

Student: _____

1. Extant microorganisms are organisms from the fossil record that are no longer present on Earth today.
True False
2. All cellular organisms can be placed into one of three _____, which include the *Bacteria*, *Archaea*, and the *Eukarya*.

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

4. Microbiologists study a variety of organisms, but all are considered either *Bacteria* or *Archaea*.
True False
5. All eukaryotes have a membrane-delimited nucleus.
True False
6. Viruses are not generally studied by microbiologists because they are not classified as living organisms.
True False
7. Viruses constitute the fourth domain of life in current biological classification schemes.
True False
8. Protists contain all of the following forms of life except
 - A. protozoa.
 - B. fungi.
 - C. slime molds.
 - D. algae.
9. Cells with a relatively complex morphology that have a true membrane-delimited nucleus are called
 - A. prokaryotes.
 - B. eukaryotes.
 - C. urkaryotes.
 - D. nokaryotes.
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.
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.

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.
13. Proteins function in modern cells as
 - A. catalysts.
 - B. hereditary information.
 - C. structural elements.
 - D. both catalysts and structural elements.
14. RNA serves to convert the information stored in DNA to _____.
 - A. carbohydrates
 - B. protein
 - C. lipids
 - D. RNA
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
16. The earliest microbial fossils that have been found are dated from approximately 4.5 million years ago.
True False
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.
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
19. Who of the following was the first to observe and accurately describe microorganisms?
 - A. Pasteur
 - B. Lister
 - C. van Leeuwenhoek
 - D. Tyndall
20. Who of the following provided the evidence needed to discredit the concept of spontaneous generation?
 - A. Pasteur
 - B. Koch
 - C. Semmelweiss
 - D. Lister

21. The concept that living organisms arise from nonliving material is called
 - A. biogenesis.
 - B. cell theory.
 - C. spontaneous generation.
 - D. germ theory.
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.
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
24. Antiseptic surgery was pioneered by
 - A. Pasteur.
 - B. Lister.
 - C. Jenner.
 - D. Kitasato.
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.
26. The first surgical antiseptic to be used was
 - A. iodine.
 - B. ethanol.
 - C. phenol.
 - D. none of the choices.
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.
28. Who is credited with developing and documenting the first vaccination procedure against smallpox?
 - A. Koch
 - B. Pasteur
 - C. Jenner
 - D. Lister
29. Who is credited with developing a vaccine against chicken cholera?
 - A. Koch
 - B. Pasteur
 - C. Jenner
 - D. Lister

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
31. The use of enrichment cultures and selective media was pioneered by
- A. Beijerinck.
 - B. Jenner.
 - C. Pasteur.
 - D. von Behring.
32. Fanny Hesse first suggested that agar be used to solidify microbiological media.
True False
33. M. J. Berkeley demonstrated that the great potato blight of Ireland was caused by a fungus.
True False
34. Invisible living creatures were thought to exist and cause disease long before they were ever observed.
True False
35. Koch's postulates were instrumental in establishing that *Mycobacterium leprae* is the cause of leprosy.
True False
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.
True False
37. Although developed over 100 years ago, Koch's postulates continue to be used successfully in all known human infectious diseases.
True False
38. The criteria for establishing a causative link between a particular microorganism and a particular disease were first proposed by Jacob Henle.
True False
39. Viruses and bacteria were first cultured in the laboratory at about the same time.
True False
40. Agar is used as a solidifying agent for microbiological media because it is not readily digested by most microorganisms.
True False
41. Charles Chamberland developed porcelain filters that allowed other scientists to demonstrate that viruses are smaller than bacteria.
True False
42. The first disease to be identified as being caused by a virus was tobacco mosaic disease.
True False
43. John Tyndall demonstrated that microorganisms present in the air are carried on dust particles.
True False
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 False

45. The usefulness of agar in solidifying microbiological growth media is limited because it does not remain solid at temperatures above 28°C.
True False
46. Robert Koch developed a vaccine that could be used to prevent anthrax.
True False
47. Elie Metchnikoff discovered _____, which is a major feature of the host immune response.

