

Chapter 01 The Evolution of Microorganisms and Microbiology

True / False Questions

1. Extant microorganisms are organisms from the fossil record that are no longer present on Earth today.

FALSE

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

*ASM Objective: 07.03b Ability to communicate and collaborate with other disciplines:
Identify credible scientific sources and interpret and evaluate the information therein.*

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

*Learning Outcome: 01.02.01 Propose a time line of the origin and history of microbial life
and integrate supporting evidence into it*

Section: 01.02

Topic: Microbial Evolution

Fill in the Blank Questions

2. All cellular organisms can be placed into one of three _____, which include the *Bacteria*, *Archaea*, and the *Eukarya*.
domains

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: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial World

3. *Archaea* are cellular organisms that have unique cell membrane _____.
lipids

ASM Objective: 02.02 Bacteria and Archaea have specialized structures (e.g. flagella, endospores, and pili) that often confer critical capabilities.

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

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

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

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

ASM Topic: Module 01 Evolution

ASM Topic: Module 02 Structure and Function

Blooms Level: 1. Remember

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Learning Outcome: 01.01.04 Determine the type of microbe (e.g., bacterium, fungus, etc.) when given a description of a newly discovered microbe

Section: 01.01

Topic: Microbial World

True / False Questions

4. Microbiologists study a variety of organisms, but all are considered either *Bacteria* or *Archaea*.

FALSE

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

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

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial World

5. All eukaryotes have a membrane-delimited nucleus.

TRUE

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

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

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial World

6. Viruses are not generally studied by microbiologists because they are not classified as living organisms.

FALSE

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

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Learning Outcome: 01.01.04 Determine the type of microbe (e.g., bacterium, fungus, etc.) when given a description of a newly discovered microbe

Section: 01.01

Topic: Microbial World

7. Viruses constitute the fourth domain of life in current biological classification schemes.

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: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial Evolution

Multiple Choice Questions

8. Protists contain all of the following forms of life except

- A. protozoa.
- B. fungi.**
- C. slime molds.
- D. algae.

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial Evolution

9. Cells with a relatively complex morphology that have a true membrane-delimited nucleus are called

- A. prokaryotes.
- B. eukaryotes.**
- C. urkaryotes.
- D. nokaryotes.

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: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial Evolution

10. Cells with a relatively simple cell morphology that do not have a true membrane-delimited nucleus are called

- A. prokaryotes.
- B. eukaryotes.
- C. urkaryotes.
- D. nokaryotes.

ASM Topic: Module 01 Evolution

ASM Topic: Module 02 Structure and Function

Blooms Level: 1. Remember

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.01

Topic: Microbial Evolution

11. The ribosomal RNA studies that led to the division of prokaryotic organisms into the Bacteria and the Archaea were begun by

- A. Pasteur.
- B. Woese.
- C. Needham.
- D. Watson.

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.01.02 Explain Carl Woese's contributions in establishing the three domain systems for classifying cellular life

Section: 01.01

Topic: Microbial Evolution

12. Definition of life includes all of the following except

- A. cells maintain internal order.
- B. cells use energy and have a metabolism.
- C. cells reproduce.
- D. cells lack response to external environment.**

*ASM Objective: 07.03b Ability to communicate and collaborate with other disciplines:
Identify credible scientific sources and interpret and evaluate the information therein.*

ASM Topic: Module 01 Evolution

Blooms Level: 1. Remember

*Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists
from those studied by other biologists*

Section: 01.02

Topic: Microbial Evolution

13. Proteins function in modern cells as

- A. catalysts.
- B. hereditary information.
- C. structural elements.
- D. both catalysts and structural elements.**

