Texas Biology

STAAR EOC

Review

MAMMOTH SCIENCE PUBLISHING

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Reporting Category 1: Biological Structures, Functions, and Processes

Reporting Category 2: Mechanisms of Genetics

Reporting Category 3: Biological Evolution

Reporting Category 4: Interdependence within Environmental Systems.

Instructor Resources

- **Distribute Study Guides**: Provide students with a study guide that outlines the topics and concepts that will be covered on the exam.

- **Review Key Concepts**: Review key concepts with your students, using class notes, textbooks, and other resources to reinforce understanding.

- **Practice Test Questions**: Provide students with practice test questions that mimic the format and style of the state exam. Encourage them to complete these questions under exam conditions.

- **Provide Feedback**: Provide feedback on students' practice test questions to help them identify areas of weakness and improve their understanding.

- **Encourage Collaboration**: Encourage students to work together to review concepts and practice test questions. Peer teaching can be a valuable learning tool.

- **Offer Support**: Be available to answer questions and provide additional support to students as needed. Offer review sessions or office hours leading up to the exam.

- **Monitor Progress**: Monitor students' progress throughout the review process. Use formative assessment tools to gauge their understanding and adjust your instruction accordingly.

- **Review Exam Format**: Review the format and structure of the state exam with your students so they know what to expect on test day.

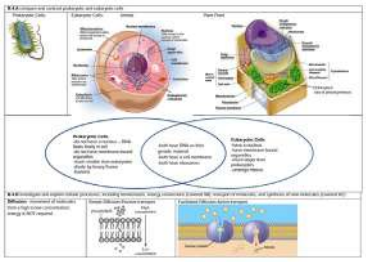
- **Provide Test-Taking Tips**: Offer tips and strategies for taking the state exam, such as managing time effectively and reading questions carefully.

- **Encourage Self-Care:** Remind students to take care of themselves during the exam period by getting enough rest, eating well, and managing stress.

Electronic Resources

- **LINK**: Google Slides: Review by TEKS and Reporting Categories

- **LINK**: List of Content Videos for Every Topic for Biology Tested Content



- **LINK**: Content Study Guide

- **LINK**: Kahoot – Both Semesters

- **LINK** : Gimkit

- **LINK**: T.E.A. Cambium Practice

RC1

Biological Structures, Functions, and Processes

B.5 A–D
B.6 A-C
B.11 A-B
B.12 A-B

The Chemistry of Life

5A - relate the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids, to the structure and function of a cell;

Previously Tested Examples: LINK

Macromolecules	Elements	Monomer	Example	Function
Carbohydrates				
Proteins				
Lipids				
Nucleic Acids				

1. Explain how carbohydrates contribute to the structure and function of a cell. Provide specific examples of carbohydrates and their roles within the cell.

2. Describe the importance of lipids in cell structure and function. How do lipids contribute to the cell membrane and what role do they play in cellular processes?

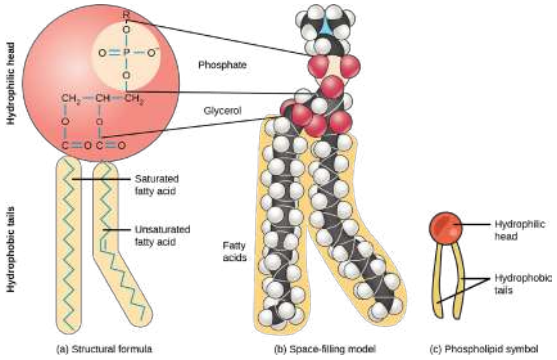
3. Discuss the functions of proteins in a cell, including their structural roles and involvement in cellular activities. Provide examples of proteins and their specific functions within the cell.

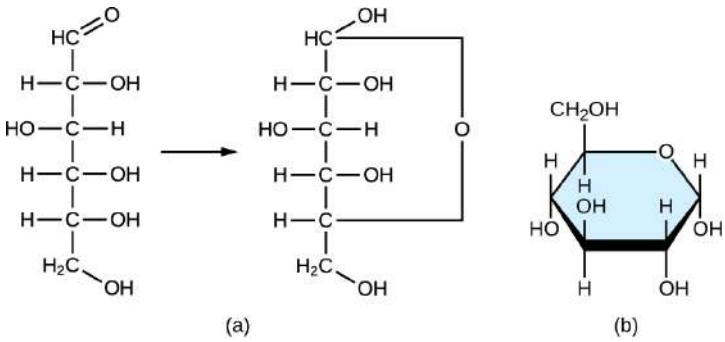
4. Explain the significance of nucleic acids in cellular processes. How do nucleic acids such as DNA and RNA contribute to cell structure and function, and what roles do they play in cellular activities like protein synthesis?

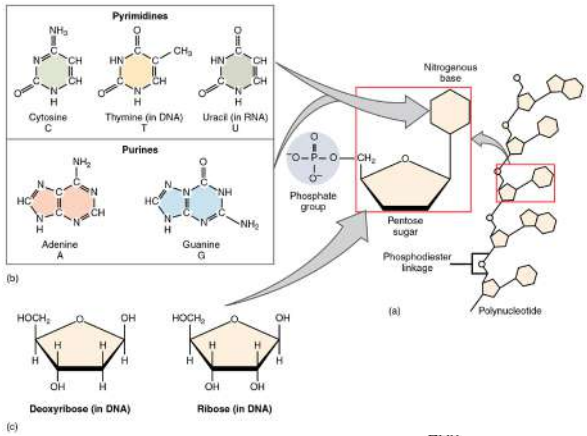
The Chemistry of Life

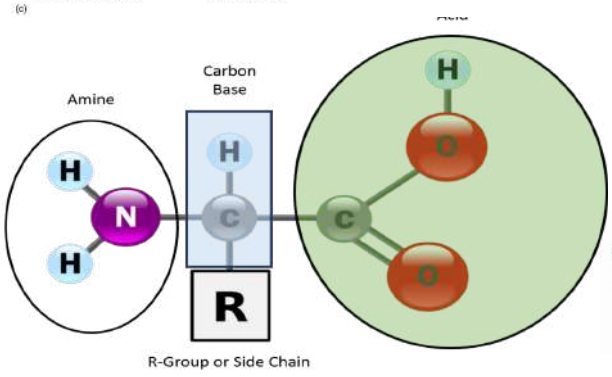
5A - relate the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids, to the structure and function of a cell;

5. Identify and describe the following molecules below as either - Carbohydrate, Lipid, Protein, and/or Nucleic Acid









The Chemistry of Life

11B - investigate and explain the role of enzymes in facilitating cellular processes.

Previously Tested Examples: LINK

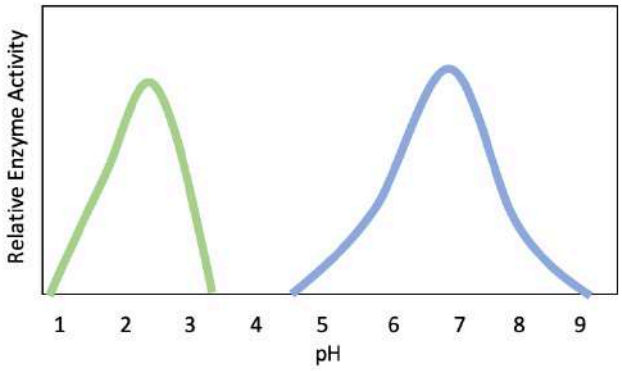
6. How do enzymes facilitate cellular processes, and what is their role in speeding up chemical reactions within cells?

7. Describe the importance of enzymes in cell structure and function. How do enzymes contribute to the regulation of cellular processes? Common suffix?

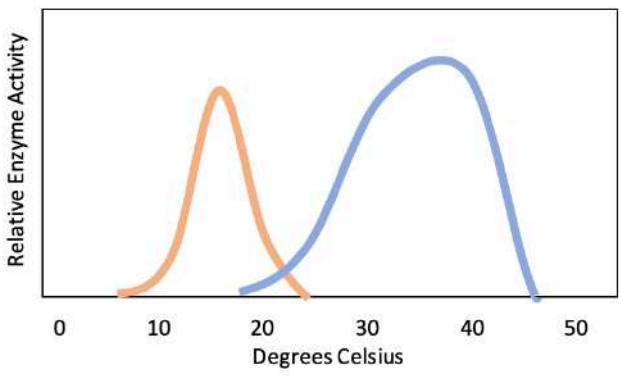
8. Explain the significance of enzyme-substrate specificity in cellular processes. How do enzymes recognize and bind to their specific substrates, and how does this contribute to cellular function?

Using the graphs right:

9. Identify and explain what is the optimal pH for an enzyme operating in the stomach.



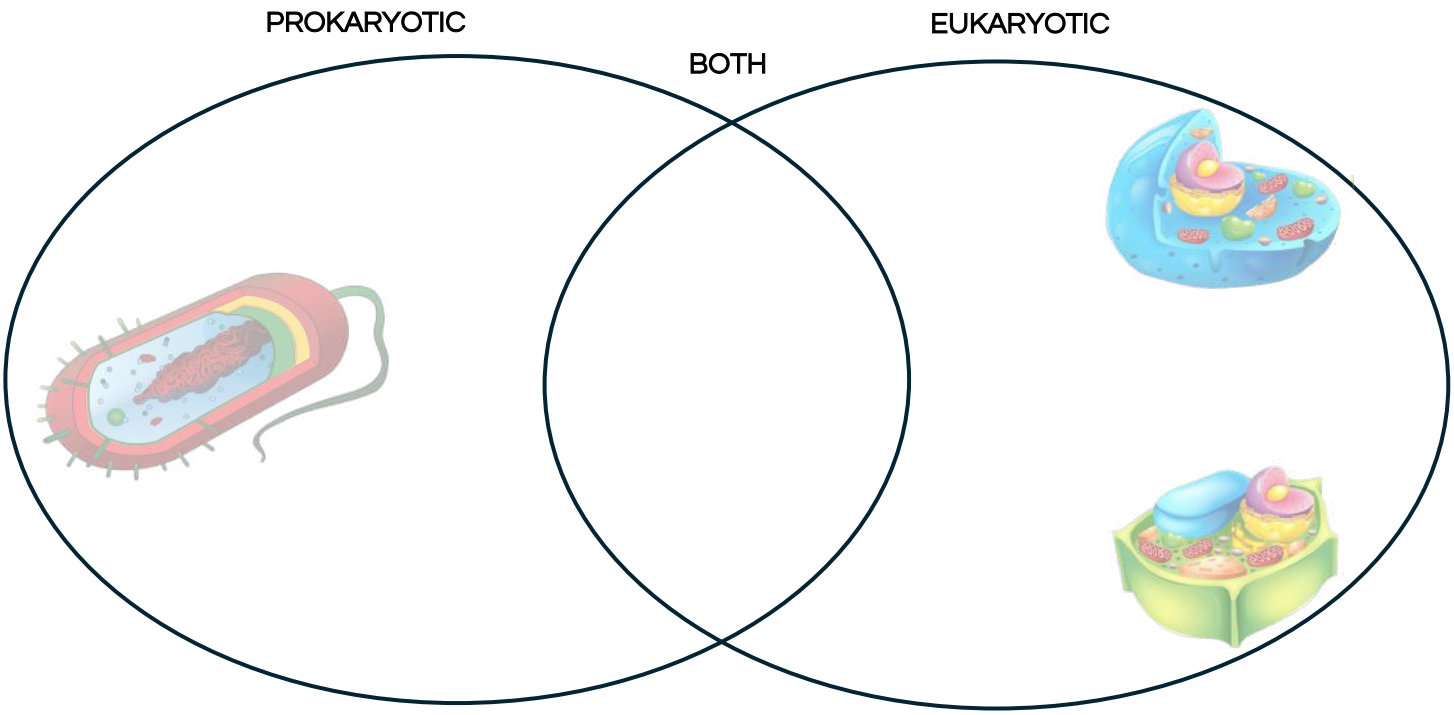
10. Identify and explain what is the optimal temperature for an enzyme operating in a Toucan in the Amazon Rainforest.



