

1. During DNA replication, which of the following segments would be complementary to the original DNA segment of CCTAAT?
- A CGATTA
 - B GGUTTU
 - C GGATTA
 - D GGAUUA
2. Which of the strands below is the complement to the segment GCATCCGA of a DNA molecule?
- A CCTAGGCT
 - B GCATCCGA
 - C CGUAGGCU
 - D CGTAGGCT
3. What type of RNA is responsible for bringing amino acids to the ribosome for protein synthesis?
- A messenger RNA
 - B transfer RNA
 - C ribosomal RNA
 - D mitochondrial RNA

4. The chart below matches messenger RNA codons with amino acids.

Messenger RNA Codons

glycine	leucine	alanine	serine
GGU, GGC, GGA, GGG	UUA, UUG, CUU, CUC, CUA, CUG	GCU, GCC, GCA, GCG	UCU, UCC, UCA, UCG, AGC, AGU

A DNA strand has the codon TCA. According to the chart, the corresponding messenger RNA codes for which of the following amino acids?

- A glycine
- B leucine
- C alanine
- D serine

5. The messenger RNA will carry the DNA's instructions out of the nucleus to which of the following?
- A vacuole
 - B mitochondria
 - C chloroplast
 - D ribosome
6. To determine the molecular sequence of a gene for a protein, which molecule should be analyzed?
- A tRNA
 - B ATP
 - C DNA
 - D rRNA
7. If a portion of a DNA strand has the base sequence TACGCA, what will be the base sequence of the mRNA strand transcribed?
- A TACGCA
 - B UACGCA
 - C AUGCGU
 - D ATGCGT
8. Transcription of the DNA sequence below:
- AAGCTGGGA
- would **most directly** result in which of the following?
- A a sequence of three amino acids, linked by peptide bonds
 - B a DNA strand with the base sequence TTCGACCCT
 - C a mRNA strand with the sequence TTCGACCCT
 - D a mRNA strand with the sequence UUCGACCCU
9. What is the purpose of transfer RNA?
- A It unzips the double helix so transcription can begin.
 - B It retrieves amino acids from the cytoplasm for protein construction.
 - C It carries genetic information to the ribosomes.
 - D It produces a complementary copy of a strand of DNA.

10. Which statement is true regarding asexual reproduction as a method of producing offspring?
- A common among mammals
 - B not a method used by plants
 - C produces offspring that are genetically identical
 - D limited to unicellular organisms
11. Which process is responsible for the diversity of plants within a species?
- A cross-pollination
 - B transpiration
 - C self-fertilization
 - D photosynthesis
12. Which of the following demonstrates the **most significant** difference between asexual and sexual reproduction?
- A The chromosome number is reduced during asexual reproduction.
 - B The number of chromosomes is reduced during sexual reproduction.
 - C The appearance of the organism is changed as a result of asexual reproduction.
 - D There is genetic variation as a result of sexual reproduction.
13. What is true about any two normal gametes from a human male parent?
- A Each has a diploid number of chromosomes.
 - B They can combine to form a new organism.
 - C Their chromosomes are exactly the same.
 - D They have the same number of chromosomes.
14. A cell has undergone a meiotic division cycle. In order for the cell to achieve a diploid state, what must occur?
- A cleavage
 - B fertilization
 - C meiosis
 - D mitosis

Use the following information to answer questions 15 and 16.

As scientists have developed more productive crop varieties, farmers have switched from growing many traditional varieties to new high-yield varieties. For example, in India, the 10,000 varieties of rice once grown have been reduced to 10 major ones for most of the rice crop.

15. Besides the varieties of rice being reduced, what else is reduced by this practice?
- A types of soil nutrients
 - B the gene pool for rice
 - C food chains that include rice
 - D human dietary choices
16. Why is this practice of reducing the varieties of a crop dangerous?
- A It makes the overall crop more susceptible to pests or disease.
 - B It reduces the variety of crops available for human diets.
 - C It requires a larger investment than small farmers can make.
 - D It could reduce or cause the extinction of some predatory insects.
17. A human skin cell contains 46 chromosomes. How many chromosomes are present in a human sperm cell?
- A 23
 - B 46
 - C 92
 - D 138
18. Some traits are determined by more than two alleles. If aabbcc is crossed with AABBCC, what would be the genotype of the offspring?
- A AaBbCc
 - B AABBCC
 - C aabbcc
 - D aaAAbbBBccCC
19. In a genetics laboratory, two heterozygous tall plants are crossed. If tall is dominant over short, what are the expected phenotypic results?
- A 100% tall
 - B 75% tall, 25% short
 - C 50% tall, 50% short
 - D 25% tall, 75% short

