Chapter 01 An Introduction to Biology

Multiple Choice Questions

- 1. Plant photosynthesis and the consumption of plants by animals is best explained by what unifying principle of life?
- A. All living organisms have evolved over the course of many generations.
- B. All living organisms are composed of similar structures.
- C. All living organisms maintain some level of homeostasis.
- D. All living organisms maintain organization.
- **E.** All living organisms use energy.

Blooms Level: 3. Apply Gradable: automatic

LO: 01.01.01 Describe the principles of biology.

Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization

- 2. A plant will begin flowering in response to changes in length of daylight, temperature and light quality. This is an example of which unifying principle of life?
- A. Plants conduct photosynthesis
- B. Living organisms maintain homeostasis
- C. Living organisms interact with their environment
- D. Living organisms grow and develop
- E. Populations of organisms evolve from one generation to the next

Blooms Level: 3. Apply LO: 01.01.01 Describe the principles of biology. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization

3. Whether the external temperature is hot or cold, birds maintain an internal body temperature of approximately 40°C. This is an example of A. metabolism. B. cellular respiration. C. growth and development. D. homeostasis. E. proteomics.	
Blooms Level: 2. Understand Gradable: automatic LO: 01.01.01 Describe the principles of biology. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization	
4. Proteins are largely responsible for the traits of living organisms while the blueprint for the organization, development and function of living things. A. DNA B. protein C. carbohydrate D. lipid E. metabolite	provides
Blooms Level: 1. Remember LO: 01.01.01 Describe the principles of biology. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization	
 5. Which level of organization includes all of the others in the list? A. cell B. tissue C. organ D. organism E. population 	
Blooms Level: 2. Understand LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization	

6.	Which	level	of	organization	is	common	to	all	life	forms?	,
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A. cell

B. tissue

C. organ

D. organism

E. population

Blooms Level: 1. Remember

LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity.

Section: 01.01 Principles of Biology and Levels of Biological Organization

Topic: Principles of Biology and Levels of Biological Organization

- 7. When cells in an organism associate with each other they form
- A. atoms.
- B. molecules.
- C. macromolecules.
- **D.** tissues.
- E. populations.

Blooms Level: 1. Remember

Gradable: automatic

LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity.

Section: 01.01 Principles of Biology and Levels of Biological Organization

Topic: Principles of Biology and Levels of Biological Organization

- 8. A community of organisms interacting with their physical environment is a(n)
- A. population.
- B. organism.
- C. biosphere.
- **D.** ecosystem.
- E. macromolecular community.

Blooms Level: 1. Remember

Gradable: automatic

LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity.

Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization

9. Which is the simplest of all levels of organization?
A. atom B. cell
C. organ
D. organism
E. population
Blooms Level: 1. Remember LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity.
Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization
Topic. Trinciples of Biology and Ecreis of Biological Organization
10. Molecules are made up of
A. atoms
B. cells C. organs
D. organisms
E. populations
Blooms Level: 1. Remember
LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity. Section: 01.01 Principles of Biology and Levels of Biological Organization
Topic: Principles of Biology and Levels of Biological Organization
11. A researcher at sea discovers an island that contains a large number of boa constrictors and
few other species. In order to determine why so many boa constrictors dominate the habitat
the researcher would need to focus at the level of a(n)
A. cell. B. organ.
C. organism.
<u>D.</u> population.
E. ecosystem.
Blooms Level: 3. Apply Gradable: automatic
LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity. Section: 01.01 Principles of Biology and Levels of Biological Organization
Topic: Principles of Biology and Levels of Biological Organization

12. A flower on a plant represents which level of organization? A. atom B. cell C. organ D. organism E. population
Blooms Level: 2. Understand Gradable: automatic LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization
 13. The phenomenon through which populations of organisms change over several generations is termed A. homeostasis. B. growth and development. C. reproduction. D. biological evolution. E. organization.
Blooms Level: 1. Remember LO: 01.01.01 Describe the principles of biology. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization
14. Changes in represent the predominant cause for biological evolution. A. homeostasis B. growth and development C. reproduction D. genetic makeup E. energy