The Cell and Cell Theory

5B - compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity;

Previously Tested Examples: LINK

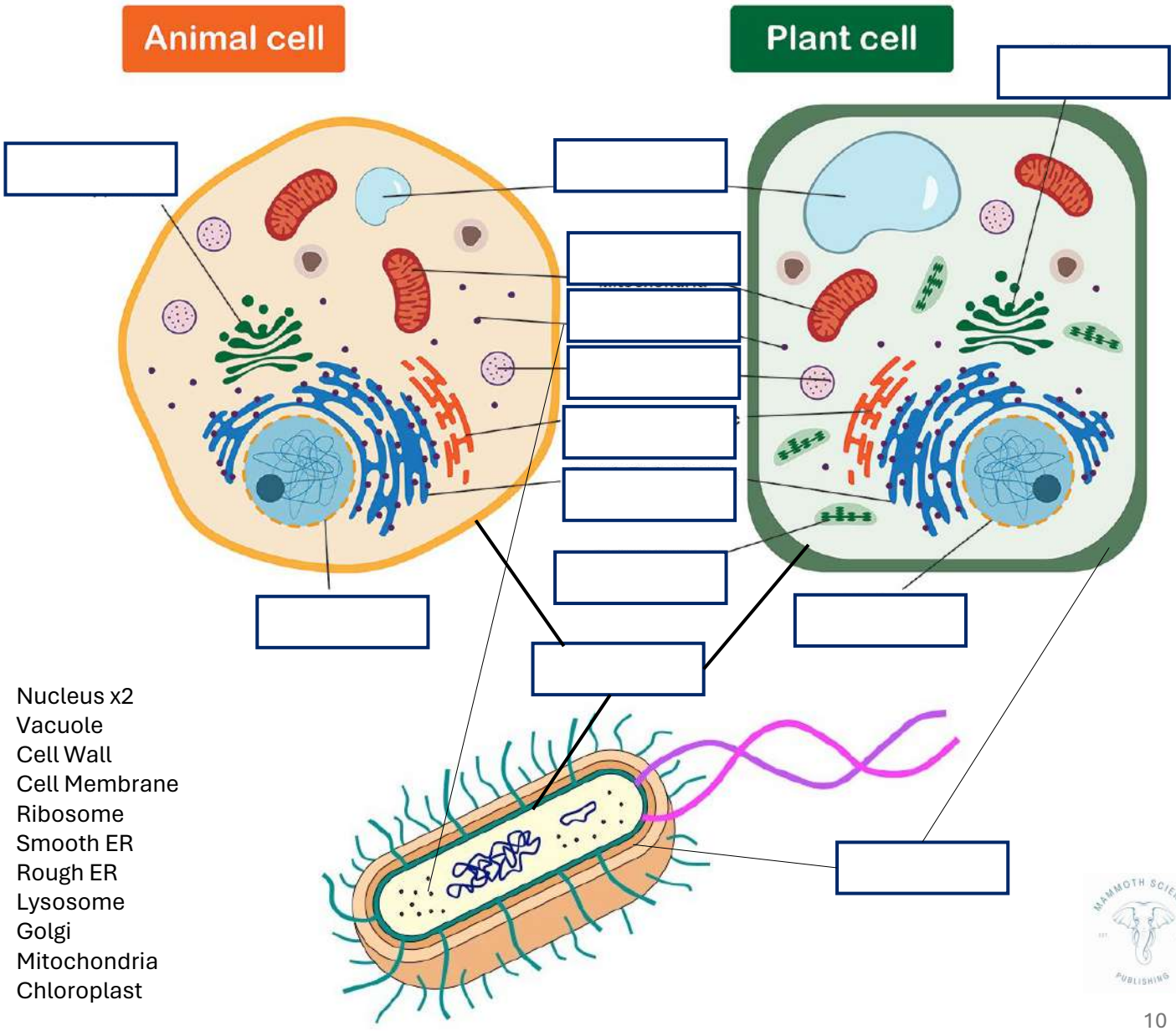


Cell Part and Letter	Structure Description	Function	PRO	EU
Nucleus				
Plasma Membrane				
Cell wall				
Mitochondria				
Vacuoles				
Chloroplasts				
Ribosomes				

11. Compare and contrast scientific explanations for the complexity of prokaryotic and eukaryotic cells. How do researchers explain the differences in complexity between these two cell types?

12. Discuss the similarities and differences in cellular complexity between prokaryotic and eukaryotic cells. How do these differences affect their functions and abilities?

Label the following:

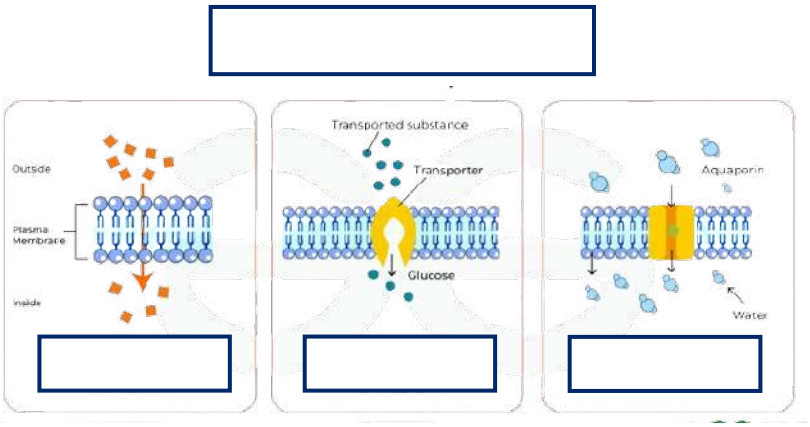


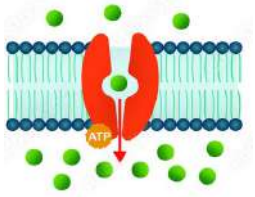
- Nucleus x2
- Vacuole
- Cell Wall
- Cell Membrane
- Ribosome
- Smooth ER
- Rough ER
- Lysosome
- Golgi
- Mitochondria
- Chloroplast

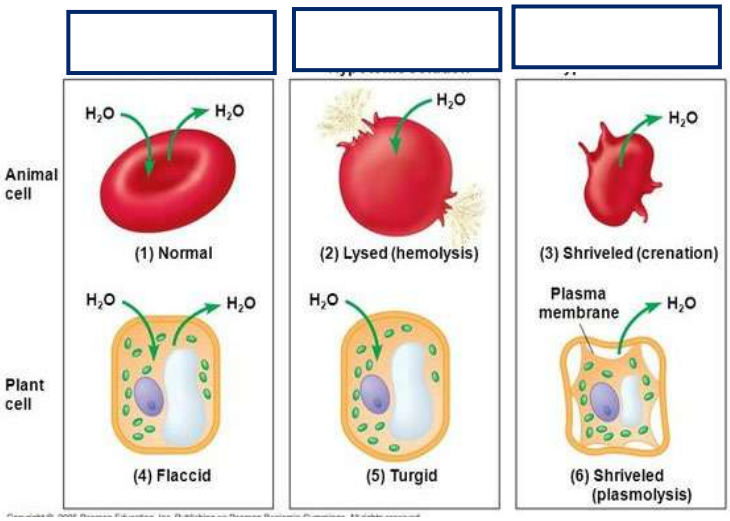
Cell Transport & Homeostasis

5C - investigate homeostasis through the cellular transport of molecules; and

Previously Tested Examples: LINK







13. Compare and Contrast types of solutions in terms of water movement/osmosis and concentrations of solute.

14. How does cellular permeability contribute to the maintenance of homeostasis? Provide examples of how cells respond to hypotonic, hypertonic, and isotonic solutions through different forms of passive transport.

15. Explain the concept of homeostasis through cellular transport. How do cells regulate the movement of molecules across their membranes in response to changes in solution concentration?

16. Compare and Contrast active and passive transport in maintaining cellular homeostasis in terms of energy use and concentration gradients.

Viruses

5D - compare the structures of viruses to cells and explain how viruses spread and cause disease.

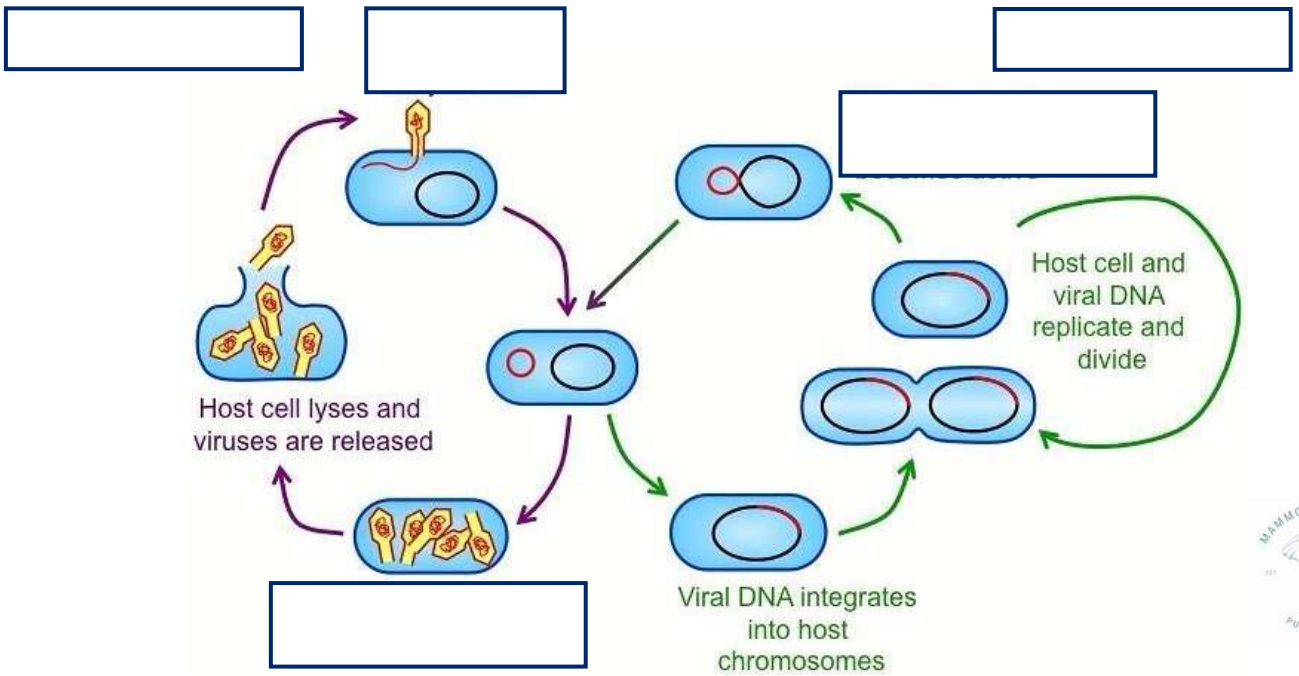
Previously Tested Examples: LINK

17. Compare the structures of viruses to cells. How do these structures differ, and what unique features of viruses contribute to their ability to spread and cause disease?

18. Explain how viruses spread and cause disease, considering their structure and mode of infection. What are the key steps in the viral lifecycle that lead to infection and disease?

19. Describe the mechanisms by which viruses cause disease in cells. How do viruses interact with host cells to replicate and spread, leading to the development of disease symptoms?

Identify and describe the following viral replication cycles:



The Cell Cycle & Cancer

- *6A - explain the importance of the cell cycle to the growth of organisms, including an overview of the stages of the cell cycle and deoxyribonucleic acid (DNA) replication models;*
- *6C - relate disruptions of the cell cycle to how they lead to the development of diseases such as cancer.*

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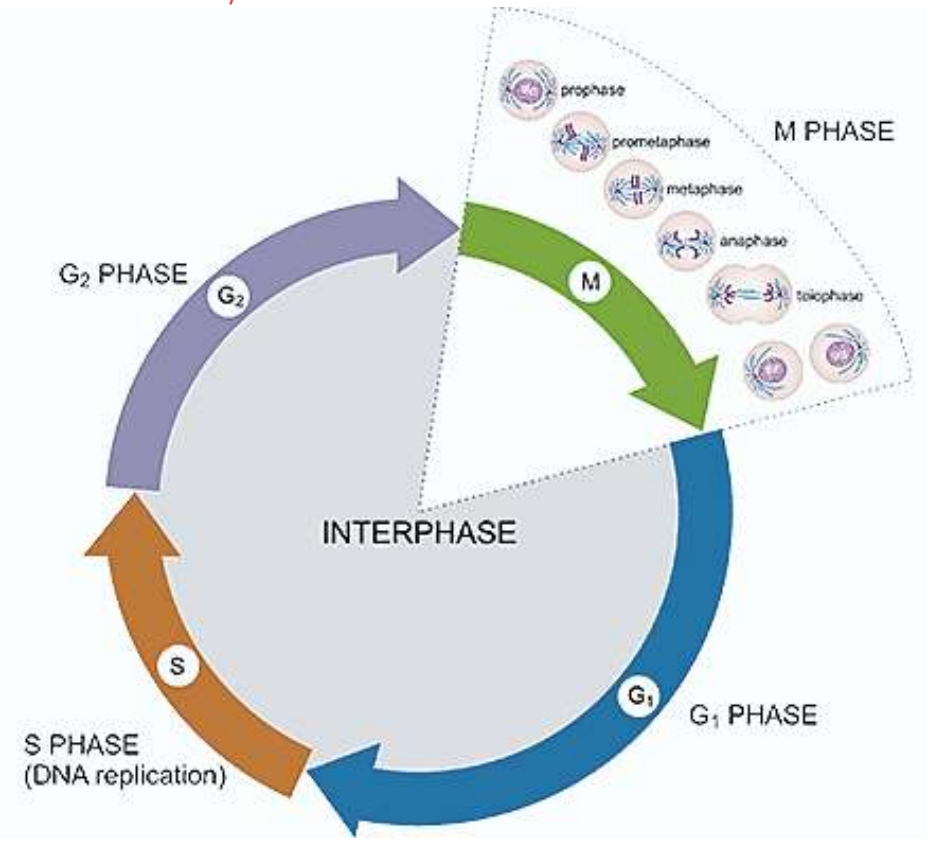
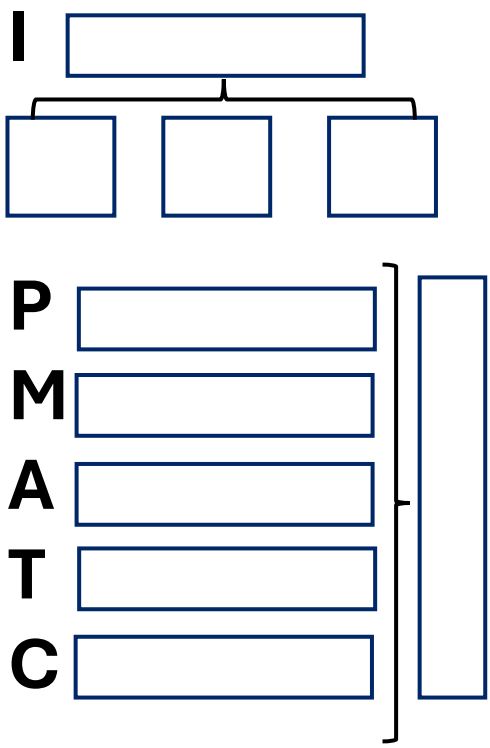
Previously Tested Examples: LINK / LINK





17. Describe the stages of the cell cycle and their significance in the growth and development of organisms. How does DNA replication contribute to the cell cycle, and why is it essential for the growth of organisms?