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Section: 01.02

14. RNA serves to convert the information stored in DNA to _____.

- A. carbohydrates
- B. protein**
- C. lipids
- D. RNA

ASM Topic: Module 04 Information Flow

Blooms Level: 2. Understand

Section: 01.02

Topic: Microbial Evolution

15. Catalytic proteins speed up the myriad of chemical reactions that occur in cells; these proteins are known as

- A. ribozymes
- B. nucleic acids
- C. enzymes**
- D. lipids

ASM Topic: Module 03 Metabolic Pathways

Blooms Level: 2. Understand

Section: 01.02

Topic: Microbial Evolution

True / False Questions

16. The earliest microbial fossils that have been found are dated from approximately 4.5 million years ago.

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 01 Evolution

Blooms Level: 1. Remember

Learning Outcome: 01.02.01 Propose a time line of the origin and history of microbial life and integrate supporting evidence into it

Section: 01.02

Topic: Microbial Evolution

Multiple Choice Questions

17. Which of the following distinguish the field of microbiology from other fields of biology?

- A. The size of the organism studied.
- B. The techniques used to study organisms regardless of their size.
- C. Both the size of the organism studied and the techniques employed in the study of organisms.**
- D. Neither the size of the organism studied nor the techniques employed in the study of organisms regardless of their size.

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

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

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.03

Topic: History of Microbiology

18. Who of the following developed a set of criteria that could be used to establish a causative link between a particular microorganism and a particular disease?

- A. Fracastoro
- B. Koch**
- C. Pasteur
- D. Lister

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

19. Who of the following was the first to observe and accurately describe microorganisms?

- A. Pasteur
- B. Lister
- C. van Leeuwenhoek
- D. Tyndall

Blooms Level: 1. Remember

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

20. Who of the following provided the evidence needed to discredit the concept of spontaneous generation?

- A. Pasteur
- B. Koch
- C. Semmelweis
- D. Lister

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

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

21. The concept that living organisms arise from nonliving material is called

- A. biogenesis.
- B. cell theory.
- C. spontaneous generation.**
- D. germ theory.

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, KITASATO, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

22. The concept that human and animal diseases are caused by microorganisms is called the

- A. cell theory.
- B. germ theory.**
- C. causative theory.
- D. disease theory.

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, KITASATO, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

23. Whose work on spontaneous generation first demonstrated the existence of a very heat-resistant form of bacteria that are called endospores?

- A. Schwann
- B. Redi
- C. Tyndall**
- D. Pasteur

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

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

24. Antiseptic surgery was pioneered by

- A. Pasteur.
- B. Lister.**
- C. Jenner.
- D. Kitasato.

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

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

25. Studies by Emil von Behring and Shibasaburo Kitasato demonstrated that inactivated toxins can induce the synthesis of antitoxins in the blood of rabbits. These antitoxins (antibodies) are the basis of
- A. humoral immunity.
 - B. cell-mediated immunity.
 - C. antibiotic immunity.
 - D. phagocyte-mediated immunity.

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

26. The first surgical antiseptic to be used was
- A. iodine.
 - B. ethanol.
 - C. phenol.
 - D. none of the choices.

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

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

27. Old cultures of bacteria that have lost their ability to cause disease are said to be
- A. impotent.
 - B. virulent.
 - C. pathogenic.
 - D.** attenuated.

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

ASM Topic: Module 02 Structure and Function

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, KITASATO, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

28. Who is credited with developing and documenting the first vaccination procedure against smallpox?
- A. Koch
 - B. Pasteur
 - C.** Jenner
 - D. Lister

ASM Objective: 07.04 Ability to understand the relationship between science and society: Identify and discuss ethical issues in microbiology.

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, KITASATO, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

29. Who is credited with developing a vaccine against chicken cholera?

- A. Koch
- B. Pasteur**
- C. Jenner
- D. Lister

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, KITASATO, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

30. Who of the following first discovered that some blood leukocytes could engulf disease-causing bacteria?

- A. von Behring
- B. Meister
- C. Metchnikoff**
- D. Ivanowski

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, KITASATO, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

31. The use of enrichment cultures and selective media was pioneered by

- A. Beijerinck.
- B. Jenner.
- C. Pasteur.
- D. von Behring.