20. Mr. Jones has blood type A and Mrs. Jones has blood type AB. What is the probability that they will have a child with blood type A if both of Mr. Jones's parents were AB?
- A 0%
 - B 25%
 - C 50%
 - D 100%
21. Color blindness is a sex-linked recessive trait. A mother with normal color vision and a color blind father have a color blind daughter. Which of the following statements is correct?
- A All of their daughters will be color blind.
 - B The mother is a carrier of the color blindness gene.
 - C All of their sons will have normal color vision.
 - D All of their sons will be color blind.
22. In sickle cell anemia, the heterozygous condition results in resistance to malaria. If two heterozygous parents have a child, what are the chances of that child being resistant to malaria but not having sickle cell anemia?
- A 25%
 - B 50%
 - C 75%
 - D 100%
23. In guinea pigs, the allele for rough coat (R) is dominant to the allele for smooth coat (r). A rough coat male and a smooth coat female mate. They produce several litters, of which 50% are rough coat and 50% are smooth coat. What were the genotypes of the parents?
- A $RR \times rr$
 - B $Rr \times rr$
 - C $RR \times Rr$
 - D $Rr \times Rr$
24. Which genotype is used in a test cross?
- A homozygous dominant
 - B heterozygous dominant
 - C homozygous recessive
 - D heterozygous recessive

25. How would genetically altering crops for pest resistance be economically beneficial?
- A Erosion of topsoil would no longer be a concern.
 - B Crops would be more easily protected from weeds.
 - C Crop-eating pests would not ruin crops.
 - D Abnormal plant growth would be eliminated.
26. Great caution must be exercised with recombinant DNA technology. What is the **main** reason for this concern?
- A possible patent violations from competing companies
 - B possibility of the fragile recombinant organisms dying
 - C possible release of genetically engineered organisms into the environment with unpredictable results
 - D possibility of producing medicine at a lower cost than with current technology
27. Which of the following DNA technologies offers the **best** chance of survival for endangered species?
- A sequencing
 - B cloning
 - C electrophoresis
 - D antibody production
28. After performing amniocentesis, which analysis is **most often** used to determine the chromosomal condition of a developing fetus?
- A blood type
 - B DNA sequence
 - C genetic marker
 - D karyotype
29. When viewing a karyotype to detect genetic disorders, which of the following would be a concern?
- A different chromosomes of different lengths
 - B two X chromosomes
 - C twenty-three pairs of chromosomes
 - D three chromosomes in any one set

30. Albinism is a genetic mutation that results in some animals being born without the enzyme that produces the pigment for skin and eye color. Which of the following **best** explains this mutation?
- A The DNA failed to replicate.
 - B The deoxyribose sugar became separated from the DNA.
 - C The genetic code change caused the wrong protein to form.
 - D The RNA necessary to produce proteins was not present.
31. A student has cystic fibrosis, a genetic condition caused by the presence of a homozygous recessive gene. What could be her parent's genotypes for the cystic fibrosis trait?
- A Her father is homozygous dominant; her mother is homozygous recessive.
 - B Her father is heterozygous; her mother is homozygous dominant.
 - C Her father is homozygous dominant; her mother is homozygous dominant.
 - D Her father is heterozygous; her mother is homozygous recessive.
32. The genetic information in the DNA of humans, chimpanzees, and gorillas is more than 98% the same. What is the **most likely** explanation for this similarity?
- A They evolved from a common ancestor.
 - B They evolved from each other.
 - C Their evolution is nearly complete.
 - D They evolved at the same time.
33. Islands are the habitats of many of the world's rare species. Which of the following factors contributes **most** to this situation?
- A small land area
 - B genetic isolation
 - C limited food variety
 - D fewer predators
34. Biochemical analysis uses similarities in which of the following as evidence for evolutionary relationships?
- A amino acid sequence
 - B bone structure
 - C cellular architecture
 - D movement

35. The Galapagos finches are a group of closely related species of birds. Over time, specialized beaks have evolved for each species in response to mutations and competition for food and living space. This is an example of which of the following?
- A adaptive radiation
 - B coevolution
 - C convergent evolution
 - D vestigial structures
36. A population of bacteria is treated with an antibiotic. How will variation in the population of bacteria increase the likelihood of survival?
- A It allows all of the bacteria to be resistant to the antibiotic.
 - B It enables the population to increase rapidly.
 - C Some of the bacteria may be resistant to the antibiotic.
 - D The population will be better able to obtain a food source.