18. Relate disruptions of the cell cycle to the development of diseases such as cancer. How do abnormalities in the cell cycle regulation lead to uncontrolled cell growth and cancer formation?

19. Discuss the relationship between DNA replication errors and cancer development. How can mutations in genes involved in DNA replication contribute to the development of cancerous cells?

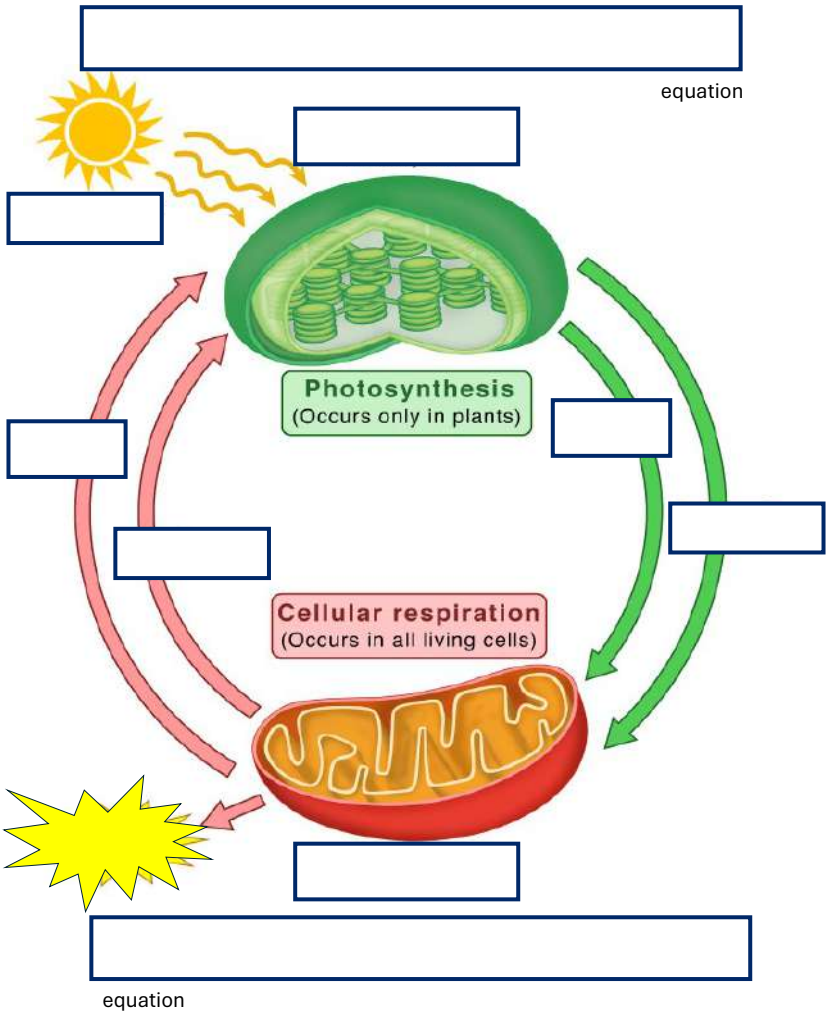
Photosynthesis & Cellular Respiration

11A - explain how matter is conserved and energy is transferred during photosynthesis and cellular respiration using models, including the chemical equations for these processes;.

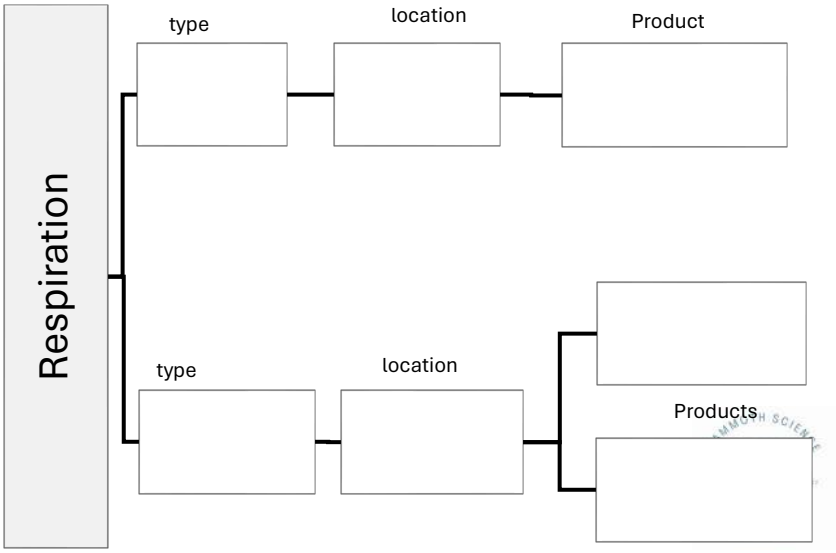
Previously Tested Examples: LINK

20. Explain how matter is conserved and energy is transferred during photosynthesis and cellular respiration using models. Include the chemical equations for these processes in your explanation.

21. Describe the relationship between photosynthesis and cellular respiration. How do these processes complement each other in terms of matter and energy cycling in ecosystems?



22. Compare and contrast the chemical equations for photosynthesis and cellular respiration. How do these equations demonstrate the conservation of matter and the transfer of energy between these two processes?



Interactions of Animal Systems

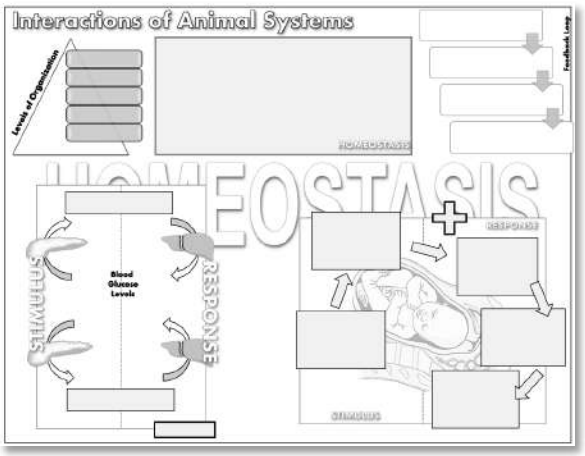
- *12A - analyze the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;*

Previously Tested Examples: LINK

23. How do body systems in animals collaborate to regulate internal processes such as temperature, pH, and hormone levels? Provide examples of interactions between these systems in maintaining homeostasis.

24. Discuss the interactions among the body systems involved in nutrient absorption, highlighting the role of each system in the digestion, absorption, and distribution of nutrients throughout the organism.

25. Discuss the interactions among the body systems involved in defense mechanisms, including the immune system, integumentary system, and respiratory system. How do these systems collaborate to protect the organism from external threats?

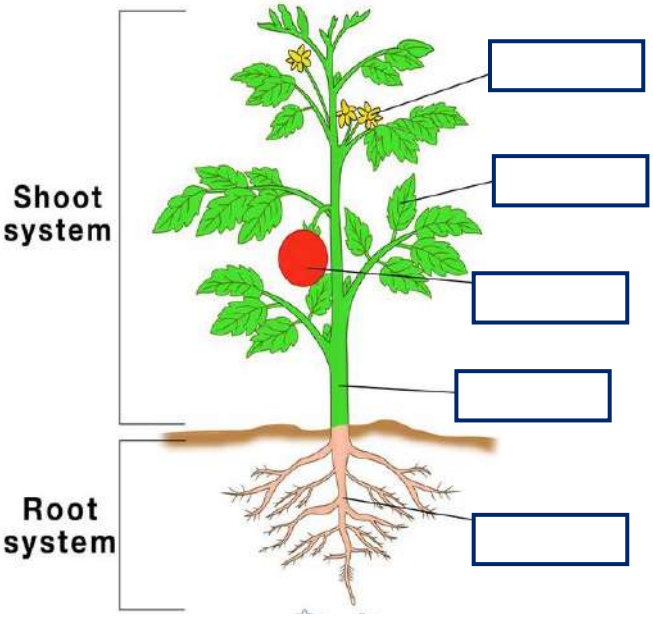


Click for Document PDF

Plant Systems

12B - explain how the interactions that occur among systems that perform functions of transport, reproduction, and response in plants are facilitated by their structures.

Previously Tested Examples: LINK

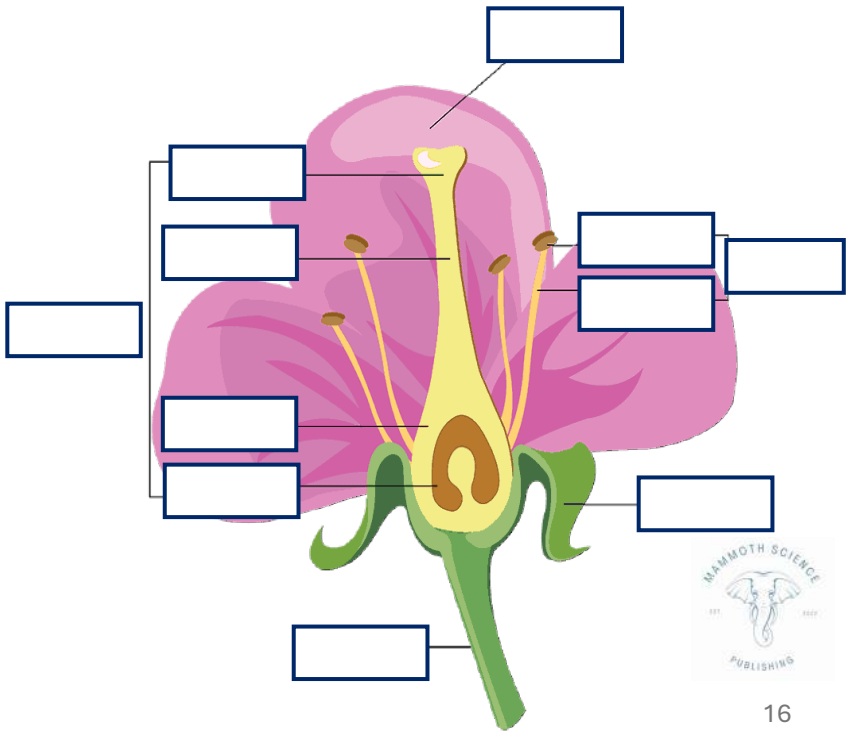


26. Explain how the structures of plants facilitate the interactions among systems that perform functions of transport and response. How do these structures support the efficient exchange of materials and signals within the plant?

27. Describe the role of plant structures in facilitating interactions among systems involved in transport (xylem/phloem), reproduction (flower parts), and response.

28. Discuss how the structures of plants enable the coordination of response systems. Provide examples of specific plant hormones and their functions in these processes.

