

Chapter 01 The Main Themes of Microbiology

Multiple Choice Questions

1. When humans manipulate the genes of microorganisms, the process is called
- A. bioremediation.
 - B. genetic engineering.**
 - C. epidemiology.
 - D. immunology.
 - E. taxonomy.

ASM Objective: 04.05 Cell genomes can be manipulated to alter cell function.
ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.
ASM Topic: Module 04 Information Flow
ASM Topic: Module 05 Systems
Blooms Level: 1. Remember
Learning Outcome: 01.02 Identify multiple professions using microbiology.
Section Number: 01.01
Topic: Taxonomy of Microorganisms

2. Which of the following are not considered microorganisms?
- A. mosquitoes**
 - B. protozoa
 - C. bacteria
 - D. viruses
 - E. fungi

ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.
ASM Topic: Module 05 Systems
Blooms Level: 1. Remember
Learning Outcome: 01.01 List the various types of microorganisms.
Section Number: 01.01
Topic: Taxonomy 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.

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).

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Learning Outcome: 01.09 Compare and contrast the relative sizes of the different microbes.

Section Number: 01.01

Topic: Cellular Organization

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

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

ASM Topic: Module 04 Information Flow

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Learning Outcome: 01.05 Explain one old and one new way that humans manipulate organisms for their own uses.

Section Number: 01.01

Section Number: 01.02

Section Number: 01.03

Topic: Microbial Roles

5. The study of the immune response to infection caused by microorganisms is

- A. hypersensitivity.
- B. epidemiology.
- C. immunology.
- D. morbidity.
- E. geomicrobiology.

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

ASM Topic: Module 05 Systems

Blooms Level: 1. Remember

Learning Outcome: 01.02 Identify multiple professions using microbiology.

Section Number: 01.01

Topic: Microbial Roles

6. Which of the following does not indicate microbe involvement in energy and nutrient flow?

- A. formation of oxygen by an oxygenic photosynthesis
- B. formation of greenhouse gases
- C. formation of soil
- D. digestion of complex carbohydrates in animal diets
- E. decomposition of dead matter and wastes

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

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 and/or animal microflora).

ASM Topic: Module 05 Systems

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01 List the various types of microorganisms.

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Section Number: 01.01

Topic: Microbial Roles

7. The microorganisms that recycle nutrients by breaking down dead matter and wastes are called

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

ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).

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 and/or animal microflora).

ASM Topic: Module 03 Metabolic Pathways

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 1. Remember

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Section Number: 01.02

Topic: Microbial Roles

8. The microorganisms that do not have a nucleus in their cells are called

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

ASM Objective: 02.04 While microscopic eukaryotes (for example, fungi, protozoa, and algae) carry out some of the same processes as bacteria, many of the cellular properties are fundamentally different.

ASM Topic: Module 02 Structure and Function

Blooms Level: 1. Remember

Learning Outcome: 01.07 Differentiate among bacteria, archaea, and eukaryotic microorganisms.

Section Number: 01.02

Topic: Cellular Organization

9. The first prokaryotes appeared about ____ billion years ago.

- A. 5
- B. 4.5
- C. 3.5**
- D. 2
- E. 1

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.07 Differentiate among bacteria, archaea, and eukaryotic microorganisms.

Section Number: 01.05

Topic: History of Microbiology

10. Which of the following is not a human use of microorganisms?

- A. baking bread
- B. treating water and sewage
- C. fruit production**
- D. mass-producing antibiotics
- E. cleaning up oil spills

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Learning Outcome: 01.05 Explain one old and one new way that humans manipulate organisms for their own uses.

Section Number: 01.03

Topic: Microbial Roles

11. Using microbes to detoxify a site contaminated with heavy metals is an example of

- A. biotechnology.
- B. bioremediation.**
- C. decomposition.
- D. immunology.
- E. epidemiology.

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 1. Remember

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Section Number: 01.02

Section Number: 01.03

Topic: Microbial Roles

12. Disease-causing microorganisms are called

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

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

ASM Topic: Module 05 Systems

Blooms Level: 1. Remember

Learning Outcome: 01.06 Summarize the relative burden of human disease caused by microbes, emphasizing the differences between developed countries and developing countries.

