Robert L. Merritt

8th Grade **Math** Pack

Week of June 22-26, 2020

11. An antibiotic binds to tRNA molecules and prevents them from binding to an amino acid. What will happen as a result of this?

A Protein synthesis will be stopped.

B Proteins being synthesized will not be folded properly.

C Protein synthesis will not be able to make the correct mRNA.

D Proteins being synthesized will be longer than normal.

12. The amino acid methionine is coded for in humans by the mRNA nucleotide sequence: adenine-uracil-guanine, or AUG. Which statement is true regarding this amino acid?

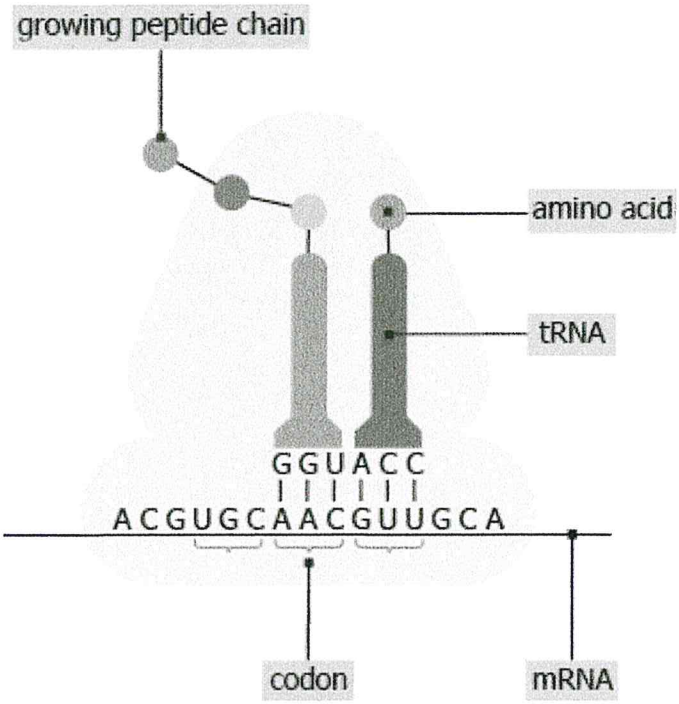
A Any sequence of the nucleotides A, U, and G would code for methionine in other organisms.

B AUG would also code for methionine in every other organism on Earth.

C AUG would only code for methionine in species closely related to humans (primates).

D There is no way to predict what nucleotides will code for methionine in other organisms.

13. **The image shows the translation process in a eukaryotic cell.**



What step ends translation?

A addition of an amino acid into the growing peptide chain

B separation of mRNA from the ribosome when a stop codon is reached

C detachment of tRNAs from the ribosome

D connection of tRNA anticodons with codons on mRNA

14. **A section of DNA codes for the sequence of nitrogenous bases of mRNA to initiate protein synthesis as shown.**

GATACGCT ⟶ CUAUGCGA
(DNA) (mRNA)

What is the process involved in the coding?

A replication

B transcription

C transduction

D translation

15. **The codon chart shows the amino acids coded for by each RNA codon.**

mRNA Codon Chart

First Base	Second Base				Third Base
	U	C	A	G	
U	phenylalanine	serine	tyrosine	cysteine	U
U	phenylalanine	serine	tyrosine	cysteine	C
U	leucine	serine	STOP	STOP	A
U	leucine	serine	STOP	tryptophan	G
C	leucine	proline	histidine	arginine	U
C	leucine	proline	histidine	arginine	C
C	leucine	proline	glutamine	arginine	A
C	leucine	proline	glutamine	arginine	G
A	isoleucine	threonine	asparagine	serine	U
A	isoleucine	threonine	asparagine	serine	C
A	isoleucine	threonine	lysine	arginine	A
A	methionine	threonine	lysine	arginine	G
G	valine	alanine	aspartic acid	glycine	U
G	valine	alanine	aspartic acid	glycine	C
G	valine	alanine	glutamic acid	glycine	A
G	valine	alanine	glutamic acid	glycine	G

Which amino acids are coded for by the mRNA strand: AUG UCA CGA GGU?

A methionine, leucine, alanine, lysine

B methionine, serine, arginine, glycine

C tyrosine, serine, alanine, proline

D tyrosine, proline, serine, glycine

16. What process is important for creating genetic variability among organisms that reproduce primarily by asexual means?

A crossing over

B fertilization

C meiosis

D mutation

17. A DNA base sequence that has undergone an addition mutation reads: TATCCGACGC. What original DNA base sequence is possible?