29. Compare and Contrast Tropism types.



RC2

Mendelian Genetics

B.7 A–D
B.8 A-B

DNA

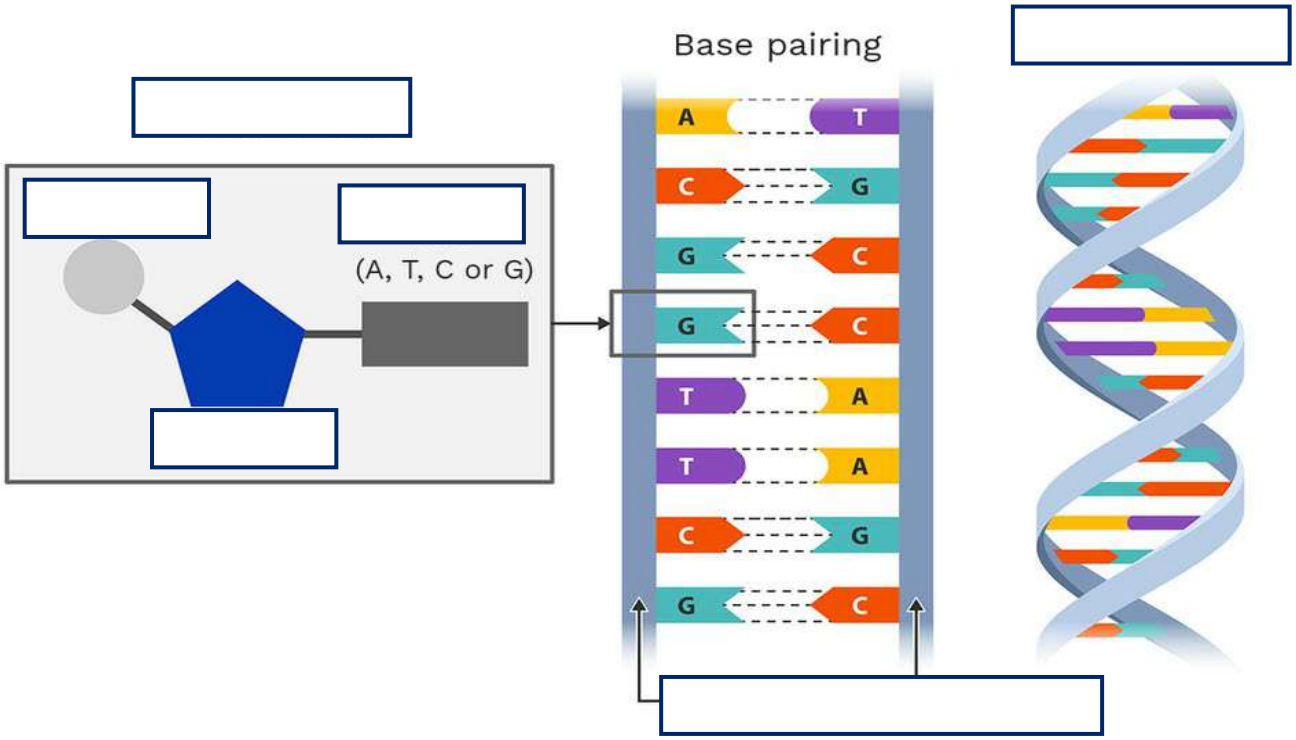
- *7A -identify components of DNA, explain how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA;*

Previously Tested Examples: LINK

30. Identify the components of DNA and explain how the nucleotide sequence specifies some traits of an organism. How do variations in the DNA sequence contribute to the diversity of traits among organisms?

31. Describe how the nucleotide sequence of DNA determines specific traits in an organism. Provide examples of how changes in the DNA sequence can lead to variations in traits.

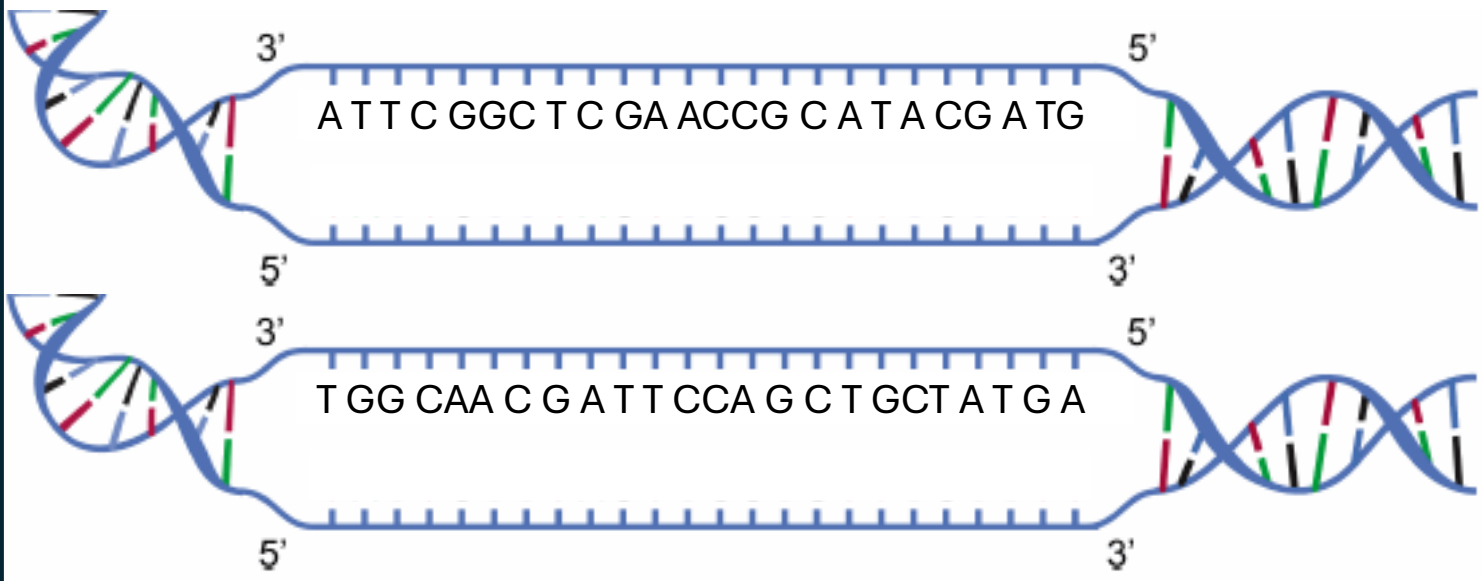
32. Examine scientific explanations for the origin of DNA. How do theories about the origin of DNA contribute to our understanding of the evolution of life on Earth?



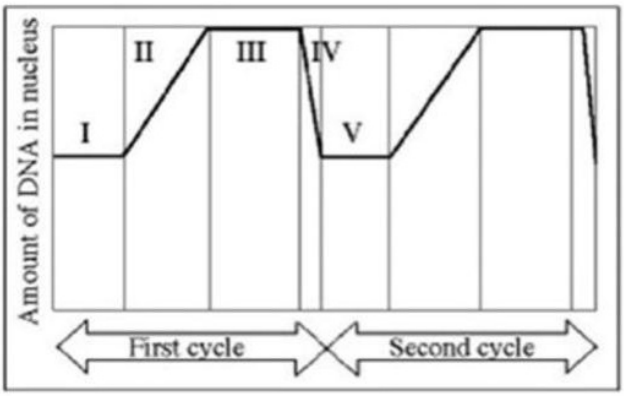
DNA - Continued

- *7A -identify components of DNA, explain how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA;*

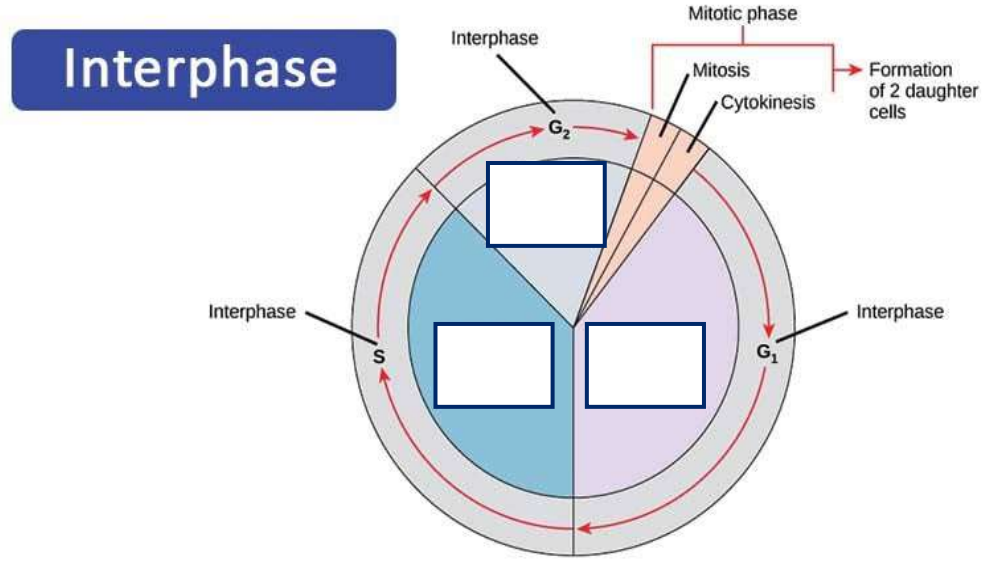
33. Find the complementary strands to the following template strands



34. Where on the graph right showing the completed cell cycle does S-Phase occur?



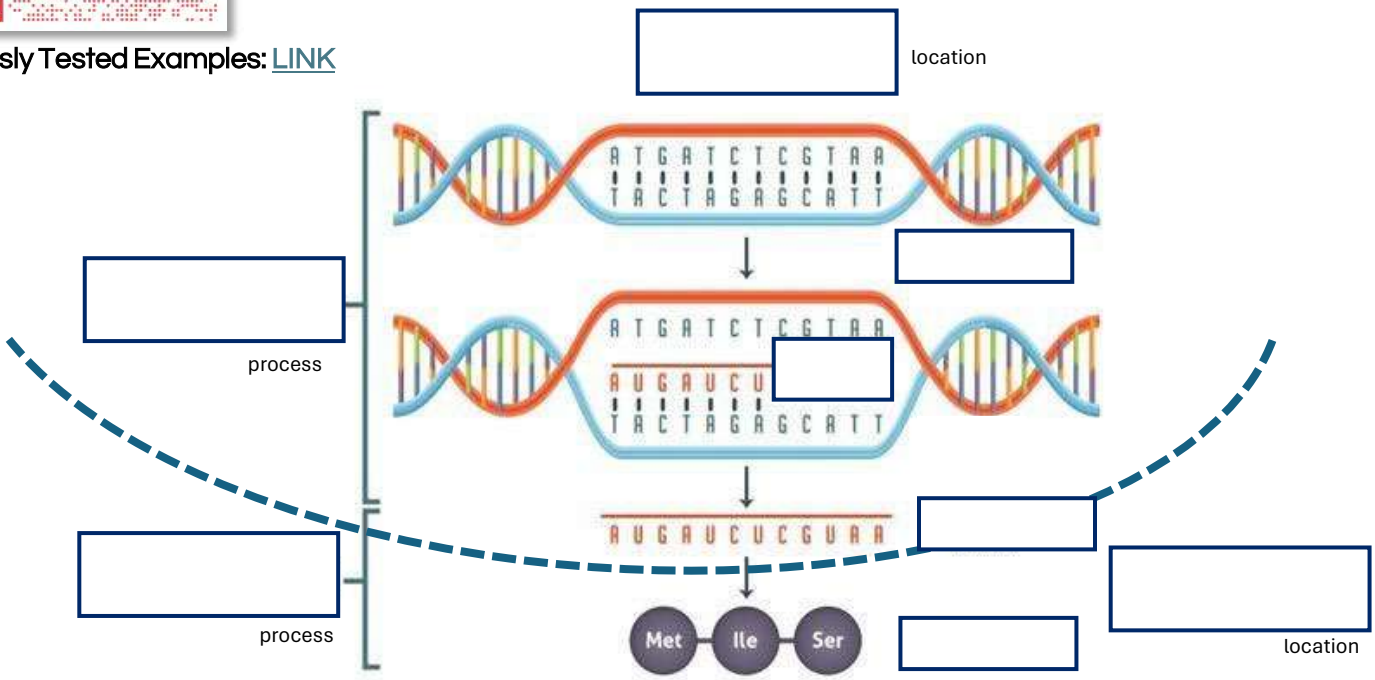
35. When in the cell cycle does DNA Replication Occur?



Protein Synthesis

7B - describe the significance of gene expression and explain the process of protein synthesis using models of DNA and ribonucleic acid (RNA);

Previously Tested Examples: LINK



36. Describe the significance of gene expression in living organisms. How does gene expression allow for the development, growth, and functioning of organisms?

37. Explain the process of protein synthesis using models of DNA and RNA. Include the roles of transcription and translation in this process, and how they relate to gene expression.

38. How do the proteins synthesized from gene expression contribute to the structure and function of cells and organisms?