Section Number: 01.04

Topic: Microbial Roles

13. The number one worldwide infectious diseases are

- A. AIDS-related diseases.
- B. diarrheal diseases.
- C. malaria diseases.
- D. measles.
- E. respiratory diseases.

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

ASM Topic: Module 05 Systems

Blooms Level: 2. Understand

Learning Outcome: 01.06 Summarize the relative burden of human disease caused by microbes, emphasizing the differences between developed countries and developing countries.

Section Number: 01.04

Topic: Microbial Roles

14. 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

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.08 Identify a fourth type of microorganism.

Section Number: 01.05

Topic: Taxonomy of Microorganisms

15. Helminths are

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

ASM Objective: 02.04 While microscopic eukaryotes (for example, fungi, protozoa, and algae) carry out some of the same processes as bacteria, many of the cellular properties are fundamentally different.

ASM Topic: Module 02 Structure and Function

Blooms Level: 1. Remember

Learning Outcome: 01.01 List the various types of microorganisms.

Section Number: 01.01

Topic: Taxonomy of Microorganisms

16. Organisms called parasites are

- A. always classified in the Kingdom Monera.
- B. always harmful to their host.**
- C. the decomposers in ecosystems.
- D. always viruses.
- E. free-living.

ASM Objective: 02.04 While microscopic eukaryotes (for example, fungi, protozoa, and algae) carry out some of the same processes as bacteria, many of the cellular properties are fundamentally different.

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

ASM Topic: Module 05 Systems

Blooms Level: 1. Remember

Learning Outcome: 01.06 Summarize the relative burden of human disease caused by microbes, emphasizing the differences between developed countries and developing countries.

Section Number: 01.01

Topic: Taxonomy of Microorganisms

17. Which group of microorganisms is composed only of hereditary material wrapped in a protein covering?

- A. viruses**
- B. bacteria
- C. parasites
- D. fungi
- E. yeasts

ASM Objective: 02.05 The replication cycles of viruses (lytic and lysogenic) differ among viruses and are determined by their unique structures and genomes.

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Learning Outcome: 01.01 List the various types of microorganisms.

Learning Outcome: 01.08 Identify a fourth type of microorganism.

Section Number: 01.01

Section Number: 01.05

Topic: Taxonomy of Microorganisms

18. 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.

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).

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.

ASM Topic: Module 02 Structure and Function

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 1. Remember

Learning Outcome: 01.10 Make a time line of the development of microbiology from the 1600s to today.

Learning Outcome: 01.11 List some recent microbiological discoveries of great impact.

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.06

Topic: History of Microbiology

19. Which of the following is not a process in the scientific method?

- A. belief in a preconceived idea**
- B. formulation of a hypothesis
- C. systematic observation
- D. laboratory experimentation
- E. development of a theory

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.06

Topic: History of Microbiology

20. Experimentation

- A. is designed to refute an hypothesis.
- B. is designed to support an hypothesis.
- C. provides a means to gather subjective data.
- D. provides a means to gather objective data.**
- E. is the first step in the scientific method.

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.06

Topic: History of Microbiology

21. A scientist who constructs a hypothesis, tests its validity by outlining predicted events of the hypothesis, and conducts experiments to test for those events is using the _____ approach.

- A. Koch
- B. scientific method**
- C. spontaneous generation
- D. taxonomic

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 1. Remember

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.06

Topic: History of Microbiology

22. The scientific method includes all of the following except

- A. hypothesis.
- B. experimentation.
- C. observation.
- D. publish.**

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

Chapter 01 - The Main Themes of Microbiology

on the scientific method.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.06

Topic: History of Microbiology

23. 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.

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.10 Make a time line of the development of microbiology from the 1600s to today.

Section Number: 01.06

Topic: History of Microbiology

24. 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.

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.

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 1. Remember

Learning Outcome: 01.10 Make a time line of the development of microbiology from the 1600s to today.

Section Number: 01.06

Topic: History of Microbiology

25. Sterile refers to

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

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

ASM Topic: Module 05 Systems

Blooms Level: 1. Remember

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.02

Section Number: 01.06

Topic: History of Microbiology

26. 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

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.

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 1. Remember

Learning Outcome: 01.10 Make a time line of the development of microbiology from the 1600s to today.