Blooms Level: 2. Understand LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

- 15. A variety of finch species within the Hawaiian Islands have acquired different types of beaks needed for utilizing specific food resources. What is the likely process by which these different species of finches came about?
- A. vertical descent with mutation
- B. horizontal gene transfer
- C. an accumulation of harmful genetic mutations

Blooms Level: 2. Understand

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

transfer

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 16. What feature of genetic mutations can eventually lead to the evolution of new species?
- A. Mutations always produce harmful effects.
- B. Mutations never affect protein structure or function.
- C. Mutations are not a mechanism through which biological evolution occurs.
- D. Mutations always produce beneficial effects.
- **E.** Mutations produce changes in the DNA sequence of a gene.

Blooms Level: 2. Understand

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

transfer

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 17. New species evolve from pre-existing species by the accumulation of
- A. metabolic events.
- **B.** genetic mutations.
- C. proteomes.
- D. reproductive events.
- E. developmental events.

Blooms Level: 1. Remember

Gradable: automatic

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

transfer.

- 18. How does evolutionary change occur?
- A. Through the modification of characteristics in a preexisting population.
- B. It may involve vertical descent with mutation.
- C. It may involve horizontal gene transfer.
- **D.** All of these choices are correct.
- E. None of these choices are correct.

Blooms Level: 1. Remember

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

transfer

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 19. In the process of biological evolution, new species may evolve through exchange of genes from one species to another. This process is called
- A. proteome transfer.
- **B.** horizontal gene transfer.
- C. vertical evolution.
- D. vertical descent with mutation.
- E. genomic sciences.

Blooms Level: 1. Remember

Gradable: automatic

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

transfer.

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 20. The grouping or classification of species is termed
- A. genus.
- B. kingdom.
- **C.** taxonomy.

Blooms Level: 1. Remember Gradable: automatic

LO: 01.02.02 Outline how organisms are classified (taxonomy).

21. When grouping organisms, which classification is most general for a particular type of organism? A. Kingdom B. Phylum C. Order D. Family E. Species
Blooms Level: 1. Remember LO: 01.02.02 Outline how organisms are classified (taxonomy). Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life
22. All organisms in the Kingdom can perform photosynthesis. A. Animalia B. Protista C. Fungi D. Plantae E. Bacteria
Blooms Level: 1. Remember LO: 01.02.02 Outline how organisms are classified (taxonomy). Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life
23. Our species is called <i>Homo sapiens</i> . The first word refers to which taxonomical grouping? A. Kingdom B. Phylum C. Order D. Genus E. Species

Blooms Level: 1. Remember LO: 01.02.02 Outline how organisms are classified (taxonomy). Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 24. When considering nomenclature for scientific names, what is the difference between the two primates, *Homo sapiens* and *Homo erectus*?
- A. One is a primate but the other is not.
- B. They are animals of a different kingdom.
- C. They are animals of a different order.
- **D.** They are animals of a different species.
- E. They are animals of a different genus.

Blooms Level: 2. Understand LO: 01.02.02 Outline how organisms are classified (taxonomy). Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 25. Which domain of life contains the most multicellular organisms?
- A. Archaea
- B. Bacteria
- C. Prokarya
- D. Eukarya
- E. Microorganisms

Blooms Level: 1. Remember LO: 01.02.02 Outline how organisms are classified (taxonomy).

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 26. The complete genetic composition of an organism is called its
- A. proteome.
- **B.** genome.
- C. transcriptosome.
- D. phenotype.
- E. None of these choices are correct.

Blooms Level: 1. Remember Gradable: automatic

LO: 01.02.03 Describe how evolution accounts for unity and diversity in biology.