Protein Synthesis - Continued

7B - describe the significance of gene expression and explain the process of protein synthesis using models of DNA and ribonucleic acid (RNA);

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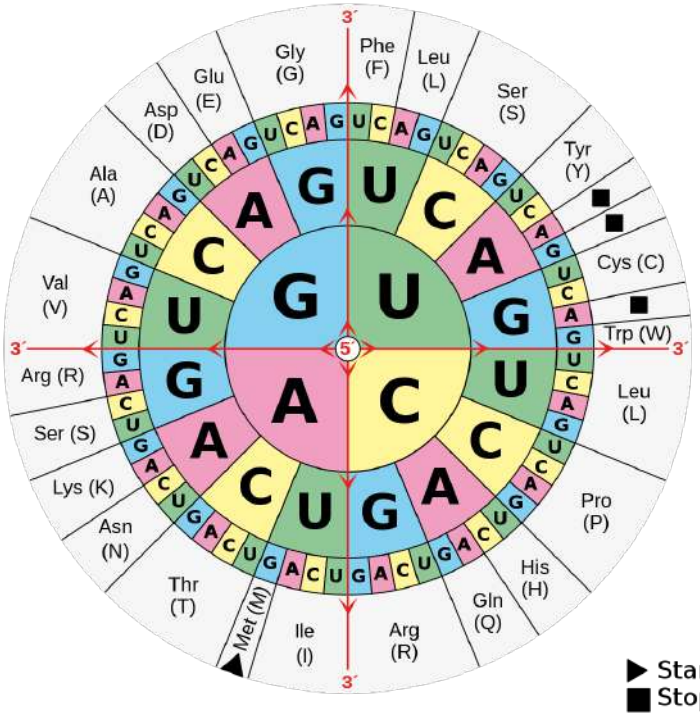
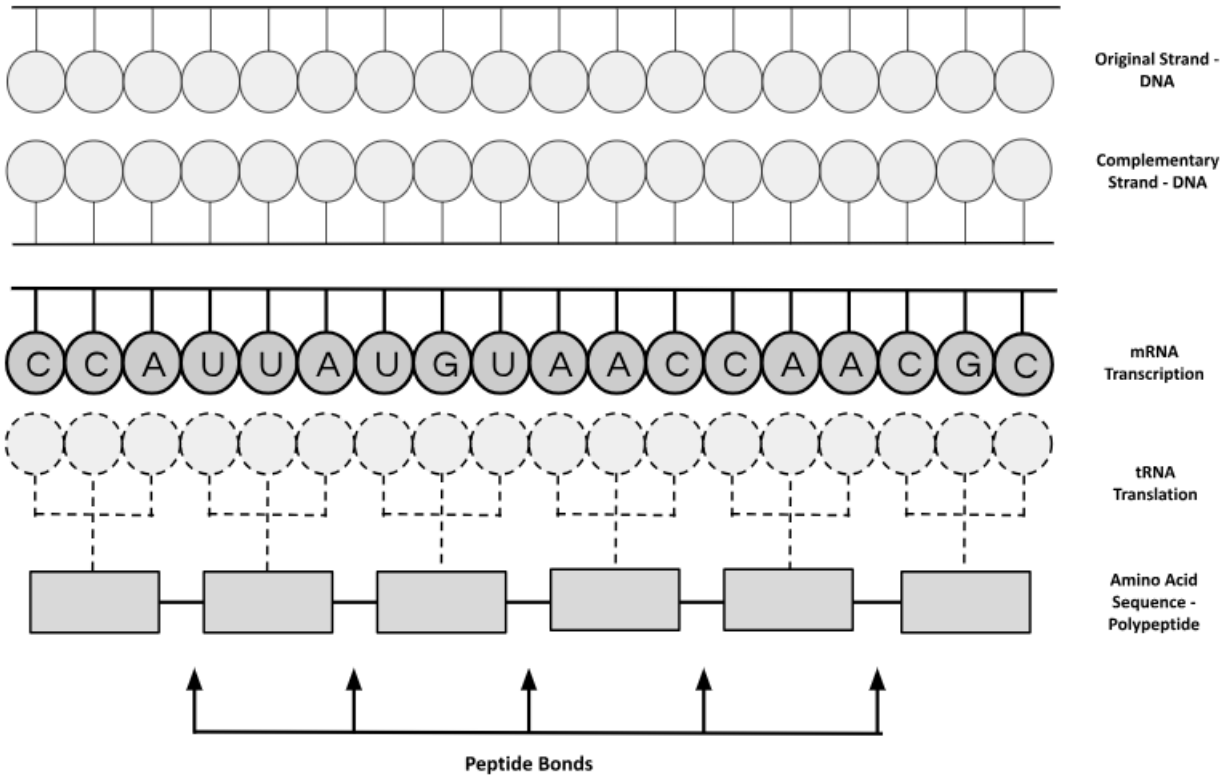
39. For the following, use the mRNA Codon chart provided to perform the processes of transcription and translation for the template strands provided



mRNA Codon Chart

First Base	Second Base U	Second Base C	Second Base A	Second Base G	Third Base
U	Phenylalanine	Serine	Tyrosine	Cysteine	U
	Phenylalanine	Serine	Tyrosine	Cysteine	C
	Leucine	Serine	Stop	Stop	A
	Leucine	Serine	Stop	Tryptophan	G
C	Leucine	Proline	Histidine	Arginine	U
	Leucine	Proline	Histidine	Arginine	C
	Leucine	Proline	Glutamine	Arginine	A
	Leucine	Proline	Glutamine	Arginine	G
A	Isoleucine	Threonine	Asparagine	Serine	U
	Isoleucine	Threonine	Asparagine	Serine	C
	Isoleucine	Threonine	Lysine	Arginine	A
	Methionine	Threonine	Lysine	Arginine	G
G	Valine	Alanine	Aspartic Acid	Glycine	U
	Valine	Alanine	Aspartic Acid	Glycine	C
	Valine	Alanine	Glutamic Acid	Glycine	A
	Valine	Alanine	Glutamic Acid	Glycine	G



Gene Expression- Continued

7B - describe the significance of gene expression and explain the process of protein synthesis using models of DNA and ribonucleic acid (RNA);

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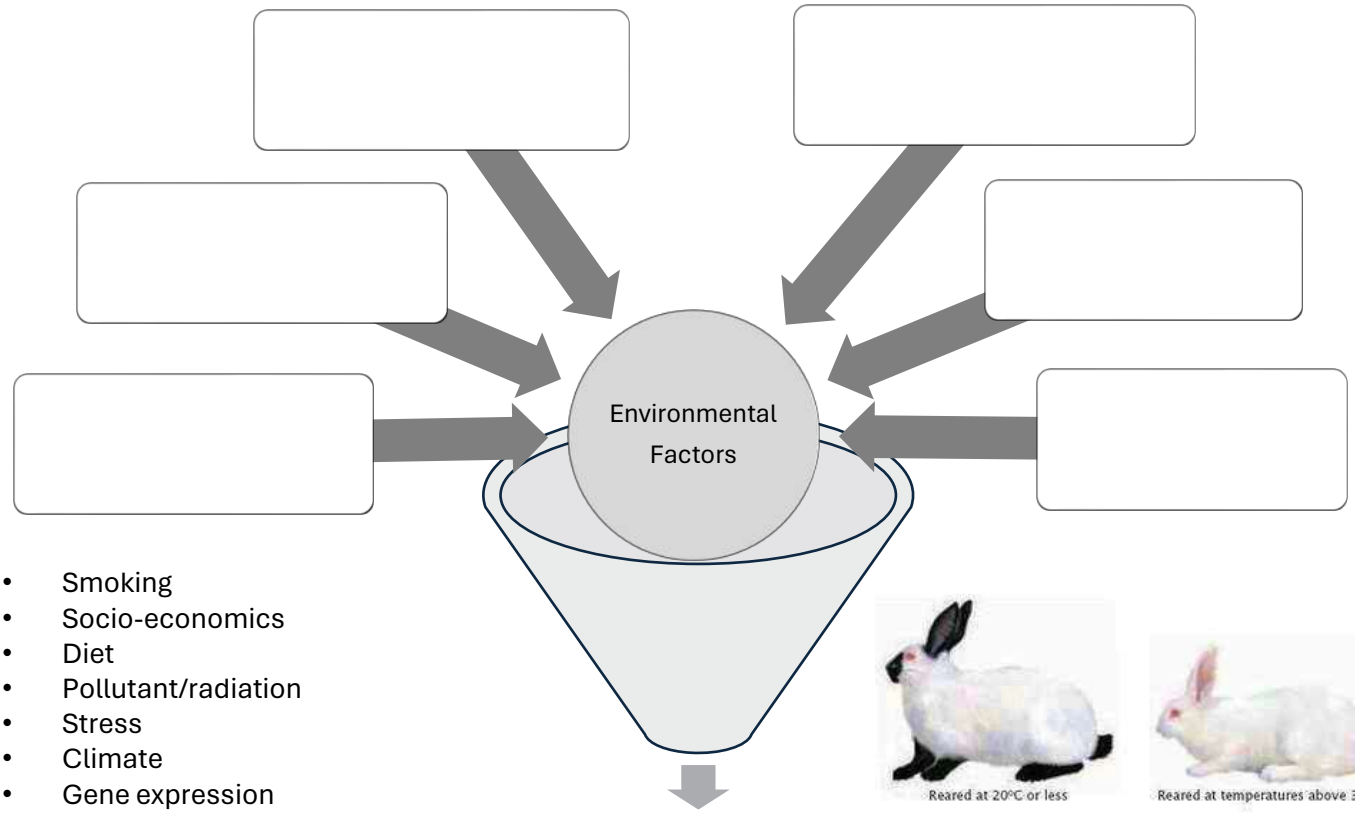


- Smoking
- Socio-economics
- Diet
- Pollutant/radiation
- Stress
- Climate
- Gene expression

Reared at 20°C or less

Reared at temperatures above 30°C

GENETIC MODIFICATIONS

39. Describe the significance of gene expression in living organisms. How does gene expression allow cells to respond to environmental cues and adapt to changing conditions?

40. Discuss the importance of understanding gene expression in the context of environmental adaptation and evolution. How do changes in gene expression contribute to an organism's ability to survive and reproduce in different environments?

Mutations

- *7C - identify and illustrate changes in DNA and evaluate the significance of these changes;*

41. Identify changes in DNA and illustrate these changes. How do mutations, deletions, insertions, and substitutions alter the genetic code and impact the organism?

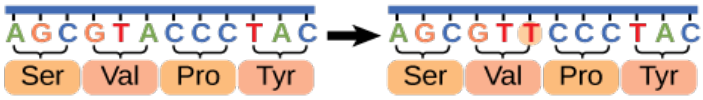
Previously Tested Examples: LINK

42. Evaluate the significance of changes in DNA. How do these changes affect protein synthesis, gene expression, and ultimately, the phenotype of the organism?

43. Discuss the implications of DNA changes in the context of evolution and genetic diversity. How do these changes contribute to the adaptation and survival of species over time?

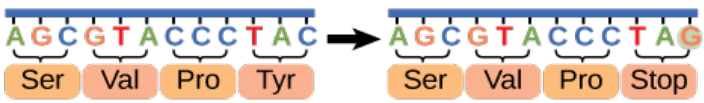
type

has no effect on the protein sequence



results in an amino acid substitution

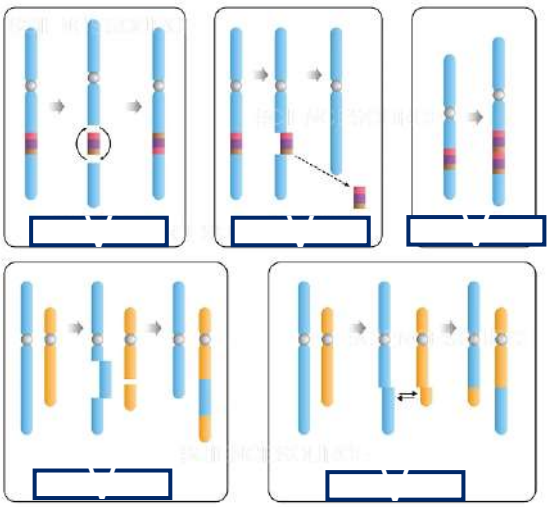
substitutes a stop codon for an amino acid



Mutations

Insertions or deletions of nucleotides may result in a shift in the reading frame or insertion of a stop codon.

Chromosomal Mutations



Meiosis

8A - analyze the significance of chromosome reduction, independent assortment, and crossing-over during meiosis in increasing diversity in populations of organisms that reproduce sexually;.

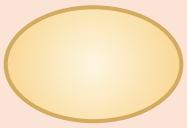
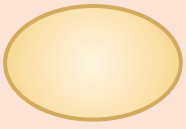
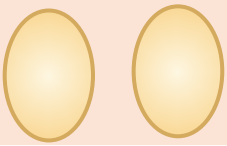
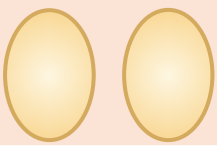
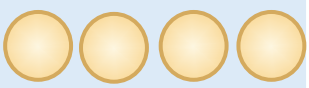
Previously Tested Examples: LINK

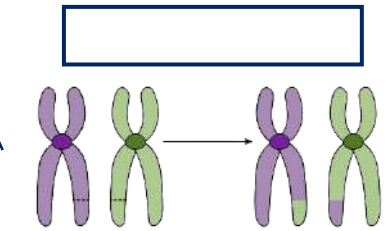
44. Analyze the significance of chromosome reduction, independent assortment, and crossing-over during meiosis in increasing diversity in populations of organisms that reproduce sexually

45. Discuss the importance of independent assortment in increasing genetic diversity. How does the random alignment of chromosomes during meiosis lead to the formation of genetically diverse gametes?

46. Analyze the significance of non-disjunction during meiosis in increasing diversity in populations of organisms that reproduce sexually. How do these processes contribute to genetic variation, and what are the consequences of non-disjunction in terms of genetic diversity?