A ATAGGCTGCG

B TATCCGAACGC

C TATCCGACTC

D TATCGACGC

18. The table lists two genetic disorders and their causes.

Genetic Disorder	Cause
cystic fibrosis	loss of three nucleotide bases from chromosome 7
Prader-Willi syndrome	loss of seven genes on chromosome 15

Which mutation is responsible for the listed disorders?

A A deletion mutation is responsible for both the disorders.

B A substitution mutation is responsible for both the disorders.

C A deletion mutation is responsible for cystic fibrosis, while a substitution mutation is responsible for Prader-Willi syndrome.

D A substitution mutation is responsible for cystic fibrosis, while a deletion mutation is responsible for Prader-Willi syndrome.

19. The nucleotide sequence in a DNA strand and the coded amino acid sequence in the protein produced are shown in the table.

DNA sequence	TACATA**AGA**TGCGTT
protein sequence	Met-Tyr-Ser-Thr-Gln

What would be the sequence of the protein produced if the nucleotides indicated with a box in the DNA strand undergo a deletion mutation during DNA replication?

A Met-Tyr-Thr-Ser

B Met-Ser-Thr-Gln

C Met-Tyr-Ser-Thr

D Met-Tyr-Thr-Gln

20. The phrase "the cat sat and the dog ran" is being used to represent a DNA sequence.

Which altered phrase would represent a frameshift mutation?

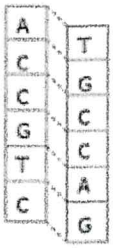
A the sat and the dog ran

B the cat saa ndt hed ogr an

C the dog sat and the cat ran

D the cat sat cat sat and the dog ran

21. The diagram shows a segment of DNA that codes for a genetic disease.



Which factor *most likely* affected the DNA as shown in the diagram?

A base pairing

B bacterial infection

C mutation

D parasite

22. In horses, chestnut and white alleles are codominant. Heterozygous horses express both genes equally, giving them a golden tan color as a result of the presence of both white and chestnut hairs.

What is the predicted phenotypic outcome for a cross between two golden tan horses?

A 100% golden tan

B 75% chestnut; 25% white

C 50% chestnut; 50% white

D 25% chestnut; 50% golden tan; 25% white

IO Assessment © 2020 IO Education
All content is the private property of the copyright holders.

23. The alleles for straight hair and curly hair show an incomplete dominance inheritance pattern in humans. Individuals with two S alleles (SS) will have straight hair, and individuals with two C alleles (CC) will have curly hair. Heterozygous individuals (SC) will have both alleles expressed and have wavy hair.

What is the predicted phenotypic outcome for a cross between a wavy-haired individual and one with straight hair?

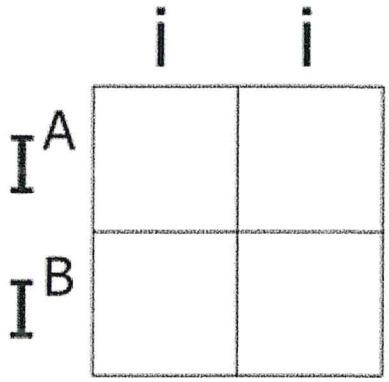
A 100% straight hair

B 100% wavy hair

C 50% straight hair; 50% wavy hair

D 75% straight hair; 25% wavy hair

24. Blood type is an example of a trait controlled by multiple alleles.



What will be the expected outcome for blood type among children born to parents according to this cross?

A 0% type A; 50% type AB; 0% type B; 50% type O

B 25% type A; 25% type AB; 25% type B; 25% type O

C 25% type A; 50% type AB; 25% type B; 0% type O

D 50% type A; 0% type AB; 50% type B; 0% type O

25. Which statement is true regarding the transmission of sex-linked traits in a population?

A Males cannot carry recessive alleles for sex-linked traits.

B Males cannot express dominant alleles on the X chromosome.

C Males cannot express recessive alleles on the X chromosome.

D Males cannot pass alleles for sex-linked traits to their daughters.

Robert L. Merritt

8th Grade **ELA** Pack

Week of June 22-26, 2020

For Questions 1 - 5:

from "Charles E. Taylor: The Unsung Hero of Kitty Hawk Finally Gets His Day"

by Maria Papageorgiou

1. Charles E. Taylor has been called "the man aviation history almost forgot." No wonder. Three people—Orville and Wilbur Wright, plus Taylor—made the first powered flight at Kitty Hawk, N.C., happen. Despite intermittent "rediscoveries" of Taylor's contributions to aviation throughout the decades, only the Wright brothers continue to be named in most accounts of the milestone flight at Kitty Hawk; at most, Taylor is a footnote. Without question, it was Taylor's hand-crafted engine that transformed the Wrights' airframe into the extraordinary vehicle that changed transportation forever. Without Taylor's engine, the brothers and aviation would not have soared and moved forward as they did.