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

True / False Questions

32. Fanny Hesse first suggested that agar be used to solidify microbiological media.

TRUE

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

33. M. J. Berkeley demonstrated that the great potato blight of Ireland was caused by a fungus.

TRUE

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 1. Remember

Section: 01.03

Topic: History of Microbiology

34. Invisible living creatures were thought to exist and cause disease long before they were ever observed.

TRUE

Blooms Level: 2. Understand

Section: 01.03

Topic: History of Microbiology

35. Koch's postulates were instrumental in establishing that *Mycobacterium leprae* is the cause of leprosy.

FALSE

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

36. Edward Jenner's work in preventing rabies led to the use of the term vaccination to describe a type of procedure used in the prevention of disease.

FALSE

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

37. Although developed over 100 years ago, Koch's postulates continue to be used successfully in all known human infectious diseases.

FALSE

ASM Objective: 07.04 Ability to understand the relationship between science and society: Identify and discuss ethical issues in microbiology.

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Learning Outcome: 01.03.03 Predict the difficulties that might arise when using Koch's postulates to determine if a microbe causes a disease unique to humans

Section: 01.03

Topic: History of Microbiology

38. The criteria for establishing a causative link between a particular microorganism and a particular disease were first proposed by Jacob Henle.

TRUE

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

Blooms Level: 1. Remember

Section: 01.03

Topic: History of Microbiology

39. Viruses and bacteria were first cultured in the laboratory at about the same time.

FALSE

Blooms Level: 2. Understand

Section: 01.03

Topic: History of Microbiology

40. Agar is used as a solidifying agent for microbiological media because it is not readily digested by most microorganisms.

TRUE

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

ASM Topic: Module 08 Microbiology Skills

Blooms Level: 2. Understand

Section: 01.03

Topic: History of Microbiology

41. Charles Chamberland developed porcelain filters that allowed other scientists to demonstrate that viruses are smaller than bacteria.

TRUE

ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).

ASM Topic: Module 08 Microbiology Skills

Blooms Level: 1. Remember

Section: 01.03

Topic: History of Microbiology

42. The first disease to be identified as being caused by a virus was tobacco mosaic disease.

TRUE

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 1. Remember

Section: 01.03

Topic: History of Microbiology

43. John Tyndall demonstrated that microorganisms present in the air are carried on dust particles.

TRUE

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

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

Blooms Level: 1. Remember

Section: 01.03

Topic: History of Microbiology

44. Agastino Bassi demonstrated that a type of silkworm disease was caused by a fungus and proposed that many diseases are caused by microorganisms.

TRUE

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01.03 Provide an example of the importance to humans of each of the major types of microbes

Section: 01.03

Topic: History of Microbiology

45. The usefulness of agar in solidifying microbiological growth media is limited because it does not remain solid at temperatures above 28°C.

FALSE

ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment.

ASM Topic: Module 08 Microbiology Skills

Blooms Level: 2. Understand

Section: 01.03

Topic: History of Microbiology

46. Robert Koch developed a vaccine that could be used to prevent anthrax.

FALSE

Blooms Level: 1. Remember

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

Fill in the Blank Questions

47. Elie Metchnikoff discovered _____, which is a major feature of the host immune response.

phagocytosis

Blooms Level: 3. Apply

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

48. An Italian physician, _____, challenged the concept of spontaneous generation by demonstrating that maggots do not arise from decaying meat but rather from developing fly eggs.

Redi

ASM Objective: 06.02 Microorganisms provide essential models that give us fundamental knowledge about life processes.

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Section: 01.03

Topic: History of Microbiology

49. _____ discovered that soil bacteria could oxidize iron, sulfur, and ammonia to obtain energy.

Winogradsky

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: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

50. _____ was the first to isolate a root nodule bacterium capable of nitrogen fixation.
Beijerinck

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

ASM Objective: 03.02 The metabolic abilities of a cell determine how it interacts with other cells and its environment (e.g. quorum sensing, oxygen consumption, nitrogen transformations).

ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.

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

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).

ASM Topic: Module 01 Evolution

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

True / False Questions

51. The endosymbiotic hypothesis is generally accepted as the origin of two eukaryotic organelles: mitochondria and chloroplasts.