47. Complete the diagrams below

	Normal Meiosis	Nondisjunction Meiosis I	Nondisjunction Meiosis II
Before			
Meiosis I			
Meiosis II			
Gametes			

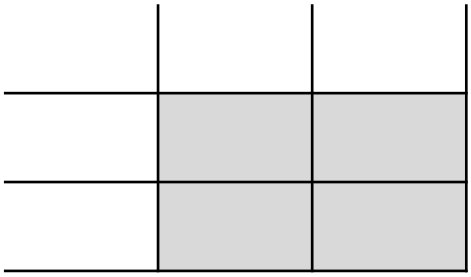


Genetics

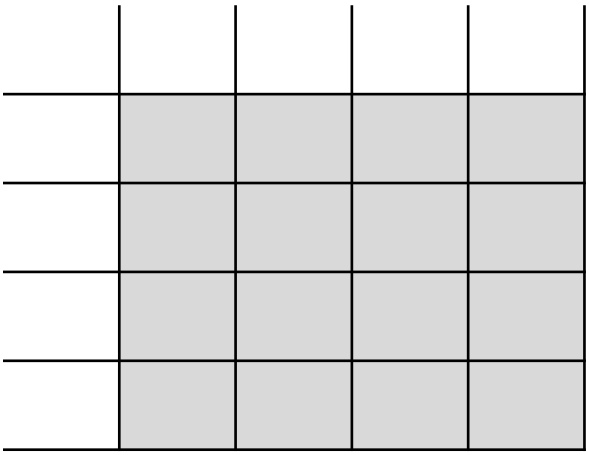
- *8B - predict possible outcomes of various genetic combinations using monohybrid and dihybrid crosses, including non-Mendelian traits of incomplete dominance, codominance, sex-linked traits, and multiple alleles.*

Previously Tested Examples: LINK

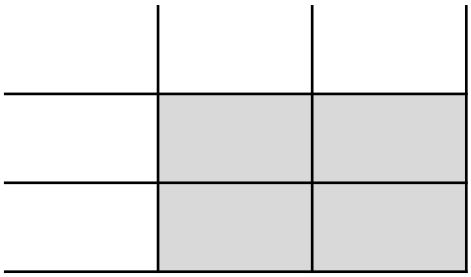
48. Predict possible outcomes of a monohybrid cross involving incomplete dominance. If a red flower (RR) is crossed with a white flower (rr), what are the expected phenotypic and genotypic ratios in the offspring?



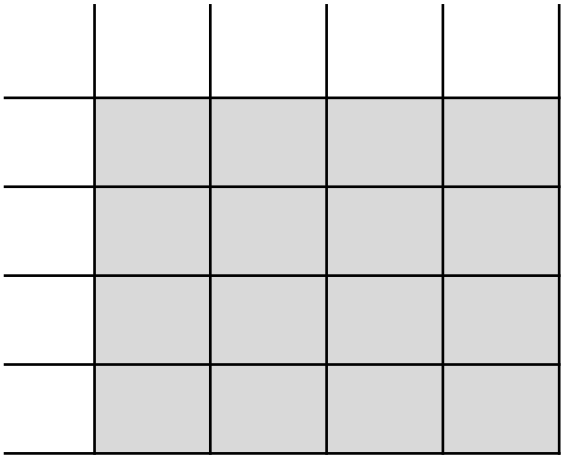
49. Perform a dihybrid cross for two traits: flower color (R = red, r = white) and plant height (T = tall, t = short). If a plant with the genotype RrTt is crossed with a plant with the genotype RrTt, what are the expected phenotypic and genotypic ratios in the offspring?



50. Calculate the probabilities of sex-linked trait inheritance. If a male with a colorblindness gene (X^cY) mates with a female carrier (X^CX^c), what are the chances of having a colorblind son and a carrier daughter?



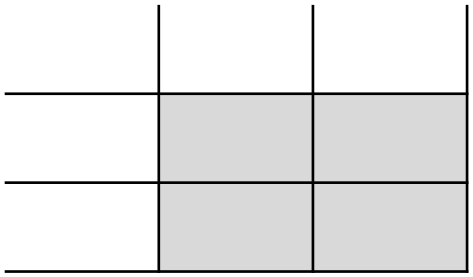
51. If a rabbit with the genotype (BBDD) is crossed with a rabbit with the genotype (bbdd), what is the probability of phenotypes for the offspring for coat color and fur length?

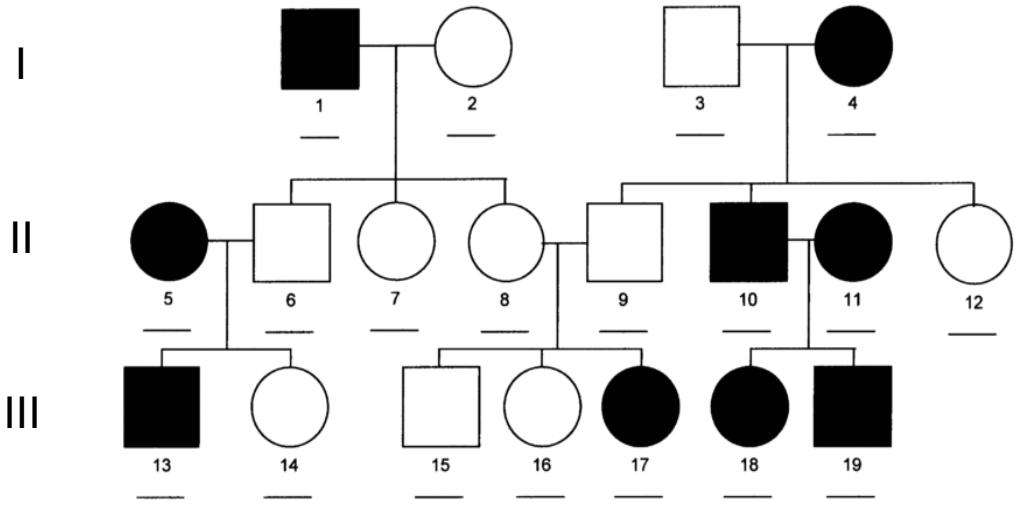


Genetics -Continued

- *8B - predict possible outcomes of various genetic combinations using monohybrid and dihybrid crosses, including non-Mendelian traits of incomplete dominance, codominance, sex-linked traits, and multiple alleles.*

52. In humans, the ABO blood group is determined by three alleles: IA, IB, and i. The IA allele produces the A antigen, the IB allele produces the B antigen, and the i allele does not produce antigens (O blood type). Both IA and IB are codominant. If a man with blood type AB (IAIB) has children with a woman with blood type O (ii), what are the possible blood types of their offspring? Use a Punnett square to illustrate your answer.





53. Identify the affected individuals in the pedigree. How many individuals are affected by the trait?

54. Determine the genotypes of the individuals labeled in the pedigree. Use the information provided to deduce the genotypes of the affected and unaffected individuals.

55. Analyze the pattern of inheritance in the pedigree. Does the trait appear to affect males and females equally? Explain your reasoning.

56. Predict the likelihood of a child inheriting the trait from two unaffected carrier parents. Use the pedigree to support your answer.

57. What type of inheritance pattern is shown in the above pedigree? Autosomal or X-Linked? Dominant or Recessive? Support your answer using from the pedigree above.

RC3

Biological Evolution

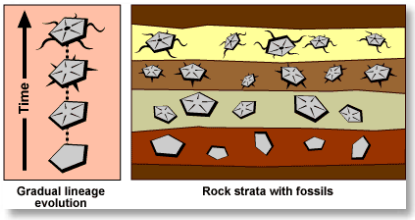
B.9 A–B
B.10 A-D

Biodiversity & Evolution

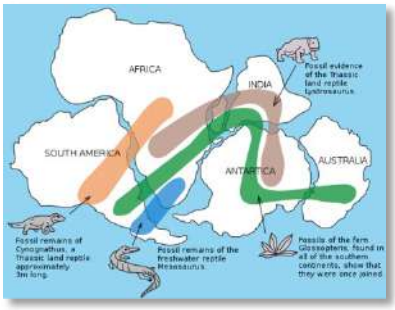
9A -analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;

Previously Tested Examples: LINK

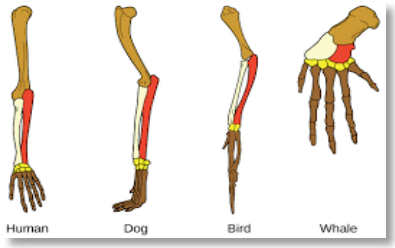
58. Analyze the evidence of common ancestry provided by the fossil record. How do transitional fossils support the idea of evolution and common ancestry among different groups of organisms?



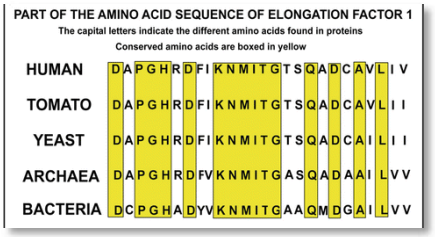
59. Evaluate the role of biogeography in providing evidence for common ancestry. How do the distribution patterns of species across different continents support the concept of evolution and shared ancestry?



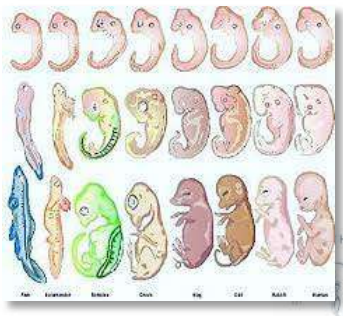
60. Examine the anatomical homologies among different species as evidence of common ancestry. How do similarities in the structures of organisms indicate shared evolutionary histories?



61. Discuss the molecular homologies observed in DNA and proteins as evidence for common ancestry. How do similarities in genetic sequences support the idea of a common ancestor for all living organisms?



62. Describe the significance of developmental homologies, such as embryological similarities, in providing evidence for common ancestry. How do similarities in early developmental stages among different species suggest shared evolutionary pathways?

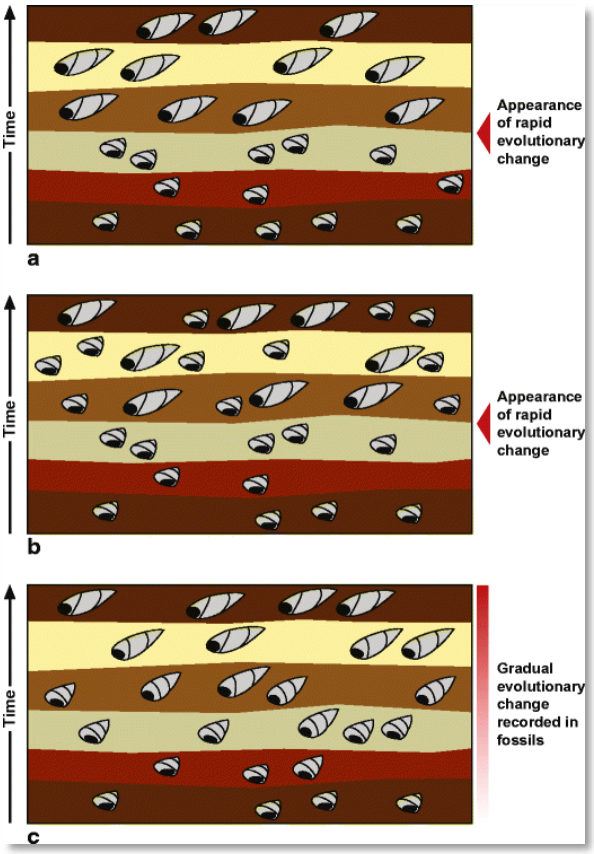


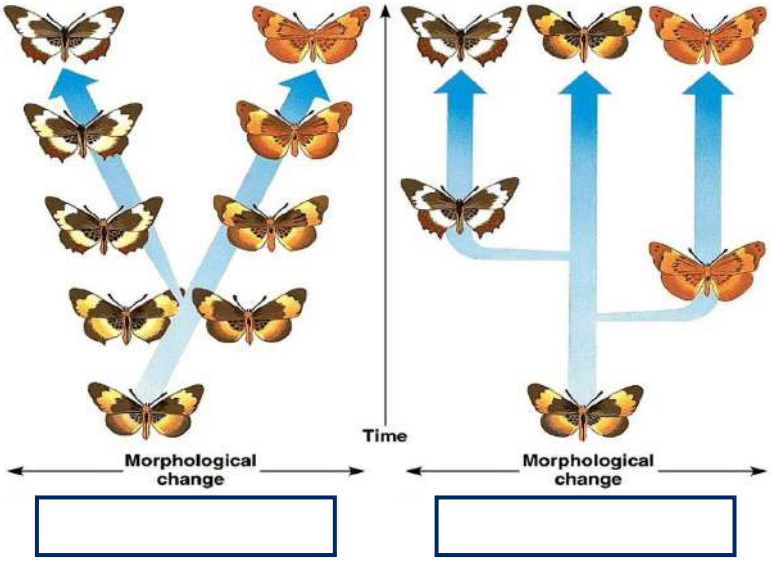
Biodiversity & Evolution - Continued

9B - examine scientific explanations for varying rates of change such as gradualism, abrupt appearance, and stasis in the fossil record.

Previously Tested Examples: LINK

63. Compare and contrast the explanations of gradualism, abrupt appearance (punctuated equilibrium), and stasis in the fossil record. How do these theories provide different perspectives on the patterns of evolution observed in the fossil record?