2. With the number of aviation industry "firsts" that can be credited to Taylor, it is difficult to believe that the talented, but modest, Midwesterner went unheralded for so many decades after the first engine-driven flight at Kitty Hawk. His story is a simple, yet at times a heart-breaking, one. In its twists and turns of fortune can be found evidence of the fickleness of fate as well as the very deep friendship that existed between the "Wright boys" (as he often called Orville and Wilbur) and Taylor.

Early Life

3. On May 24, 1868, Charles E. Taylor was born in a log cabin on a farm in Cerro Gordo, Illinois. When he was a young boy, his family moved to Nebraska. Most sources state that he dropped out of school at age 12 to work as an errand boy for the Nebraska State Journal, but others indicate he graduated from high school.

All content is the private property of the copyright holders.

Whatever his academic achievements were, they are not of much consequence because while at the Journal and working in their bindery, he discovered that he was mechanically inclined. And it was this natural inclination to use tools easily and skillfully that led Taylor to his greatest accomplishment.

4. In his 20s, Taylor moved to Kearney, Nebraska. He started his own business of making metal house numbers (the dexterity needed to fashion numerical shapes from metal was good practice for when he would later construct the first airplane engine from scratch), and, in 1894, he married Henrietta Webbert. It was through his wife's family that he eventually met the Wright brothers.

Moving to Dayton and Meeting the Wrights

5. Interested in bettering their lives, the couple decided in 1896 to move to Dayton, Ohio, where many members of Henrietta's family lived. As the world would soon learn, also living there were two highly motivated, technologically sharp brothers who owned a bicycle shop. The shop was leased to them by Henrietta's uncle.

6. At the dawn of what would be called the "American Century," Taylor found opportunities aplenty in Dayton. After first working for the Stoddard Manufacturing Company, which made farm equipment and then bicycles, he opened his own tool shop. Since Taylor had been introduced to the Wrights through Henrietta's family, they were familiar with his trade and occasionally asked him to make mechanical parts for their bicycles. They were so satisfied with his work that the inevitable eventually happened. As Taylor recalled the fateful moment in a 1948 interview: "It was a hot June night in Dayton. It must have been a Saturday because I was at the Wright Cycle Company gassing [yakking] with Wilbur and Orville. They stayed open Saturday nights to take care of the folks who worked all week.... One of the brothers, I forget which, asked me how would I

All content is the private property of the copyright holders.

like to go to work for them. There were just the two of them in the shop, and they said they needed another hand. They offered me $18 a week." Taylor took them up on the offer not only because of what was a good salary at that time, but also because he lived only six blocks away from the shop and could bicycle home for lunch. "Besides," he elaborated, "I liked the Wrights." The year was 1901, and in two more years, the three of them would make history.

Helping Out the Boys and Making the Engine

7. From his visits to the shop and "gassing" with the guys, Taylor already knew Orville and Wilbur were very involved in "their flying studies and experiments." His role as an employee would be to handle the shop's customers and bicycle business, especially when the brothers were in North Carolina testing their experimental gliders. The Wrights traveled to Kitty Hawk a couple times a year whenever they had an improved flying machine. They were obviously intellectually gifted (Orville invented a calculating machine when he was 24) and possessed the attitude of true scientists (i.e., they were never daunted by failure and willing to try the next thing).

8. At one point, they figured they needed a wind tunnel to perfect the performance of the gliders. Helping to build the wind tunnel was the first time Taylor worked on any of the Wrights' aeronautical projects.

9. When the Wrights returned from one of their trips south in 1902, they informed Taylor that they were no longer interested in gliders and wanted a powered machine. They developed the specifications for the new biplane they would build, but were unable to find a manufacturer who could or would make the engine. So they turned to Taylor for help. As Taylor recalled, "While the boys were handy with tools, they had never done much machine work...." The Wright brothers went to work building the airframe, and Taylor, using only the simple tools he had in the shop—a drill press, lathe, and

All content is the private property of the copyright holders.

assorted hand tools—went to work constructing a 180-lb., 12-horsepower engine. "We didn't make any drawings," he explained. "One of us would sketch out the part...on a piece of scratch paper, and I'd spike the sketch over my bench." Following what he saw in the sketches, Taylor made the first airplane engine in only six weeks. He also made all the metal parts for the airframe. How was this phenomenal achievement ever forgotten? After all, Taylor made the first airplane engine, thus becoming the "First Airplane Mechanic."