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.

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

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

51. The endosymbiotic hypothesis is generally accepted as the origin of two eukaryotic organelles: mitochondria and chloroplasts.
True False
52. The relationship between specific bacteria and specific diseases was first demonstrated by Koch.
True False
53. Some microorganisms are useful in bioremediation processes that reduce the effects of pollution.
True False
54. The branch of microbiology that deals with diseases of humans and animals is called _____
microbiology.

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

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

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

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.

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

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.

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

1 Key

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

Willey - Chapter 01 #1

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

Willey - Chapter 01 #2

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

Willey - Chapter 01 #3

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

Willey - Chapter 01 #4

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

Willey - Chapter 01 #5

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

Willey - Chapter 01 #6

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

Willey - Chapter 01 #7

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

Willey - Chapter 01 #8

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

Willey - Chapter 01 #9

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

Willey - Chapter 01 #10

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
Section: 01.01
Topic: Microbial Evolution
Willey - Chapter 01 #11*

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

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
Section: 01.02
Topic: Microbial Evolution
Willey - Chapter 01 #12*

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

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
Willey - Chapter 01 #13*

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
Willey - Chapter 01 #14*

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
Willey - Chapter 01 #15*

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

Willey - Chapter 01 #16

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

Willey - Chapter 01 #17

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

Willey - Chapter 01 #18

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

Willey - Chapter 01 #19

20. Who of the following provided the evidence needed to discredit the concept of spontaneous generation?
- A.** Pasteur
 - B. Koch
 - C. Semmelweiss
 - 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

Willey - Chapter 01 #20

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
Willey - Chapter 01 #21

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
Willey - Chapter 01 #22

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
Willey - Chapter 01 #23

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
Willey - Chapter 01 #24

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
Willey - Chapter 01 #25

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

Willey - Chapter 01 #26

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

Willey - Chapter 01 #27

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

Willey - Chapter 01 #28

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

Willey - Chapter 01 #29

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

Willey - Chapter 01 #30

31. The use of enrichment cultures and selective media was pioneered by
A. Beijerinck.
B. Jenner.
C. Pasteur.
D. von Behring.

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
Blooms Level: 1. Remember
Section: 01.03
Topic: History of Microbiology
Willey - Chapter 01 #31

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

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
Blooms Level: 1. Remember
Section: 01.03
Topic: History of Microbiology
Willey - Chapter 01 #32

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
Willey - Chapter 01 #33

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
Willey - Chapter 01 #34

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
Section: 01.03
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
Topic: History of Microbiology
Willey - Chapter 01 #35

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

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
Blooms Level: 2. Understand
Section: 01.03
Topic: History of Microbiology
Willey - Chapter 01 #36

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
Section: 01.03
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
Topic: History of Microbiology
Willey - Chapter 01 #37

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
Willey - Chapter 01 #38

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
Willey - Chapter 01 #39

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
Willey - Chapter 01 #40

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
Willey - Chapter 01 #41

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
Willey - Chapter 01 #42

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
Willey - Chapter 01 #43

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
Willey - Chapter 01 #44

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
Willey - Chapter 01 #45

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

FALSE

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
Blooms Level: 1. Remember
Section: 01.03
Topic: History of Microbiology
Willey - Chapter 01 #46

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

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
Blooms Level: 3. Apply
Section: 01.03
Topic: History of Microbiology
Willey - Chapter 01 #47

