

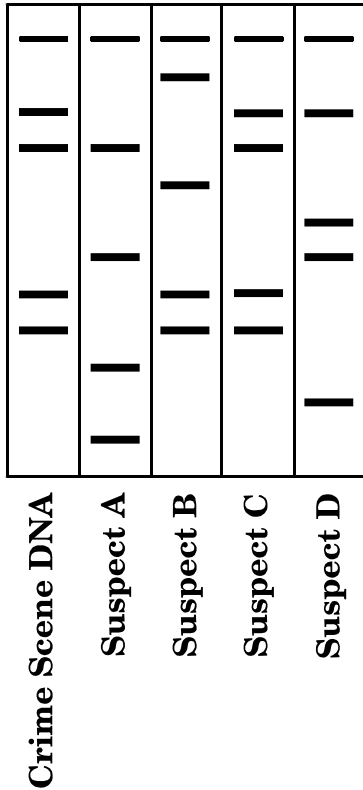
1. A segment of a DNA strand has the following bases:
- TAC GAT
- What is the complementary strand of DNA?
- A UAG CAU
B TAG CAT
C ATG CTA
D AUG CUA
2. Which relationship is **most similar** to the relationship below?
- tRNA : ribosome
- A book : publisher
B truck : factory
C key : lock
D baker : pie
3. Before a cell goes through either mitosis or meiosis, which process **must** be carried out by the DNA in the nucleus?
- A replication
B nondisjunction
C transcription
D translation
4. Sexual reproduction provides for what to occur?
- A cloning
B budding
C genetic stability
D genetic variation
5. Which would **most likely** favor species survival in changing environmental conditions?
- A genetic recombination
B energy involvement in gamete production
C length of life cycle
D number of offspring produced
6. Which term **best** describes the type of cell division in which parent cells produce daughter cells with the same number of chromosomes as the parent cells?
- A mitosis
B meiosis
C spermatogenesis
D oogenesis

7. What is the **primary** cause of variation in the offspring of sexually reproducing organisms?
- A cytoplasmic division
 - B environmental changes
 - C mutation
 - D recombination of alleles
8. Which is responsible for most genotypic and phenotypic variation among humans?
- A meiosis
 - B budding
 - C mitosis
 - D regeneration
9. In genetics research, what is the purpose of a test cross?
- A to determine the phenotypes of the parents
 - B to determine the genotypes of the parents
 - C to determine whether or not two parents could produce viable offspring
 - D to determine how many offspring can be produced by two parents
10. Several matings between the same male black guinea pig and female brown guinea pig produce a total of 12 brown and 14 black guinea pigs. If black is dominant and brown is recessive, what are the genotypes of the parents?
- A $BB \times bb$
 - B $Bb \times bb$
 - C $BB \times Bb$
 - D $Bb \times Bb$
11. Most sex-linked, recessive traits—including hemophilia and color blindness—appear in males. This phenomenon is **best** explained by which statement?
- A Males have an X chromosome with dominant genes.
 - B Most of the genes on the X and Y chromosomes of males are recessive.
 - C In males, the recessive sex-linked genes appear only on the Y chromosome.
 - D In males, the Y chromosome lacks the genes needed to mask the recessive genes on the X chromosome.

12. Huntington's disease is a dominant trait. What are the chances that a child will develop Huntington's disease if one parent is heterozygous and the other is normal?
- A 0 out of 4
 - B 1 out of 4
 - C 2 out of 4
 - D 3 out of 4
13. Some flowers show incomplete dominance. If RR = white and $R'R'$ = red, which phenotypic ratio would be expected in the offspring of two pink flowers?
- A 1 red : 2 pink : 1 white
 - B 0 red : 4 pink : 0 white
 - C 3 red : 0 pink : 1 white
 - D 4 red : 0 pink : 0 white
14. A couple has five children, all with blood type A. The mother's blood type is O, and the father's blood type is A. Based on this information, which describes the **most probable** genotype of the father?
- A diploid
 - B haploid
 - C heterozygous
 - D homozygous
15. A karyotype of a human female shows that she has only one sex chromosome. Which genotype would represent her genetic condition?
- A XO
 - B XXX
 - C XY
 - D XYY

16. The diagram below represents DNA fingerprints which are the result of gel electrophoresis done on several DNA samples found at a crime scene.

Gel Electrophoresis Results



Which suspect is linked to the crime scene by this DNA analysis?

