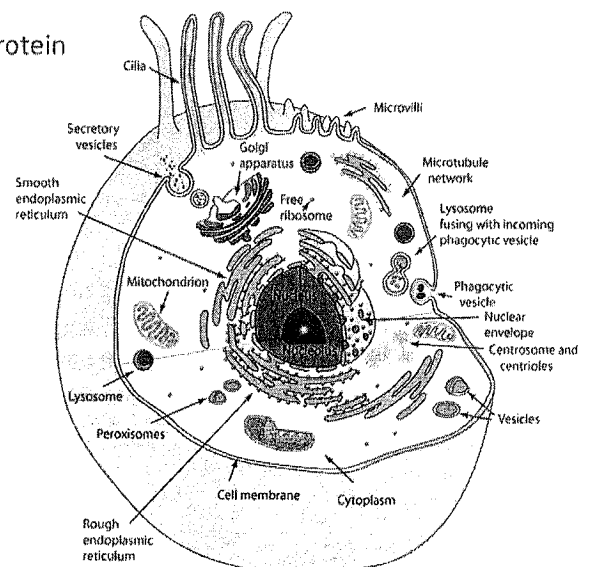


Benchmark III Review Sheet**Nucleic Acids**

1. Give the main function for:
 - a. DNA- Stores genetic information (blueprint of life)
 - b. mRNA-carries the message from DNA to ribosome
 - c. tRNA- transfers amino acids to the ribosome (acts as the delivery truck)
 - d. rRNA- makes up the ribosome structure
2. Long chains of nucleotides make up DNA. What three parts make up a nucleotide? Sugar, phosphate, base
3. Describe the process of transcription. Changing DNA to RNA
4. Describe the process of translation. Changing RNA to protein
5. What are the base-pairing rules for DNA? Adenine—Thymine and Cytosine—Guanine
6. What are the base-pairing rules for RNA? Adenine—Uracil and Cytosine—Guanine
7. What molecule is made during translation? protein
8. What binds to a ribosome in transcription? mRNA
9. If there's an error in DNA replication, what will it cause? mutation
10. What is the mRNA strand from the given DNA strand: TTAGCCTTG? AAU CGG AAC
11. Using the above mRNA strand, what amino acids are associated with that strand? Asp Arg Asp
12. What is a polypeptide chain? Chain of amino acids that makes a protein
13. What is the function of ribosomes? To make protein
14. What is protein synthesis? Where does it occur in the cell?
The process of making protein. Occurs in the ribosomes
15. In the cell diagram to the right, circle and point to a ribosome.



Genetics

16. Who is the father of genetics? Gregor Mendel
17. What is the probability that the offspring of a homozygous dominant individual and a homozygous recessive individual will show the dominant phenotype? What is the probability the offspring will show the recessive phenotype? $AA \times aa = 100\% Aa$ (dominant trait) 0% recessive trait
18. What is meant by "dominant trait?" it masks the recessive trait; shown in every generation
19. What does homozygous mean? Give an example. Having two of the same form of an allele (AA or aa)
20. What does heterozygous mean? Give an example. Having two different forms of alleles (Aa)
21. Describe Mendel's three laws. 1) Law of Dominance- one form of an allele is dominant and one form is recessive. The dominant form will mask the recessive. 2) Law of Segregation- alleles are separated at meiosis and joined together at fertilization (get half from mom and half from dad). 3) Law of Independent Assortment- Traits are inherited independently of each other. (hair color and eye color are inherited independently)
22. What is meant by phenotype? Give an example. Physical appearance Ex) pod shape in pea plants
23. If the Parent Generation is $Bb \times Bb$, what's the ratio of brown to white if brown is dominant to white? 3:1
24. Dimples are dominant over not having dimples. Show the possible offspring (use a Punnett square) for a couple who are both heterozygous. List the genotypic and phenotypic ratios. $Dd \times Dd = 75\%$ Dimples; 25% no dimples
25% DD; 25% dd; 50% Dd
25. How is the sex of an offspring determined? By the father
26. What are the female sex chromosomes? XX
 - a. What are the male sex chromosomes? XY
27. What is a mutation? A change in an organism's DNA
28. Are mutations beneficial, harmful, neutral, or all three? All three
29. Differentiate between codominance and incomplete dominance. Codominance- both traits are dominant (Red flower + white flower = red and white flower) Incomplete dominance- neither trait is completely dominant over the other (red flower + white flower = pink flower)
30. What is cloning? Making an identical copy of an organism
31. How does meiosis contribute to species diversity? Sexual reproduction (meiosis) produces offspring that are half from mom and half from dad.
32. What is a gene? A segment of DNA
33. What is an allele? Different forms of a gene Ex) dominant form, recessive form,
34. If an octopus has 32 chromosomes, how many would be in one sperm cell? 16

Complete the following genetics problems.

35. Buck teeth are dominant to straight teeth. Show a cross for a heterozygous buck tooth Indian and a homozygous straight tooth squaw.

B = buck teeth

b = straight teeth

	B	b
B	BB	Bb
b	Bb	bb

P1 = Bb X bb

What are all the possible genotypes? Bb, bb

What percentage of the offspring will be buck teeth? 50%

What percentage of offspring will be straight teeth? 50%

36. Long fluffy ears is dominant to short round ears.

Long thin tail is dominant to a short furry tail.

F = fluffy ears

L = long, thin tail

f = round ears

l = short, furry tail

Against their family, Bugs Bunny marries Minnie Mouse. Bugs is heterozygous long ears, homozygous short furry tail and Minnie is homozygous round ears, heterozygous long, thin tail. Show all possible offspring:

P1: Ffll X ffLl

	Fl	Fl	fl	fl
fL	FfLl	FfLl	ffLl	ffLl
fl	Ffll	Ffll	ffll	ffll
fL	FfLl	FfLl	ffLl	ffLl
fl	Ffll	Ffll	ffll	ffll

List all phenotype possibilities:

$\frac{4}{16} = \frac{1}{4}$ Fluffy Long ears / short tail
 $\frac{4}{16} = \frac{1}{4}$ Fluffy Long ears / long tail
 $\frac{4}{16} = \frac{1}{4}$ Round ears / short tail
 $\frac{4}{16} = \frac{1}{4}$ Round ears / long tail