10. Part of the answer can be found in the nature of the man himself. Cut from the mold of many aircraft mechanics, Taylor did not seek the limelight or notoriety. It is enough for this type of person to do a good job and that's it. The other part was the actual swiftness with which aviation technology took off. In not too long, Taylor's first engine as well as his subsequent, more powerful ones quickly became artifacts on the road to invention.

Excerpt from "Charles E. Taylor: The Unsung Hero of Kitty Hawk Finally Gets His Day" by Maria Papageorgiou. Federal Aviation Administration http://www.faa.gov/about/history/pioneers/media/Charles_E_Taylor.pdf (3/24/15).

All content is the private property of the copyright holders.

1. What is the author's purpose in paragraph 10?

A to acknowledge that Taylor's shyness may have hindered his aviation career

B to argue that aviation would not have been possible without Taylor

C to explain why Taylor's contributions to aviation have been overlooked historically

D to highlight the important role that airplane mechanics like Taylor have played in aviation

2. **What is the *most likely* reason the author includes biographical information about Taylor's early life in paragraphs 3-4?**

A to acknowledge that Taylor would have benefited from more formal education

B to describe the variety of jobs that Taylor held prior to building airplanes

C to establish that Taylor was mechanically gifted even from a young age

D to highlight the personal setbacks that Taylor experienced during his youth

All content is the private property of the copyright holders.

3. What is the meaning of *intermittent* as it is used in paragraph 1?

A justifiable

B periodic

C recent

D surprising

4. How does the author distinguish between the Wright brothers and Taylor?

A by contrasting the contributions the Wright brothers and Taylor each made to the successful invention of the first airplane

B by contrasting the education and work experiences of the Wright brothers and Taylor that led to their involvement in aviation

C by implying that the Wright brothers actively pursued fame unlike Taylor

D by implying that the Wright brothers knew less about aviation than Taylor

5. Which quotation reveals the author's admiration for Taylor?

A "Without question, it was Taylor's hand-crafted engine that transformed the Wrights' airframe into the extraordinary vehicle that changed transportation forever." (paragraph 1)

B "Most sources state that he dropped out of school at age 12 to work as an errand boy for the Nebraska State Journal, but others indicate he graduated from high school." (paragraph 3)

C "Interested in bettering their lives, the couple decided in 1896 to move to Dayton, Ohio, where many members of Henrietta's family lived." (paragraph 5)

D "At the dawn of what would be called the 'American Century,' Taylor found opportunities aplenty in Dayton." (paragraph 6)

Robert L. Merritt

8th Grade **Science** Pack

Week of June 22-26, 2020

22. The table lists some natural resources and some possible resource conservation methods.

Natural Resource	Possible Conservation Method
topsoil	rotate crops each season
forests	use recycled paper
fossil fuels	replace fossil fuels with alternative energy
freshwater	water lawns less often

If a person follows all four possible conservation methods, which natural resource(s) would be conserved the *most*?

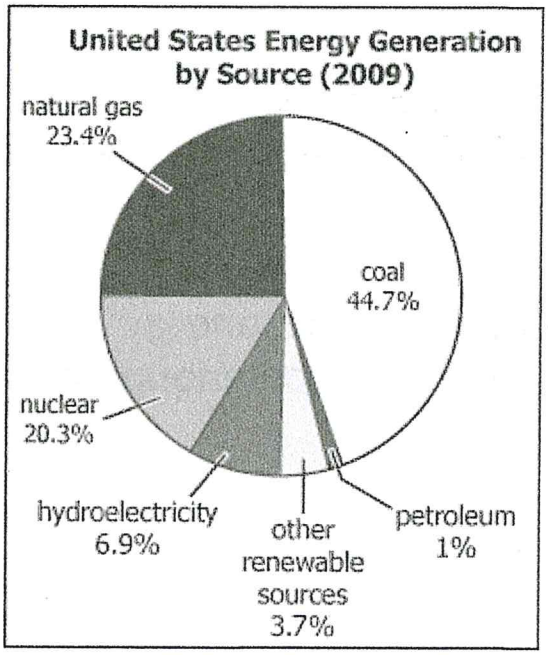
A freshwater only

B fossil fuels and freshwater

C fossil fuels, topsoil, and freshwater

D freshwater, fossil fuels, forests, and topsoil

24. Use the pie graph to answer the question.



What percentage of energy is produced from energy sources that are nonrenewable?

A 21.3%

B 44.7%

C 69.1%

D 89.4%

IO Assessment © 2020 IO Education
All content is the private property of the copyright holders.

26. A student compares the emissions from various energy sources.

Which energy source would produce the *greatest* amount of emissions?