27.	Which	is responsible	for encoding	the proteins	found in a cell?
A. ;	genome				

- B. proteome
- C. cytoskeleton
- D. evolution
- E. extracellular proteins

Blooms Level: 2. Understand LO: 01.02.03 Describe how evolution accounts for unity and diversity in biology.

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 28. If a scientist were studying the role of different proteins in the regulation of insulin secretion from a pancreatic cell, they would be studying
- A. genomics.
- B. proteomics.
- C. cell biology.
- D. both genomics and proteomics.
- **E.** both proteomics and cell biology.

Blooms Level: 2. Understand Gradable: automatic

LO: 01.03.01 Explain how researchers study biology at different levels, ranging from molecules to ecosystems.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

- 29. An explanation for a biological process that is substantiated by a large body of evidence is called a
- A. hypothesis.
- **B.** theory.
- C. systems biology.
- D. reductionism.
- E. prediction.

Blooms Level: 1. Remember Gradable: automatic

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline

Topic: Biology as a Scientific Discipline

Type: Quantitative Reasoning

- 30. Collecting data without a specific hypothesis in mind is called
- A. reductionism.
- B. hypothesis testing.
- C. discovery-based science.
- D. theoretical.
- E. All of these choices are correct.

Blooms Level: 1. Remember Gradable: automatic

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

True / False Questions

31. All tissues are composed of cells.

TRUE

Blooms Level: 1. Remember LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization

32. The capacity to maintain a fairly constant body temperature is a homeostatic process.

TRUE

Blooms Level: 2. Understand LO: 01.01.01 Describe the principles of biology. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization

33. A community is composed of different populations of animals and plants.

TRUE

Blooms Level: 1. Remember LO: 01.01.02 Explain how life can be viewed at different levels of biological complexity. Section: 01.01 Principles of Biology and Levels of Biological Organization Topic: Principles of Biology and Levels of Biological Organization 34. A defining characteristic that distinguishes prokaryotic and eukaryotic organisms is the lack of a cell membrane in prokaryotes.

FALSE

Blooms Level: 1. Remember

LO: 01.02.02 Outline how organisms are classified (taxonomy).

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

35. The modification of a limb that was used for walking in a pre-existing ancestor to one that is used as a wing for a species today is called proteomics.

FALSE

Blooms Level: 1. Remember

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

transfer.

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

36. A bacterial infection such as pneumonia is most likely caused by organisms derived from the kingdom fungi.

FALSE

Blooms Level: 3. Apply

LO: 01.02.02 Outline how organisms are classified (taxonomy).

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

37. All genetic mutations are harmful to an organism.

FALSE

Blooms Level: 2. Understand

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

ransfer

38. Vertical evolution, whereby living organisms evolve from a common ancestor ("tree of life"), is the only mechanism of evolution on Earth.

FALSE

Blooms Level: 1. Remember

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

39. The proteome, rather than genome, is most directly responsible for the structure, function, and appearance of organisms.

TRUE

Blooms Level: 2. Understand

LO: 01.02.03 Describe how evolution accounts for unity and diversity in biology.

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

40. Little scientific evidence is necessary when formulating a theory.

FALSE

Blooms Level: 2. Understand

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

41. The maintenance of cell structure requires energy.

TRUE

Blooms Level: 1. Remember

LO: 01.01.01 Describe the principles of biology.

Section: 01.01 Principles of Biology and Levels of Biological Organization

Topic: Principles of Biology and Levels of Biological Organization

42. Discovery-based science and hypothesis testing are the two major scientific approaches that help us understand biology.

TRUE

Blooms Level: 1. Remember

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

Type: General

Multiple Choice Questions

- 43. What is the appropriate order of stages needed to investigate whether maple trees drop their leaves in the autumn because of colder days?
- (1) Maple trees are grown in 2 greenhouses where the only variable is temperature (15°C vs. 10°C).
- (2) The hypothesis is rejected.
- (3) There is no statistical difference in the number of leaves dropped at 10°C as compared to 15°C.
- (4) The observation is that maple trees drop their leaves in autumn.
- (5) The hypothesis is that maple trees drop their leaves because of colder temperatures.