37. Which of the following is an example of natural selection in bacteria?
- A genetic engineering
 - B binary fission
 - C antibiotic resistance
 - D nitrogen fixation

End of Goal 2 Sample Items

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Answers to EOC Biology Sample Items

Goal 2

1. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Applying **Correct Answer:** C

2. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Knowledge **Correct Answer:** D

3. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Knowledge **Correct Answer:** B

4. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Organizing **Correct Answer:** D

5. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Analyzing **Correct Answer:** D

6. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Applying **Correct Answer:** C

7. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Knowledge **Correct Answer:** C

8. Objective 2.01

Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).

Thinking Skill: Generating **Correct Answer:** D

Answers to EOC Biology Sample Items

Goal 2

- 9. Objective 2.01**
Analyze the molecular basis of heredity/DNA including: Replication; Protein synthesis (transcription, translation).
Thinking Skill: Knowledge **Correct Answer:** B
- 10. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Knowledge **Correct Answer:** C
- 11. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Analyzing **Correct Answer:** A
- 12. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Integrating **Correct Answer:** D
- 13. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Generating **Correct Answer:** D
- 14. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Applying **Correct Answer:** B
- 15. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Integrating **Correct Answer:** B
- 16. Objective 2.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Evaluating **Correct Answer:** A
- 17. Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Knowledge **Correct Answer:** A

Answers to EOC Biology Sample Items

Goal 2

18. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Analyzing **Correct Answer:** A
19. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Applying **Correct Answer:** B
20. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Integrating **Correct Answer:** C
21. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Generating **Correct Answer:** B
22. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Applying **Correct Answer:** B
23. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Applying **Correct Answer:** B
24. **Objective 2.03**
Interpret and use the laws of probability to predict patterns of inheritance.
Thinking Skill: Knowledge **Correct Answer:** C
25. **Objective 2.04**
Assess the application of DNA technology to forensics, medicine, and
Thinking Skill: Generating **Correct Answer:** C
26. **Objective 2.04**
Assess the application of DNA technology to forensics, medicine, and
Thinking Skill: Integrating **Correct Answer:** C

Answers to EOC Biology Sample Items

Goal 2

27. Objective 2.04

Assess the application of DNA technology to forensics, medicine, and

Thinking Skill: Applying **Correct Answer:** B

28. Objective 2.04

Assess the application of DNA technology to forensics, medicine, and

Thinking Skill: Applying **Correct Answer:** D

29. Objective 2.05

Analyze and explain the role of genetics and environment in health and

Thinking Skill: Knowledge **Correct Answer:** D

30. Objective 2.05

Analyze and explain the role of genetics and environment in health and

Thinking Skill: Analyzing **Correct Answer:** C

31. Objective 2.05

Analyze and explain the role of genetics and environment in health and

Thinking Skill: Analyzing **Correct Answer:** D

32. Objective 2.06

Examine the development of the Theory of Biological Evolution including:
The origins of life; Patterns; Variation; Natural selection.

Thinking Skill: Analyzing **Correct Answer:** A

33. Objective 2.06

Examine the development of the Theory of Biological Evolution including:
The origins of life; Patterns; Variation; Natural selection.

Thinking Skill: Evaluating **Correct Answer:** B

34. Objective 2.06

Examine the development of the Theory of Biological Evolution including:
The origins of life; Patterns; Variation; Natural selection.

Thinking Skill: Applying **Correct Answer:** A

35. Objective 2.06

Examine the development of the Theory of Biological Evolution including:
The origins of life; Patterns; Variation; Natural selection.

Thinking Skill: Organizing **Correct Answer:** A

Answers to EOC Biology Sample Items

Goal 2

36. Objective 2.06

Examine the development of the Theory of Biological Evolution including:
The origins of life; Patterns; Variation; Natural selection.

Thinking Skill: Analyzing

Correct Answer: C

37. Objective 2.06

Examine the development of the Theory of Biological Evolution including:
The origins of life; Patterns; Variation; Natural selection.

Thinking Skill: Analyzing

Correct Answer: C