Section Number: 01.06

Topic: History of Microbiology

27. Taxonomy does not involve

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

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Section Number: 01.07

Topic: History of Microbiology

28. Which scientific field is involved in the identification, classification, and naming of organisms?

- A. nomenclature
- B.** taxonomy
- C. phylogeny
- D. Woesean classification

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

29. The orderly arrangement of organisms into a hierarchy of taxa is called

- A.** classification.
- B. identification.
- C. nomenclature.
- D. experimentation.
- E. biotechnology.

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

Chapter 01 - The Main Themes of Microbiology

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

30. Which of the following is a taxon that contains all the other taxa listed?

- A. species
- B. phylum
- C. kingdom**
- D. genus
- E. family

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

31. The smallest and most significant taxon is

- A. genus.
- B. species.**
- C. kingdom.
- D. family.
- E. phylum.

ASM Objective: 01.04 The traditional concept of species is not readily applicable to microbes due to asexual reproduction and the frequent occurrence of horizontal gene transfer.

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

32. Select the correct descending taxonomic hierarchy (left to right).

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

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Learning Outcome: 01.14 Create a mnemonic device for remembering the taxonomic categories.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

33. Which of the following is a scientific name?

- A. gram-positive streptococcus
- B. Staphylococcus
- C. *Streptococcus pyogenes***
- D. anthrax
- E. Streptobacilli

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.15 Correctly write the binomial name for a microorganism.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

34. 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.**

Chapter 01 - The Main Themes of Microbiology

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.15 Correctly write the binomial name for a microorganism.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

35. The study of evolutionary relationships among organisms is called

- A. biotechnology.
- B. genetics.
- C. recombinant DNA.
- D.** phylogeny.
- E. taxonomy.

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.04 Explain the theory of evolution and why it is called a theory.

Section Number: 01.07

Topic: History of Microbiology

36. 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. transformation.

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.04 Explain the theory of evolution and why it is called a theory.

Section Number: 01.07

Topic: History of Microbiology

37. 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.

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.04 Explain the theory of evolution and why it is called a theory.

Learning Outcome: 01.17 Explain the difference between traditional and molecular approaches to taxonomy.

Section Number: 01.07

Topic: History of Microbiology

38. The scientist/s who proposed that 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.

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.16 Draw a diagram of the three major domains.

Section Number: 01.07

Topic: History of Microbiology

39. In Haeckel's system, the protozoa and algae are classified in Kingdom

- A. Monera.
- B. Protista.**
- C. Myceteae (Fungi).
- D. Plantae (Plants).
- E. Animalia (Animals).

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.14 Create a mnemonic device for remembering the taxonomic categories.

Learning Outcome: 01.17 Explain the difference between traditional and molecular approaches to taxonomy.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

40. Which kingdom does not contain any eukaryotes?

- A. Monera**
- B. Protists
- C. Fungi
- D. Plants
- E. Animals

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

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

ASM Topic: Module 05 Systems

Blooms Level: 2. Understand

Learning Outcome: 01.07 Differentiate among bacteria, archaea, and eukaryotic microorganisms.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

41. Which scientific name is written correctly?

- A. Staphylococcus aureus
- B. staphylococcus aureus
- C. Staphylococcus Aureus
- D. Staphylococcus aureus**
- E. S. aureus

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.15 Correctly write the binomial name for a microorganism.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

42. Which of the following is NOT a recent discovery that has had a huge impact on the understanding of microbiology?

- A. Restriction enzymes
- B. PCR technique
- C. Biofilms
- D. Small RNAs
- E. All are significant discoveries.**

Refer to Section 1.6 The Historical Foundations of Microbiology and read about the recent discoveries that have had a huge impact on the understanding of microbiology.

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

ASM Objective: 06.04 Because the true diversity of microbial life is largely unknown, its effects and potential benefits have not been fully explored.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.11 List some recent microbiological discoveries of great impact.

Section Number: 01.06

Topic: History of Microbiology

43. Analysis of the small subunit rRNAs from all organisms in the three current domains suggests that

- A. the eukaryotes arose from prokaryotes.
- B. the Archaea are more closely related to eukaryotes than prokaryotes.
- C. all modern and extinct organisms on earth arose from a common ancestor.**
- D. the prokaryotes, Archaea, and eukaryotes are not related.