A. 1, 2, 3, 4, 5

B. 3, 4, 5, 1, 2

C. 5, 4, 3, 1, 2

<u>D.</u> 4, 5, 1, 3, 2

E. 3, 4, 2, 1, 5

Blooms Level: 3. Apply Gradable: automatic

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline

Topic: Biology as a Scientific Discipline

- 44. "All living organisms are composed of cells" is best related to what kind of scientific statement?
- A. Hypothesis.
- **B.** Theory.
- C. Discovery.
- D. Prediction.
- E. Fact.

Blooms Level: 3. Apply Gradable: automatic

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline

Topic: Biology as a Scientific Discipline

Type: General

- 45. A wristwatch suddenly stops working. After replacing the battery, the watch starts working again. Which statement correctly describes the situation from the perspective of the scientific method?
- A. This proves that a dead battery was the reason the wristwatch stopped working.
- B. This substantiates the theory that all wristwatches require functional batteries.
- $\underline{\mathbf{C}}$. This is consistent with the hypothesis that a dead battery caused the wristwatch to stop working.
- D. This leads to the prediction that a battery is required for wristwatch operation.

Blooms Level: 3. Apply Gradable: automatic

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

- 46. A researcher decides to test the scientific validity of the common phrase "An apple a day keeps the doctor away". What would be a valid hypothesis to investigate this specific question?
- A. Eating apples decreases the frequency of contracting a cold.
- **B.** The daily consumption of a single apple does not change the number of visits to the doctor.
- C. Eating one apple every day is good for you.
- D. Apples are high in vitamin C.
- E. Those who consume apples are more healthy than those who do not consume apples.

Blooms Level: 3. Apply LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing. Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

Type: General

- 47. A researcher tests the hypothesis that large, daily doses of vitamin C help protect against catching the common cold. What would be the best experimental and control group to test this hypothesis?
- A. Experimental group: takes a large dose of vitamin C daily;

Control group: takes nothing

B. Experimental group: people with a cold are administered vitamin C daily;

Control group: people without a cold are not administered vitamin C

C. Experimental group: takes a large dose of vitamin C daily;

Control group: takes a large weekly dose of vitamin C

D. Experimental group: takes a large, daily dose of vitamin C;

Control group: takes a daily dose of a sugar pill disguised as vitamin C

Blooms Level: 5. Evaluate LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing. Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline Type: General

A researcher hypothesizes that crocodile gender is determined by the incubation temperature of the egg. The hypothesis states that an average nest temperature of 32 - 33 °C results in the birth of male crocodiles while cooler and higher incubation temperatures result in female crocodiles.

Type: General

- 48. What is a valid, testable prediction based on this hypothesis?
- A. Male crocodiles will prefer temperatures of 32 33 °C
- **B.** Incubation of any crocodile egg at 32°C will result in a male crocodile
- C. Male eggs will hatch at 32°C while female eggs will not hatch at 32°C
- D. Male eggs will be more fragile than female eggs
- E. Crocodiles arrange the gender of offspring by manipulating incubation temperatures

Blooms Level: 3. Apply

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline

Topic: Biology as a Scientific Discipline

Type: General

- 49. The researcher determines that an average nest incubation temperature of 32 33 °C results in the birth of male crocodiles while higher and lower incubation temperatures result in female crocodiles. What is the most likely explanation for this phenomenon?
- A. Incubation temperature results in a change in the crocodilian genome
- **B.** Incubation temperature results in a change in the crocodilian proteome
- C. Since this phenomenon is influenced by an external stimuli (temperature), it cannot be attributed to changes in either the genome or the proteome
- D. Incubation temperature changes both the crocodilian genome and proteome

Blooms Level: 5. Evaluate LO: 01.02.03 Describe how evolution accounts for unity and diversity in biology.