- A Suspect A
- B Suspect B
- C Suspect C
- D Suspect D

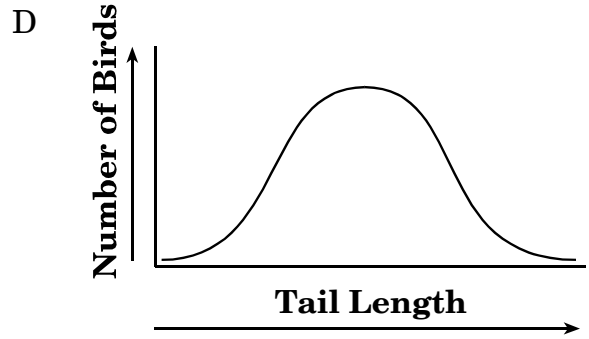
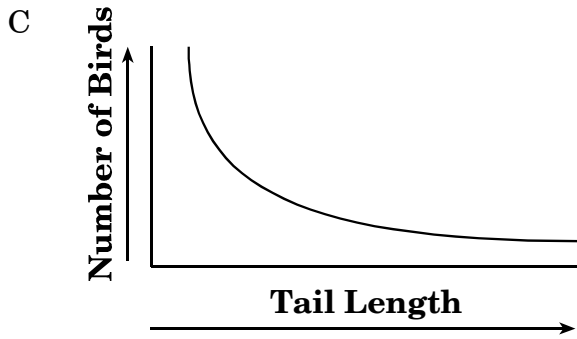
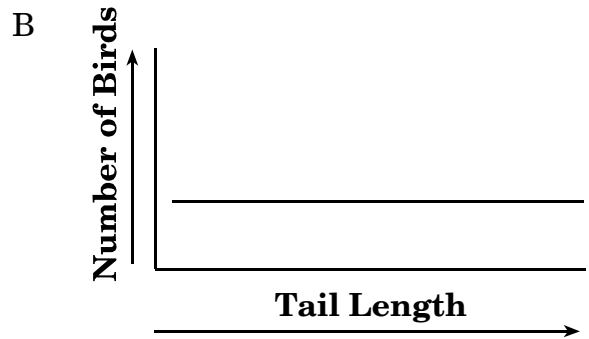
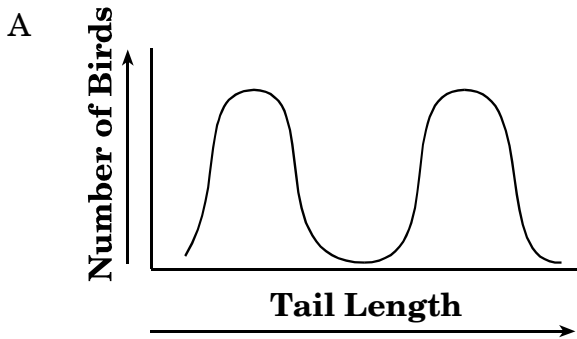
17. A plant nursery only grew one type of tomato plant. All of their tomato plants died from the same disease. What was **most likely** true of the tomato plant population?

- A They had a lot of resistance to disease.
- B They had a few plants that were resistant to the disease.
- C They had too much variation in their genes.
- D They had little variation in their genes.

18. Most individuals of a certain species of bird have medium-length tails, but tail length ranges within the species from very short to very long.



If a new predator arrived that preferred birds with medium-length tails, which graph describes the *most likely* result?



19. A paleontologist is comparing the fossilized remains of two primates. Both animals had a prehensile tail. What can be concluded from this evidence?
- A They were not related.
 - B They lived on the ground.
 - C They evolved from a common ancestor.
 - D They had bipedal locomotion.
20. Variation within species was important to the development of Darwin's theory of evolution. Which statement does individual variation help explain?
- A Resources become limited over long periods of time.
 - B Populations often increase rapidly and without warning.
 - C Competition is fierce among members of different species.
 - D Some organisms survive and reproduce better than others.
21. Variety within a species is **most likely** to result from which situation?
- A severe weather conditions that might occur, such as hurricanes or blizzards
 - B adaptation to local environmental characteristics by isolated populations of the species
 - C the extinction of competing species over a broad range of habitats
 - D sex-specific coloring differences
22. Which could be considered biochemical evidence of an evolutionary relationship?
- A absence of vestigial structures
 - B presence of embryonic gill slits
 - C similar anatomical structures
 - D presence of identical proteins

23. Which is the *best* evidence of an evolutionary relationship between two organisms?
- A similarity in behavior
 - B similarity in DNA
 - C similarity in habitat
 - D similarity in niche

End of Goal 3 Sample Items

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Biology Goal 3 Sample Items Key Report

- 1** **Objective:** **3.01**
Analyze the molecular basis of heredity including:
a. DNA replication.
b. Protein synthesis (transcription, translation).
c. Protein Synthesis.
Thinking Skill: Applying **Correct Answer:** C
- 2** **Objective:** **3.01**
Analyze the molecular basis of heredity including:
a. DNA replication.
b. Protein synthesis (transcription, translation).
c. Protein Synthesis.
Thinking Skill: Analyzing **Correct Answer:** B
- 3** **Objective:** **3.01**
Analyze the molecular basis of heredity including:
a. DNA replication.
b. Protein synthesis (transcription, translation).
c. Protein Synthesis.
Thinking Skill: Knowledge **Correct Answer:** A
- 4** **Objective:** **3.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Knowledge **Correct Answer:** D
- 5** **Objective:** **3.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Evaluating **Correct Answer:** A
- 6** **Objective:** **3.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Knowledge **Correct Answer:** A
- 7** **Objective:** **3.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Knowledge **Correct Answer:** D
- 8** **Objective:** **3.02**
Compare and contrast the characteristics of asexual and sexual reproduction.
Thinking Skill: Knowledge **Correct Answer:** A
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Biology Goal 3
Sample Items Key Report