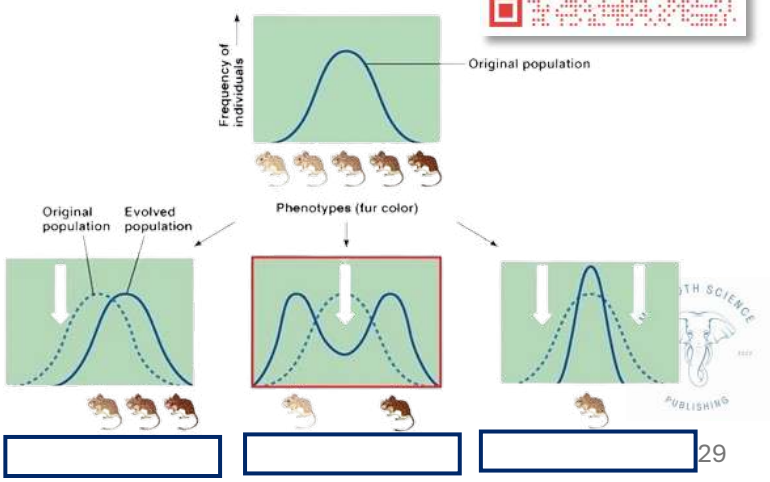


64. Explain the concept of natural selection and how it leads to changes in populations over time. How does natural selection act on the variation within a population to increase the frequency of advantageous traits?

10A - analyze and evaluate how natural selection produces change in populations and not in individuals;

Previously Tested Examples: LINK

65. Describe the difference between natural selection acting on individuals versus populations. How do the changes in allele frequencies within a population result in adaptations that increase the population's fitness?



Biodiversity & Evolution - Continued

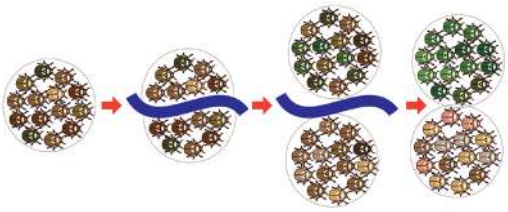
10B - analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;

Previously Tested Examples: LINK

Natural Selection

- Inheritance
- Adaptation
- Overproduction of Offspring
- Variation

66. Compare and contrast the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, adaptation, and inheritance. How do these elements interact to drive evolutionary change in populations?



10C - analyze and evaluate how natural selection may lead to speciation; and

Previously Tested Examples: LINK

67. How do changes in the environment or selective pressures (predation, competition, environmental conditions) result in the divergence of populations and the formation of new species?

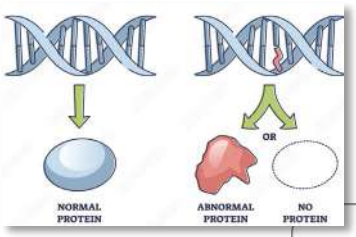
68. How does the diversification of a single ancestral species into multiple species with different adaptive traits illustrate the role of adaptive radiation?

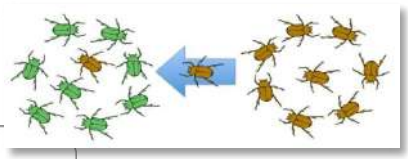
Biodiversity & Evolution - Continued

10D - analyze evolutionary mechanisms other than natural selection, including genetic drift, gene flow, mutation, and genetic recombination, and their effect on the gene pool of a population.

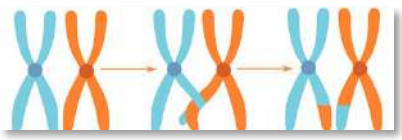
Previously Tested Examples: LINK

69. Compare and contrast the effects of genetic drift, gene flow, mutation, and genetic recombination on the gene pool of a population. How do these evolutionary mechanisms interact to shape the genetic composition of populations over time?





Gene Pool

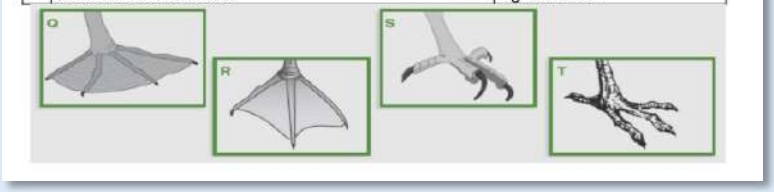


Classification & Taxonomy - phased out 2024

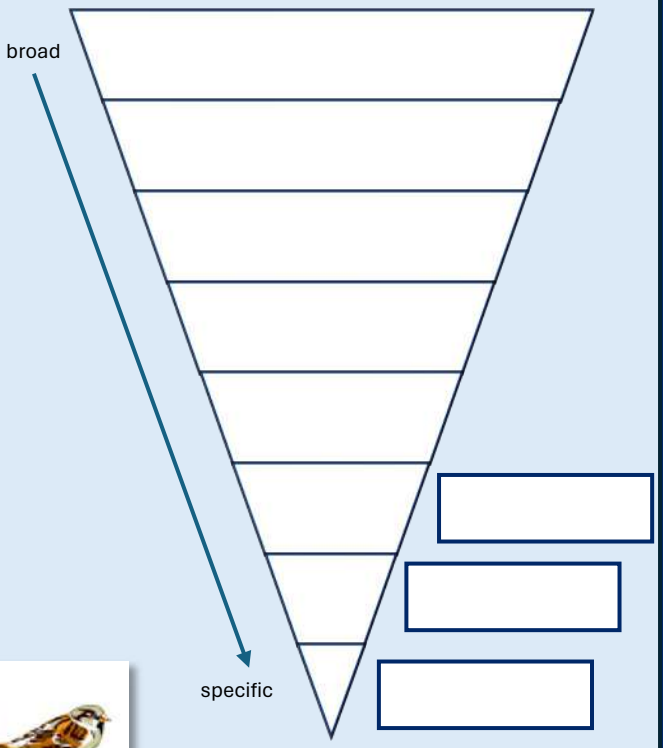
(A) define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community; (B) categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and (C) compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.

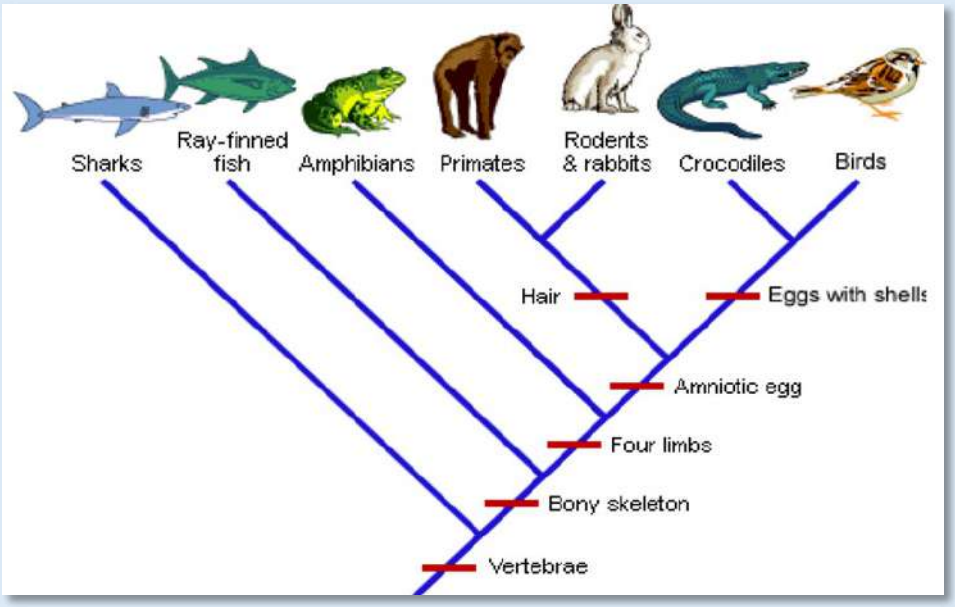
70. Define taxonomy and explain why it is important to the scientific community. How does a standardized taxonomic system help scientists organize and communicate information about the diversity of life?

1	a. Toes are webbed	Go to 2
	b. Toes are not webbed	Go to 3
2	a. Three webbed toes	Branta canadensis
	b. Four webbed toes	Phalacrocorax auritus
3	a. Claws are curved	Buteo jamaicensis
	b. Claws are not curved	Egretta thula



71. Classify the following set of Avian feet using the dichotomous key above:
    - Q.
    - R.
    - S.
    - T.





72. What separates rabbits/primate from the crocodiles on this cladogram?

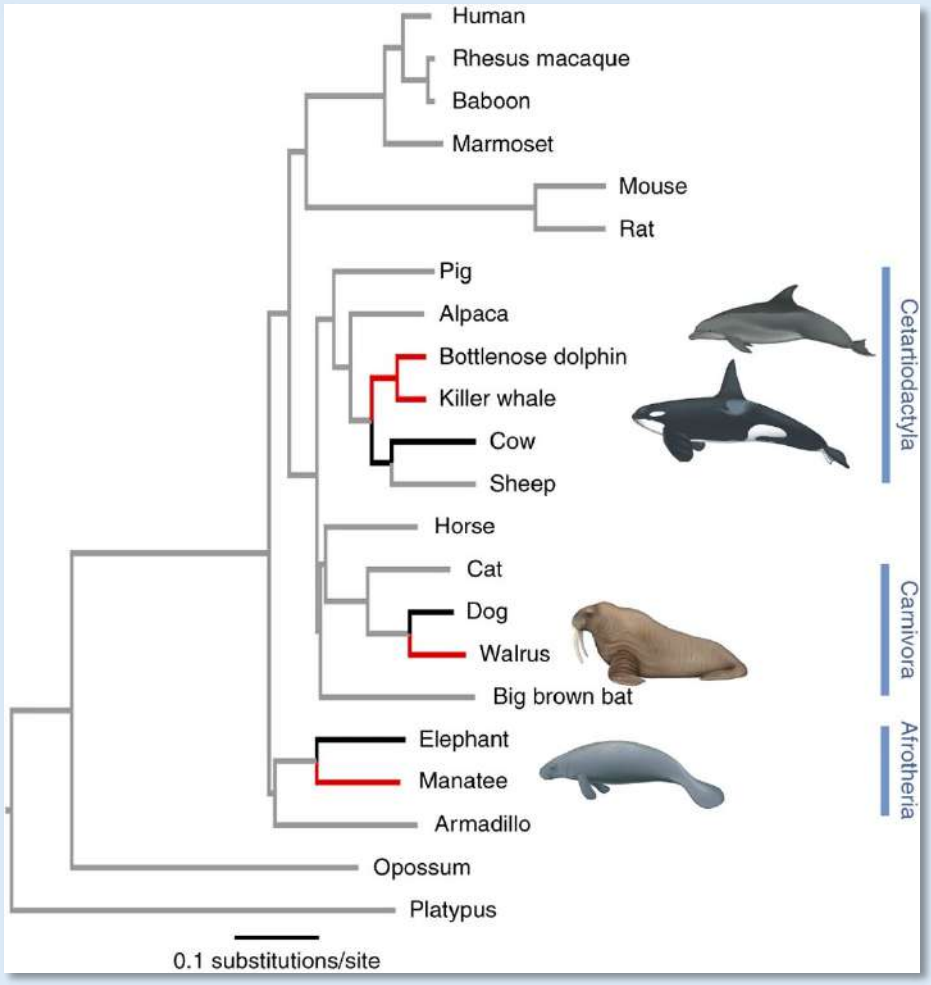
73. Which organism is most related to the rodents and rabbits on this cladogram?

74. Which organism will have DNA most similar to the bird? Why?

75. Which organism's DNA will differ the most from the bird? Why?

Classification & Taxonomy – phased out 2024

(A) define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community; (B) categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and (C) compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.



76. Based on the phylogenetic tree shown, what terrestrial vertebrate is most closely related to the manatee? Would you expect this mammal to have the mutation identified in the manatee? Why or why not?

77. The dolphin and killer whale are closely related and descended from a common ancestor. Would you expect this ancestor to have the mutation? Why or why not?

78. The walrus and manatee do not have recent common ancestors to the dolphin/killer whale group, but the same mutation is seen in those groups. Explain HOW this is an example of convergent evolution.

Classification & Taxonomy – phased out 2024

(A) define taxonomy and recognize the importance of a standardized taxonomic system to the scientific community; (B) categorize organisms using a hierarchical classification system based on similarities and differences shared among groups; and (C) compare characteristics of taxonomic groups, including archaea, bacteria, protists, fungi, plants, and animals.