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
Willey - Chapter 01 #48

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
Willey - Chapter 01 #49

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
Willey - Chapter 01 #50

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
Willey - Chapter 01 #51

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

Willey - Chapter 01 #52

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

Willey - Chapter 01 #53

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

Willey - Chapter 01 #54

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

Willey - Chapter 01 #55

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

Willey - Chapter 01 #56

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

Willey - Chapter 01 #57

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

Willey - Chapter 01 #58

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

Willey - Chapter 01 #59

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

Willey - Chapter 01 #60

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

Willey - Chapter 01 #61

1 Summary

<u>Category</u>	<u># of Questions</u>
ASM Objective: 01.01 Cells, organelles (e.g. mitochondria and chloroplasts) and all major metabolic pathways evolved from early prokaryotic cells.	3
ASM Objective: 01.03 Human impact on the environment influences the evolution of microorganisms (e.g. emerging diseases and the selection of antibiotic resistance).	5
ASM Objective: 01.05 The evolutionary relatedness of organisms is best reflected in phylogenetic trees.	4
ASM Objective: 02.02 Bacteria and Archaea have specialized structures (e.g. flagella, endospores, and pili) that often confer critical capabilities.	1
ASM Objective: 03.01 Bacteria and Archaea exhibit extensive, and often unique, metabolic diversity (e.g. nitrogen fixation, methane production, anoxygenic photosynthesis).	2
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).	2
ASM Objective: 03.03 The survival and growth of any microorganism in a given environment depends on its metabolic characteristics.	3
ASM Objective: 03.04 The growth of microorganisms can be controlled by physical, chemical, mechanical, and biological methods.	5
ASM Objective: 04.01 Genetic variations can impact microbial functions (e.g. in biofilm formation, pathogenicity and drug resistance).	1
ASM Objective: 05.01 Microorganisms are ubiquitous and live in diverse and dynamic ecosystems.	5
ASM Objective: 05.03 Microorganisms and their environment interact with and modify each other.	3
ASM Objective: 05.04 Microorganisms, cellular and viral, interact with both human and non-human hosts in beneficial, neutral or detrimental ways.	15
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).	2
ASM Objective: 06.02 Microorganisms provide essential models that give us fundamental knowledge about life processes.	3
ASM Objective: 06.03 Humans utilize and harness microorganisms and their products.	3
ASM Objective: 06.04 Because the true diversity of microbial life is largely unknown, its effects and potential benefits have not been fully explored.	1
ASM Objective: 07.03a Ability to communicate and collaborate with other disciplines: Effectively communicate fundamental concepts of microbiology, in written and oral format.	9
ASM Objective: 07.03b Ability to communicate and collaborate with other disciplines: Identify credible scientific sources and interpret and evaluate the information therein.	2
ASM Objective: 07.04 Ability to understand the relationship between science and society: Identify and discuss ethical issues in microbiology.	4
ASM Objective: 08.03 Use appropriate methods to identify microorganisms (media-based, molecular and serological).	1
ASM Objective: 08.05 Use appropriate microbiological and molecular lab equipment.	1
ASM Topic: Module 01 Evolution	13
ASM Topic: Module 02 Structure and Function	5
ASM Topic: Module 03 Metabolic Pathways	4
ASM Topic: Module 04 Information Flow	1
ASM Topic: Module 06 Impact of Microorganisms	13
ASM Topic: Module 07 Scientific Thinking	1
ASM Topic: Module 08 Microbiology Skills	3
Blooms Level: 1. Remember	27
Blooms Level: 2. Understand	33
Blooms Level: 3. Apply	1
Learning Outcome: 01.01.01 Differentiate the biological entities studied by microbiologists from those studied by other biologists	21
Learning Outcome: 01.01.02 Explain Carl Woese's contributions in establishing the three domain systems for classifying cellular life	1
Learning Outcome: 01.01.03 Provide an example of the importance to humans of each of the major types of microbes	4
Learning Outcome: 01.01.04 Determine the type of microbe (e.g., bacterium, fungus, etc.) when given a description of a newly discovered microbe	2
Learning Outcome: 01.02.01 Propose a time line of the origin and history of microbial life and integrate supporting evidence into it	2
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	23
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	1
Learning Outcome: 01.04.02 Support the belief held by many microbiologists that microbiology is experiencing its second golden age	1

Section: 01.01	10
Section: 01.02	7
Section: 01.03	35
Section: 01.04	9
Topic: History of Microbiology	35
Topic: Microbial Evolution	11
Topic: Microbial World	10
Willey - Chapter 01	61