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 01 Evolution

Blooms Level: 2. Understand

Section: 01.02

Topic: Microbial Evolution

52. The relationship between specific bacteria and specific diseases was first demonstrated by Koch.

TRUE

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.03.01 Evaluate the importance of the contributions to microbiology made by Hooke, Leeuwenhoek, Pasteur, Koch, Cohn, Beijerinck, von Behring, Kitasato, Metchnikoff, and Winogradsky

Section: 01.03

Topic: History of Microbiology

53. Some microorganisms are useful in bioremediation processes that reduce the effects of pollution.

TRUE

ASM Objective: 01.03 Human impact on the environment influences the evolution of microorganisms (e.g. emerging diseases and the selection of antibiotic resistance).

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

ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.

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

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: 01.01.03 Provide an example of the importance to humans of each of the major types of microbes

Learning Outcome: 01.04.02 Support the belief held by many microbiologists that microbiology is experiencing its second golden age

Section: 01.04

Fill in the Blank Questions

54. The branch of microbiology that deals with diseases of humans and animals is called _____ microbiology.

medical

ASM Objective: 01.03 Human impact on the environment influences the evolution of microorganisms (e.g. emerging diseases and the selection of antibiotic resistance).

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

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.04

55. The branch of microbiology that deals with the mechanisms by which the human body protects itself from disease-causing organisms is called _____.

immunology

ASM Objective: 01.03 Human impact on the environment influences the evolution of microorganisms (e.g. emerging diseases and the selection of antibiotic resistance).

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.04

56. _____ microbiologists monitor community food establishments and water supplies in order to control the spread of communicable diseases.

Public health

ASM Objective: 01.03 Human impact on the environment influences the evolution of microorganisms (e.g. emerging diseases and the selection of antibiotic resistance).

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

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

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.04

57. The branch of microbiology that studies the relationship between microorganisms and their habitats is called _____.

microbial ecology

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

ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.

ASM Topic: Module 07 Scientific Thinking

Blooms Level: 1. Remember

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.04

Topic: Microbial World

58. _____ and _____ microbiology investigates the spoilage of products for human consumption and the use of microorganisms in the production of cheese, yogurt, pickles, beer, and the like.

Food, dairy

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

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).

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

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

ASM Objective: 07.04 Ability to understand the relationship between science and society: Identify and discuss ethical issues in microbiology.

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Learning Outcome: 01.01.03 Provide an example of the importance to humans of each of the major types of microbes

Section: 01.04

Topic: Microbial World

59. _____ microbiology involves the use of microorganisms to make products such as antibiotics, vaccines, steroids, alcohols, vitamins, amino acids, and enzymes.

Industrial

ASM Objective: 01.03 Human impact on the environment influences the evolution of microorganisms (e.g, emerging diseases and the selection of antibiotic resistance).

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

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

ASM Objective: 07.04 Ability to understand the relationship between science and society: Identify and discuss ethical issues in microbiology.

ASM Topic: Module 06 Impact of Microorganisms

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Learning Outcome: 01.01.03 Provide an example of the importance to humans of each of the major types of microbes

Section: 01.04

Topic: Microbial World

60. Microbial _____ are scientists who investigate the synthesis of antibiotics and toxins, the production of energy with microorganisms, and the ways in which microorganisms survive harsh environmental conditions.

physiologists

ASM Objective: 03.02 The metabolic abilities of a cell determine how it interacts with other cells and its environment (e.g. quorum sensing, oxygen consumption, nitrogen transformations).

ASM Objective: 06.02 Microorganisms provide essential models that give us fundamental knowledge about life processes.

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

ASM Topic: Module 03 Metabolic Pathways

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.04

Topic: Microbial World

61. Microbial _____ focuses on the nature of heredity and how it regulates the development and function of cells and organisms.

genetics

ASM Objective: 04.01 Genetic variations can impact microbial functions (e.g. in biofilm formation, pathogenicity and drug resistance).

ASM Objective: 06.02 Microorganisms provide essential models that give us fundamental knowledge about life processes.

ASM Topic: Module 03 Metabolic Pathways

Blooms Level: 2. Understand

Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists

Section: 01.04

Topic: Microbial World