chain reaction

Answer: A

Section: 01.01

Topic: Microbial Roles; Basics of Genetic Engineering

Bloom's: 03. Apply

ASM Topic: Module 04 Information Flow; Module 06 Impact of Microorganisms

ASM Objective: 04.05 Cell genomes can be manipulated to alter cell function.; 06.03 Humans utilize and harness microorganisms and their products.

NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

Wanda is a medical assistant and the newest employee of your healthcare team. You notice that she does not wash her hands in between patient visits. From your microbiology background, you understand that microbes are not visible with the naked eye. As the only nurse in your small medical office, you provide education for Wanda on the importance of hand washing.

88) Many microbes that inhabit the skin have the potential to cause disease. One such pathogen is *Staphylococcus aureus*. The genus name of this organism is most properly represented as \_\_\_\_\_.

- A) *aureus*
- B) *Staphylococcus*
- C) *staphylococcus*
- D) *Aureus*

Answer: B

Section: 01.04

Topic: Taxonomy of Microorganisms

Bloom's: 03. Apply

ASM Topic: Module 01 Evolution; Module 05 Systems

ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.; 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

89) Wanda is receptive to the nurse's teaching. In reinforcing the prevalence of microbes in our environment, the nurse describes the experiments of Louis Pasteur. Pasteur hypothesized that microbes were in the air and dust. Through experiments using swan-necked flasks, he disproved the concept of \_\_\_\_\_.

- A) spontaneous mutation
- B) spontaneous generation
- C) aseptic theory
- D) biogenesis

Answer: B

Section: 01.02

Topic: History of Microbiology

Bloom's: 03. Apply

ASM Topic: Module 05 Systems

ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.

90) Hand washing in the healthcare environment is aimed at reducing the number of microbes in the medical setting to prevent the spread of infection and disease. Which of these terms best represents this technique?

- A) Sterilization
- B) Asepsis
- C) Disinfection
- D) Antisepsis

Answer: B

Section: 01.01

Topic: Microbial Roles

Bloom's: 03. Apply

ASM Topic: Module 05 Systems

ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.; 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

91) Viruses may also be transmitted to patients, even though they differ from bacteria in that they are \_\_\_\_\_.

- A) parasitic invertebrate animals
- B) infectious proteins
- C) metabolically active eukaryotes
- D) noncellular particles

Answer: D

Section: 01.01

Topic: General Viral Properties

Bloom's: 03. Apply

ASM Topic: Module 05 Systems

ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.

NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

Breonna Jones is 16 years old, 5'4", and weighs 93 lb. She was admitted to an inpatient medical unit 2 days ago after collapsing at the local high school. Her parents knew she was skinny and had lost weight in the past few months, but had no idea that her life was in danger. The medical team has instituted treatment for anorexia nervosa. As you develop Breonna's nursing plan of care, you take into consideration the four major biological molecules that are building blocks of all cells.

92) The nurse implements an extensive nutrition education plan for Breonna, beginning at the molecular level. Carbohydrates, lipids, proteins, and nucleic acids are the four main families of biological molecules referred to as \_\_\_\_\_.

- A) macromolecules
- B) monosaccharides
- C) polysaccharides
- D) micromolecules

Answer: A

Section: 01.03

Topic: Biochemistry

Bloom's: 03. Apply

ASM Topic: Module 07 Scientific Thinking

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:

Effectively communicate fundamental concepts of microbiology, in written and oral format.

93) The structure of proteins is complex and unique, and only specific molecules can interact with their surface features. The natural shape of each protein is termed the native state. When proteins are exposed to heat, acid, or alcohol, their shape is disrupted and they become nonfunctional or \_\_\_\_\_.

- A) digested
- B) denatured
- C) distorted
- D) depolymerized

Answer: B

Section: 01.03

Topic: Biochemistry

Bloom's: 03. Apply

ASM Topic: Module 07 Scientific Thinking

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:

Effectively communicate fundamental concepts of microbiology, in written and oral format.

94) You inform Breonna that it is important for her to maintain a diet rich in carbohydrates, lipids, and proteins, so that each of these macromolecules can be metabolized to form a high-energy compound called \_\_\_\_\_.

- A) cGMP
- B) RNA
- C) ATP
- D) NAD

Answer: C

Section: 01.03

Topic: Biochemistry

Bloom's: 03. Apply

ASM Topic: Module 07 Scientific Thinking

ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines:

Effectively communicate fundamental concepts of microbiology, in written and oral format.