Section: 01.02 Unity and Diversity of Life

Topic: Unity and Diversity of Life

- 50. Researchers find a group of crocodiles where an expanded incubation temperature gives rise to male crocodiles. This particular group of crocodiles hatch male crocodiles even with incubation temperatures as low as 29 °C. What type of scientific approach has led to this observation?
- A. Discovery-based science
- B. Hypothesis testing
- C. Theoretical testing
- D. Scientific method

Blooms Level: 3. Apply Gradable: automatic

LO: 01.03.02 Distinguish between discovery-based science and hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

Type: General

- 51. What is the most likely explanation for a group of crocodiles having acquired lower incubation temperatures giving rise to male crocodiles?
- A. Horizontal gene transfer from a related species has introduced changes in this group's genome
- B. Horizontal gene transfer from a related species has introduced changes in this group's proteome
- $\underline{\mathbf{C}}$. One or more mutations in the genome have been passed through the group by vertical descent
- D. One or more mutations in the proteome have been passed through the group by vertical descent

Blooms Level: 5. Evaluate Gradable: automatic

LO: 01.02.01 Explain the two basic mechanisms by which evolutionary change occurs: vertical descent with mutation and horizontal gene

ransfer

Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

- 52. A scientist isolates a single celled organism from the bottom of a sulfur hot spring. When examined under the microscope, it is clear that the cell is very small and contains no nucleus. Based on this evidence alone, in what domain of life is this organism?
- A. Eukarya
- B. Bacteria
- C. Archaea
- **D.** Either bacteria or archaea
- E. It is impossible to determine anything based on this evidence alone

Blooms Level: 3. Apply LO: 01.02.02 Outline how organisms are classified (taxonomy). Section: 01.02 Unity and Diversity of Life Topic: Unity and Diversity of Life

Check All That Apply Questions

species of plant that is found in diverse environments. These sequences lead to structural change in the size of the flowers due to environmental differences. The areas of science incorporated in this article include (check all that apply) X GeneticsX Population geneticsX Botany
incorporated in this article include (check all that apply) _X Genetics _X Population genetics
X Genetics X Population genetics
X Population genetics
X Botany
_1120)
X Ecology
Microbiology

Microbiology would only be needed if looking at microbial life.

Blooms Level: 3. Apply Gradable: automatic

 $LO:\ 01.03.01\ Explain\ how\ researchers\ study\ biology\ at\ different\ levels,\ ranging\ from\ molecules\ to\ ecosystems.$

Section: 01.03 Biology as a Scientific Discipline

Topic: Biology as a Scientific Discipline

54. When performing hypothesis testing, the steps that most accurately describe the process
you must go through include (check all that apply)
Creation of a natural phenomena
X Analyze data to accept or reject hypothesis
X Observation of a natural phenomena
Predictions of theory develop from observations
X Creation of hypothesis to explain phenomena
X Design experiment to determine if predictions are correct

A theory is usually created from vast amounts of data and to create a natural phenomena would mean that it could no longer be observed as a natural phenomena. Therefore these are not steps in perform hypothesis testing.

Blooms Level: 3. Apply Gradable: automatic

LO: 01.03.03 Describe the steps of the scientific method, also called hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline Topic: Biology as a Scientific Discipline

Type: General

Ranking Questions

- 55. The order that best fits the way in which you would conduct the five stages of scientific method would be
- 4 Analyze data
- 5 Confirm or reject hypothesis
- 3 Design experiment with predictions
- 1 Survey a natural phenomena
- 2 Create hypothesis

Blooms Level: 4. Analyze Gradable: automatic

LO: 01.03.03 Describe the steps of the scientific method, also called hypothesis testing.

Section: 01.03 Biology as a Scientific Discipline

Topic: Biology as a Scientific Discipline