Classification of Living Things

DOMAIN	Bacteria	Archaea	Eukarya			
KINGDOM	Eubacteria	Archaebacteria	"Protista"	Fungi	Plantae	Animalia
CELL TYPE	Prokaryote	Prokaryote	Eukaryote	Eukaryote	Eukaryote	Eukaryote
CELL STRUCTURES	Cell walls with peptidoglycan	Cell walls without peptidoglycan	Cell walls of cellulose in some; some have chloroplasts	Cell walls of chitin	Cell walls of cellulose; chloroplasts	No cell walls or chloroplasts
NUMBER OF CELLS	Unicellular	Unicellular	Most unicellular; some colonial; some multicellular	Most multicellular; some unicellular	Multicellular	Multicellular
MODE OF NUTRITION	Autotroph or heterotroph	Autotroph or heterotroph	Autotroph or heterotroph	Heterotroph	Autotroph	Heterotroph
EXAMPLES	*Streptococcus, Escherichia coli*	Methanogens, halophiles	*Amoeba, Paramecium*, slime molds, giant kelp	Mushrooms, yeasts	Mosses, ferns, flowering plants	Sponges, worms, insects, fishes, mammals

79. Classify the following organisms into their respective kingdoms based on the given characteristics:
    - Organism A: Unicellular, cell walls made of peptidoglycan, heterotroph
    - Organism B: Multicellular, cell walls made of chitin, heterotroph
    - Organism C: Multicellular, no cell walls, autotroph
    - Organism D: Unicellular, no cell walls, heterotroph

80. Explain how the characteristics of cell type, cell wall composition, and trophic mode are used to classify organisms into different kingdoms. Provide examples of organisms from each kingdom that exhibit these characteristics.

81. Compare and contrast the cell structures and trophic modes of bacteria, fungi, and plants. How do these differences reflect their evolutionary relationships and ecological roles?

RC4

Interdependence within Environmental Systems.

B.13 A–D

Ecology

- *13A -investigate and evaluate how ecological relationships, including predation, parasitism, commensalism, mutualism, and competition, influence ecosystem stability;*

Previously Tested Examples: LINK

82. In the images below, identify and explain the relationship you see.

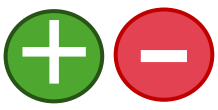
83. How does the interaction between predators and prey affect population dynamics and the overall balance of species within an ecosystem?

84. Evaluate the role of parasitism in ecosystem stability. How do parasites impact the health and population sizes of host species, and what are the broader effects on the ecosystem?

85. Analyze the effects of commensalism on ecosystem stability. How do commensal relationships, where one species benefits and the other is unaffected, contribute to the overall biodiversity and stability of an ecosystem?

86. Examine mutualism and its influence on ecosystem stability. How do mutually beneficial relationships between species enhance the resilience of ecosystems to environmental changes?

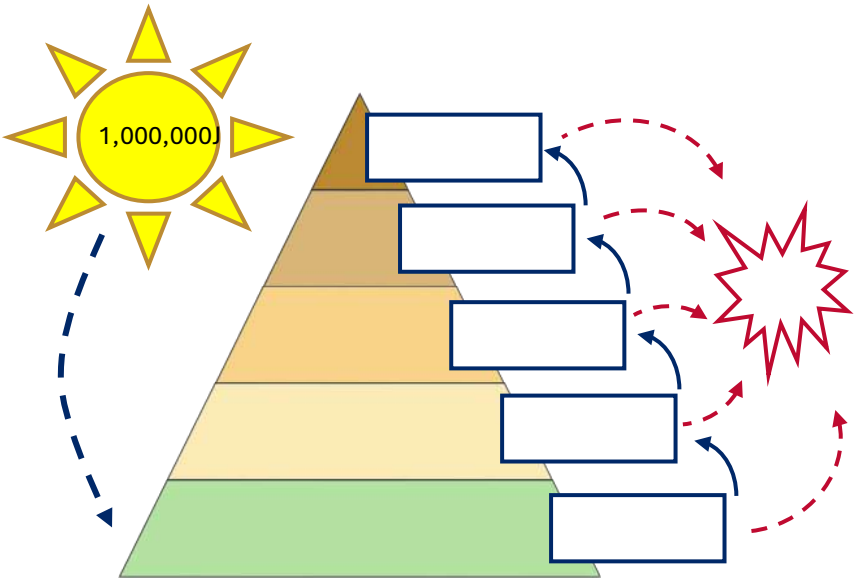
87. Discuss the impact of competition on ecosystem stability. How does competition for resources among species influence population sizes, species distributions, and ecosystem dynamics?



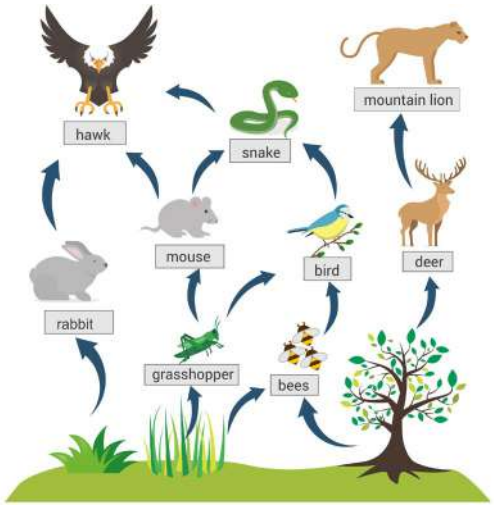
Ecology - Continued

- *13B -analyze how ecosystem stability is affected by disruptions to the cycling of matter and flow of energy through trophic levels using models;*

Previously Tested Examples: LINK



88. Label the following tropic pyramid with - producer, primary, secondary, tertiary, and quaternary consumers. Calculate how much energy is passed from one tropic level to the next according to the 10% rule.



89. Label the following food web with - producer, primary, secondary, tertiary, and quaternary consumers.

90. Analyze how disruptions to the cycling of matter and flow of energy through trophic levels affect ecosystem stability. How do human activities, such as deforestation or pollution, impact nutrient cycling and energy transfer within an ecosystem?

91. Explain the 10 percent energy rule and its significance in ecosystem dynamics. How does this rule illustrate the inefficiency of energy transfer between trophic levels and its implications for ecosystem stability?

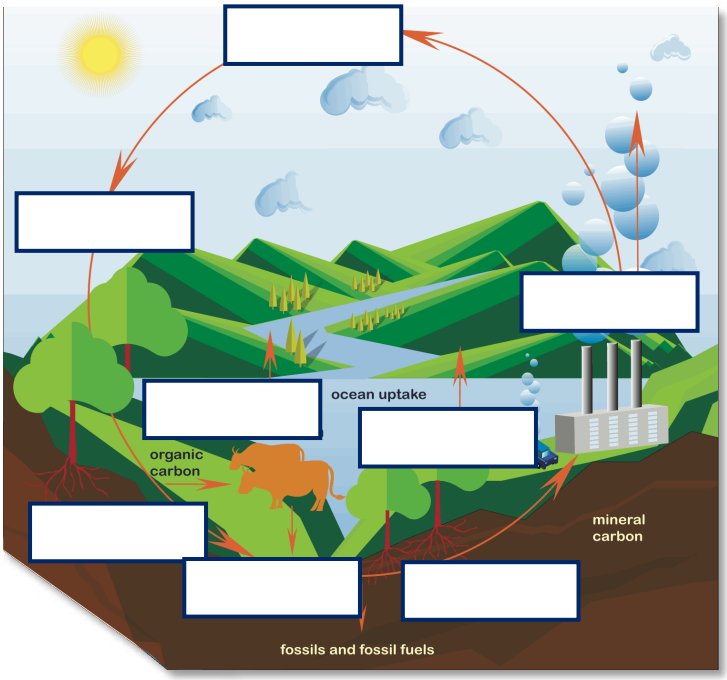
92. Describe the types of organisms in a food web and their roles in energy transfer and nutrient cycling. How do producers, consumers, and decomposers interact to maintain ecosystem stability?

Ecology - Continued

- *13C - explain the significance of the carbon and nitrogen cycles to ecosystem stability and analyze the consequences of disrupting these cycles*

Previously Tested Examples: LINK

91. Explain the significance of the carbon cycle to ecosystem stability. How does the cycling of carbon through the atmosphere, hydrosphere, biosphere, and geosphere help maintain the balance of gases and regulate Earth's climate?

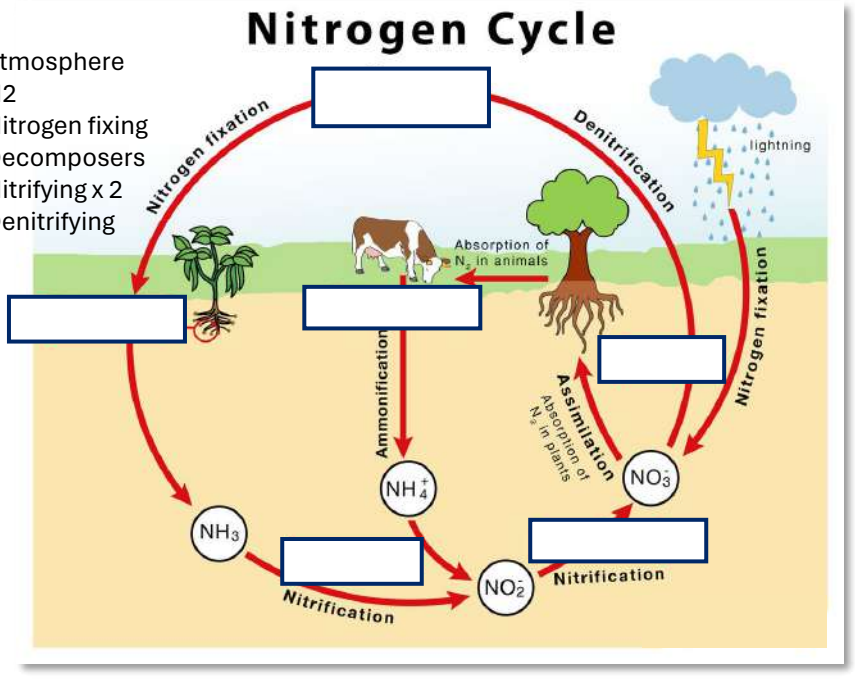


- CO2
- Photosynthesis
- Transpiration
- Cellular Respiration
- Root Uptake
- Decaying Organisms
- Animal Waste
- Human Emissions

92. Explain the significance of carbon sinks in the carbon cycle and their role in maintaining ecosystem stability. How do carbon sinks, such as oceans, forests, and soil, help regulate the amount of carbon dioxide in the atmosphere and mitigate the impacts of climate change?

93. Describe the importance of the nitrogen cycle to ecosystem stability. How do nitrogen-fixing bacteria, nitrifying bacteria, and denitrifying bacteria contribute to the availability of nitrogen for plants and other organisms?

- Atmosphere N2
- Nitrogen fixing
- Decomposers
- Nitrifying x 2
- Denitrifying



Ecology - Continued

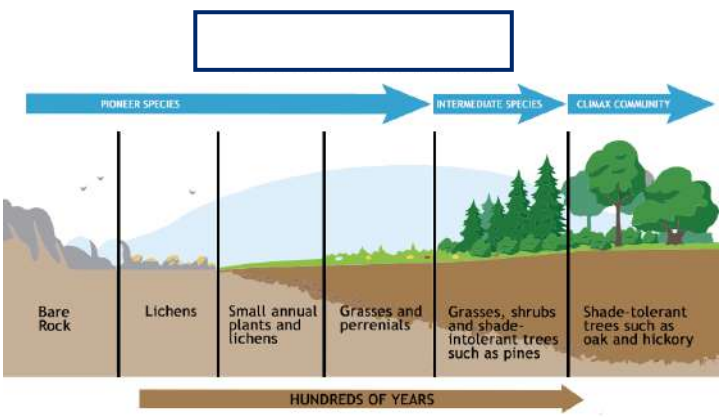
- *13D - explain how environmental change, including change due to human activity, affects biodiversity and analyze how changes in biodiversity impact ecosystem stability.*

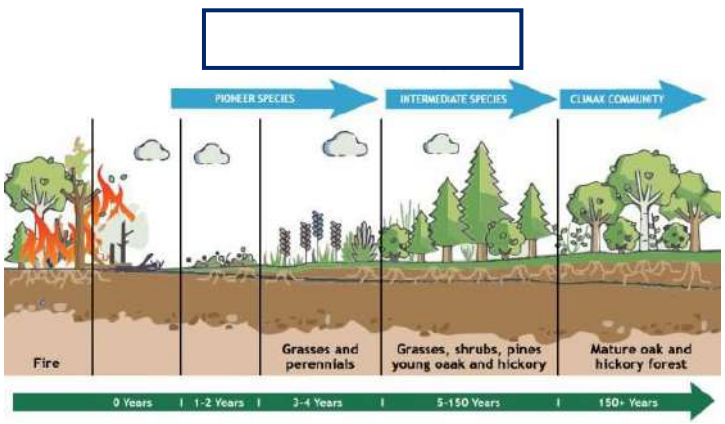
Previously Tested Examples: LINK

94. Explain how environmental change, including change due to human activity, affects biodiversity. How do factors such as habitat destruction, pollution, climate change, and invasive species influence the diversity of species in an ecosystem?

95. Analyze how changes in biodiversity impact ecosystem stability. How does a loss of biodiversity affect the resilience of an ecosystem to environmental changes and the ability to provide ecosystem services?

96. Compare primary and secondary succession in terms of their beginning and their impact on biodiversity and ecosystem stability. How do these two types of ecological succession differ in terms of the speed of recovery, the diversity of species involved, and the overall stability of the ecosystem? Use vocabulary such as pioneer species, climax community, glacier retreat, volcanism, catastrophic events, and increased/decreased biodiversity.





Credits

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Texas Biology

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