A fossil fuels

B nuclear fuels

C solar energy

D wind energy

28. How can engineers at a solar farm maximize energy collection from photovoltaic cells during the day?

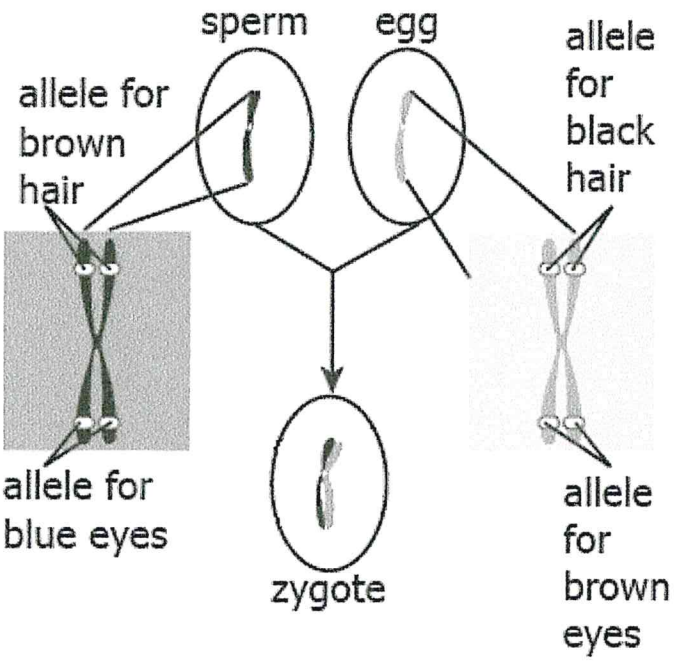
A by placing the cells closely together so that they partially shade each other during the afternoon

B by having the cells track the Sun's path across the sky so they are always directly facing the sun

C by using the cells only in the late fall and winter, when the sun is most directly overhead

D by using the cells only in the morning and late afternoon, when the sun's rays are least intense

30. A student studies the diagram shown.



What can be concluded about the relationship between genes, chromosomes, and inherited traits?

A An organism obtains one allele for a gene of a specific trait from each parent on one chromosome.

B An organism obtains two alleles for a gene of a specific trait from each parent on one chromosome.

C An organism obtains two alleles for a gene of a specific trait from each parent on two chromosomes.

D An organism obtains one allele for a gene of a specific trait from one parent on one chromosome.

23. What is one major limitation of using solar energy for electricity production?

A Solar energy can never be used in areas where it rains or snows.

B Solar energy cannot be transferred directly into electrical energy.

C Solar energy must be stored or supplemented for electrical use at night.

D Solar energy can never be used outside the tropics, where the sun is most intense.

IO Assessment © 2020 IO Education
All content is the private property of the copyright holders.

25. What is a limitation for using solar energy to meet global energy needs?

A Energy from the Sun cannot meet Earth's energy needs because at any given time half of the Earth is in darkness.

B Energy from the Sun cannot meet Earth's energy needs because the Sun simply does not produce enough power.

C Energy from the Sun far exceeds global energy needs, but methods for efficiently capturing and storing it have not been found.

D Energy from the Sun far exceeds global energy needs, but most of that energy cannot reach the Earth due to interstellar dust and clouds.

27. The image shows a house with both active and passive solar heating in its design.

The solar panels absorb sunlight that is later used to heat the house directly. The tree provides shade preventing heating of the house in the summer. How does the tree help in passive heating of the house in winter?

A The tree reflects sunlight toward the windows of the house.

B The tree branches can be burned in a fireplace to heat the house.

C The tree leaves turn bright red allowing more heat absorption.

D The tree loses its leaves allowing more sunlight to strike the house.

29. Two students conduct different activities to observe certain characteristics in parents and their offspring. Student P observes four friends (1, 2, 3, and 4) and their parents' skill levels in playing chess, while Student Q observes the flower colors among pea plants. The tables show the observations of the students.

Student P Observations			
Friend	Friend Skilled in Playing Chess?	Mother Skilled in Playing Chess?	Father Skilled in Playing Chess?
1	yes	yes	no
2	yes	no	no
3	no	no	no
4	no	yes	yes

Student Q Observations		
Flower Color of Offspring	Flower Color of Parent Plant 1	Flower Color of Parent Plant 2
purple	purple	purple
white	white	purple
purple	purple	white
white	white	white

Which student's activity can give information about inherited characteristics?

A Student P; the characteristic for chess skill can distinguish one individual from the other.

B Student P; the characteristic for chess skill is the same for all parents and their offspring.

C Student Q; the characteristic for flower color is passed from parents to offspring.