Refer to "Systems of Presenting a Universal Tree of Life" for a discussion of the ssu rRNAs and their role in taxonomy.

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.17 Explain the difference between traditional and molecular approaches to taxonomy.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

True / False Questions

44. A scientist studying helminths is working with bacteria.

FALSE

ASM Objective: 02.04 While microscopic eukaryotes (for example, fungi, protozoa, and algae) carry out some of the same processes as bacteria, many of the cellular properties are fundamentally different.

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Learning Outcome: 01.01 List the various types of microorganisms.

Section Number: 01.01

Topic: Taxonomy of Microorganisms

45. Members of the Kingdom Fungi are photosynthetic.

FALSE

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

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Learning Outcome: 01.01 List the various types of microorganisms.

Section Number: 01.01

Topic: Taxonomy of Microorganisms

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

TRUE

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

ASM Topic: Module 05 Systems

Blooms Level: 1. Remember

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Section Number: 01.02

Section Number: 01.04

Topic: History of Microbiology

47. All microorganisms are parasites.

FALSE

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01 List the various types of microorganisms.

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Section Number: 01.05

Topic: Microbial Roles

48. The scientific method involves formulating a tentative explanation, called the hypothesis, to account for what has been observed or measured.

TRUE

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.07

Topic: History of Microbiology

49. A hypothesis must be tested many times before it can be considered a theory.

TRUE

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 2. Understand

Learning Outcome: 01.12 Explain what is important about the scientific method.

Section Number: 01.07

Topic: History of Microbiology

50. The term sterile means free of all life forms.

TRUE

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

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.

ASM Topic: Module 03 Metabolic Pathways

Blooms Level: 1. Remember

Learning Outcome: 01.03 Describe the role and impact of microbes on the earth.

Section Number: 01.06

Topic: Microbial Roles

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

TRUE

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.13 Differentiate among the terms nomenclature, taxonomy, and classification.

Learning Outcome: 01.14 Create a mnemonic device for remembering the taxonomic categories.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

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

FALSE

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

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.07 Differentiate among bacteria, archaea, and eukaryotic microorganisms.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

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

TRUE

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

ASM Topic: Module 01 Evolution

ASM Topic: Module 02 Structure and Function

Blooms Level: 1. Remember

Learning Outcome: 01.08 Identify a fourth type of microorganism.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

54. The names of the three proposed domains are: Bacteria, Protista, and Eukarya.

FALSE

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.16 Draw a diagram of the three major domains.

Section Number: 01.07

Topic: Taxonomy of Microorganisms

55. One distinguishing characteristic of the archaeobacteria is that they live in extreme environments.

TRUE

ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).

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

ASM Topic: Module 02 Structure and Function

ASM Topic: Module 03 Metabolic Pathways

ASM Topic: Module 05 Systems

Blooms Level: 1. Remember

Learning Outcome: 01.07 Differentiate among bacteria, archaea, and eukaryotic microorganisms.

Section Number: 01.07

Topic: Microbial Roles

56. Microbes have been found existing in salty, acidic lakes.

TRUE

ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g., nitrogen fixation, methane production, anoxygenic photosynthesis).

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

ASM Topic: Module 03 Metabolic Pathways

Blooms Level: 1. Remember

Learning Outcome: 01.11 List some recent microbiological discoveries of great impact.

Section Number: 01.07

Topic: Microbial Roles

Multiple Choice Questions

57. In the experiments constructed by Pasteur to disprove spontaneous generation, swan-necked flasks were used. Why was this shape of flask used in this experiment?

- A. The glass necks needed to be open to the air, yet constructed so that bacteria would settle in the lowest part of the neck.
- B. These flask shapes were the easiest and cheapest to produce.
- C. The shape of the glass neck allowed the bacteria into the flask and then into the media, but air could not enter.
- D. Because the glass necks were stretched out, the heat used to sterilize the medium inside of the flask could not kill the bacteria in the neck.

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.

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.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 4. Analyze

Learning Outcome: 01.10 Make a time line of the development of microbiology from the 1600s to today.

Section Number: 01.06

Topic: History of Microbiology