- 9** **Objective: 3.03**
Interpret and predict patterns of inheritance.
a. dominant, recessive and intermediate traits.
b. Multiple alleles.
c. Polygenic inheritance.
d. Sex-linked traits.
e. Independent assortment.
f. Test cross.
g. Pedigrees.
h. Punnett squares.
Thinking Skill: Applying **Correct Answer:** B
- 10** **Objective: 3.03**
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c. Polygenic inheritance.
d. Sex-linked traits.
e. Independent assortment.
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g. Pedigrees.
h. Punnett squares.
Thinking Skill: Generating **Correct Answer:** B
- 11** **Objective: 3.03**
Interpret and predict patterns of inheritance.
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b. Multiple alleles.
c. Polygenic inheritance.
d. Sex-linked traits.
e. Independent assortment.
f. Test cross.
g. Pedigrees.
h. Punnett squares.
Thinking Skill: Evaluating **Correct Answer:** D
- 12** **Objective: 3.03**
Interpret and predict patterns of inheritance.
a. dominant, recessive and intermediate traits.
b. Multiple alleles.
c. Polygenic inheritance.
d. Sex-linked traits.
e. Independent assortment.
-

**Biology Goal 3
Sample Items Key Report**

f. Test cross.

g. Pedigrees.

h. Punnett squares.

Thinking Skill: Applying

Correct Answer: C

13 Objective: 3.03

Interpret and predict patterns of inheritance.

a. dominant, recessive and intermediate traits.

b. Multiple alleles.

c. Polygenic inheritance.

d. Sex-linked traits.

e. Independent assortment.

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Thinking Skill: Generating

Correct Answer: A

14 Objective: 3.03

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f. Test cross.

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h. Punnett squares.

Thinking Skill: Analyzing

Correct Answer: D

15 Objective: 3.03

Interpret and predict patterns of inheritance.

a. dominant, recessive and intermediate traits.

b. Multiple alleles.

c. Polygenic inheritance.

d. Sex-linked traits.

e. Independent assortment.

f. Test cross.

g. Pedigrees.

h. Punnett squares.

Thinking Skill: Applying

Correct Answer: A

Biology Goal 3 Sample Items Key Report

- 16 Objective: 3.04**
Assess the impact of advances in genomics on individuals and society.
a. Human genome project.
b. Applications of biotechnology.
Thinking Skill: Analyzing **Correct Answer:** C
- 17 Objective: 3.05**
Examine the development of the theory of evolution by natural selection including:
a. Development of the theory.
b. The origin and history of life and Fossil and biochemical evidence.
c. Mechanisms of evolution.
d. Applications (pesticide and antibiotic resistance).
Thinking Skill: Generating **Correct Answer:** D
- 18 Objective: 3.05**
Examine the development of the theory of evolution by natural selection including:
a. Development of the theory.
b. The origin and history of life and Fossil and biochemical evidence.
c. Mechanisms of evolution.
d. Applications (pesticide and antibiotic resistance).
Thinking Skill: Analyzing **Correct Answer:** A
- 19 Objective: 3.05**
Examine the development of the theory of evolution by natural selection including:
a. Development of the theory.
b. The origin and history of life and Fossil and biochemical evidence.
c. Mechanisms of evolution.
d. Applications (pesticide and antibiotic resistance).
Thinking Skill: Analyzing **Correct Answer:** C
- 20 Objective: 3.05**
Examine the development of the theory of evolution by natural selection including:
a. Development of the theory.
b. The origin and history of life and Fossil and biochemical evidence.
c. Mechanisms of evolution.
d. Applications (pesticide and antibiotic resistance).
Thinking Skill: Analyzing **Correct Answer:** D
- 21 Objective: 3.05**
Examine the development of the theory of evolution by natural selection including:
a. Development of the theory.
b. The origin and history of life and Fossil and biochemical evidence.
-

**Biology Goal 3
Sample Items Key Report**

- c. Mechanisms of evolution.
- d. Applications (pesticide and antibiotic resistance).

Thinking Skill: Analyzing

Correct Answer: B

22 Objective: 3.05

Examine the development of the theory of evolution by natural selection including:

- a. Development of the theory.
- b. The origin and history of life and Fossil and biochemical evidence.
- c. Mechanisms of evolution.
- d. Applications (pesticide and antibiotic resistance).

Thinking Skill: Analyzing

Correct Answer: D

23 Objective: 3.05

Examine the development of the theory of evolution by natural selection including:

- a. Development of the theory.
- b. The origin and history of life and Fossil and biochemical evidence.
- c. Mechanisms of evolution.
- d. Applications (pesticide and antibiotic resistance).

Thinking Skill: Knowledge

Correct Answer: B