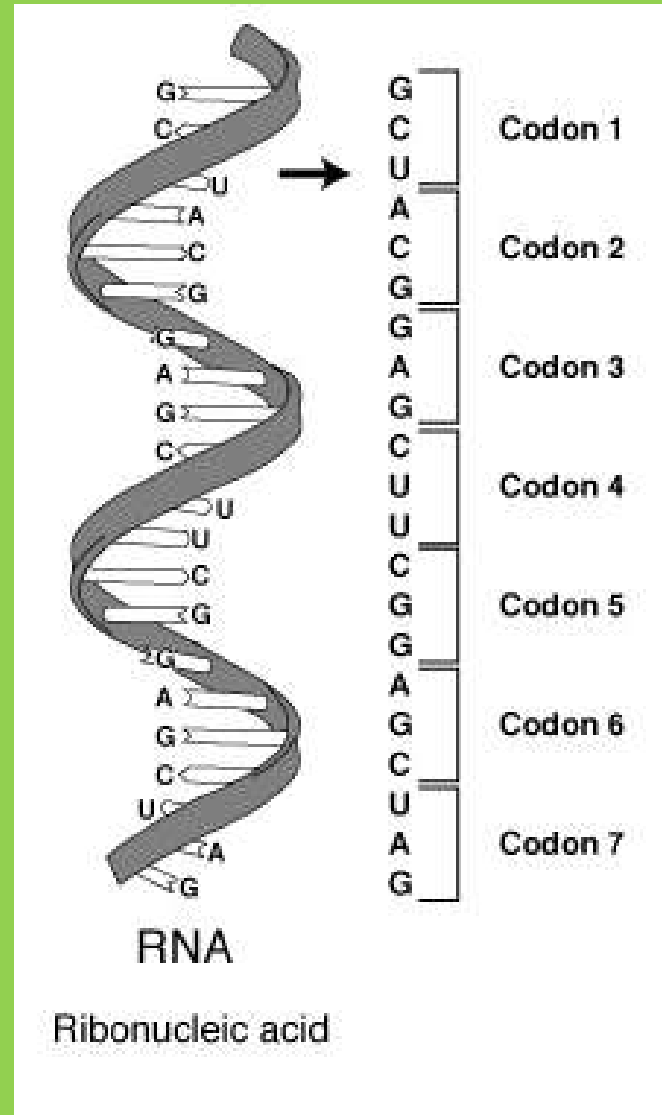
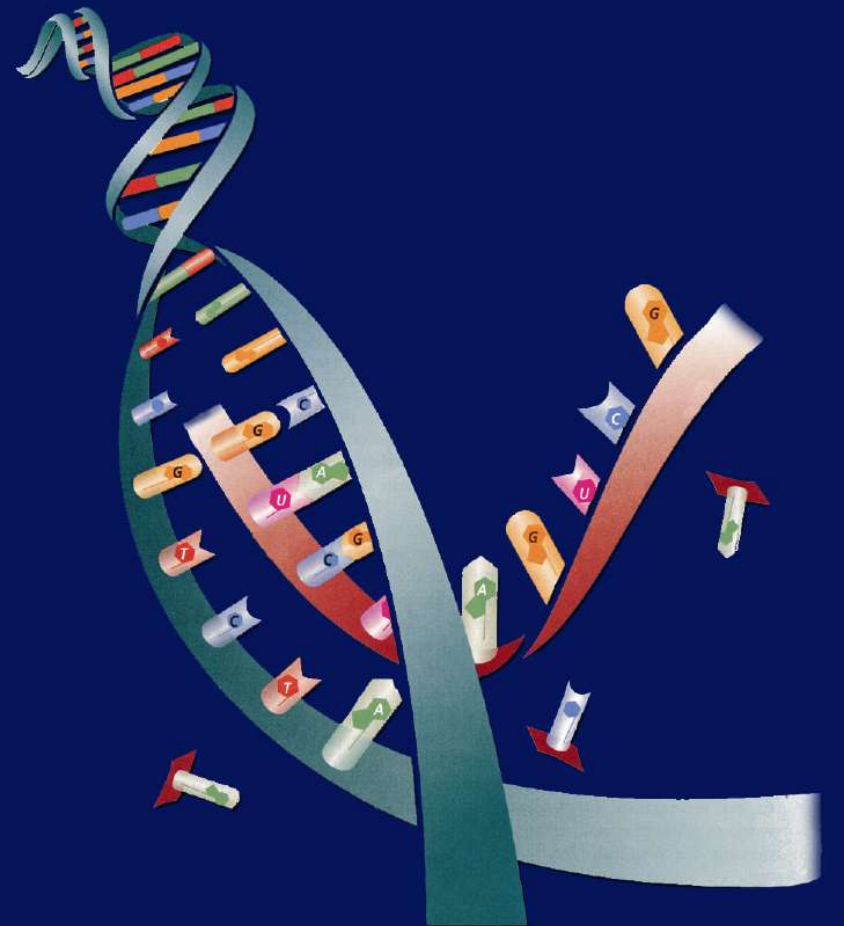


10/3 Protein Synthesis: Transcription 11.2

Obj. TSW explain the process of Protein Synthesis by transcribing and translating DNA sequences from their Mini Lab 11.1 P.64 NB

Learn.genetics.utah.edu/



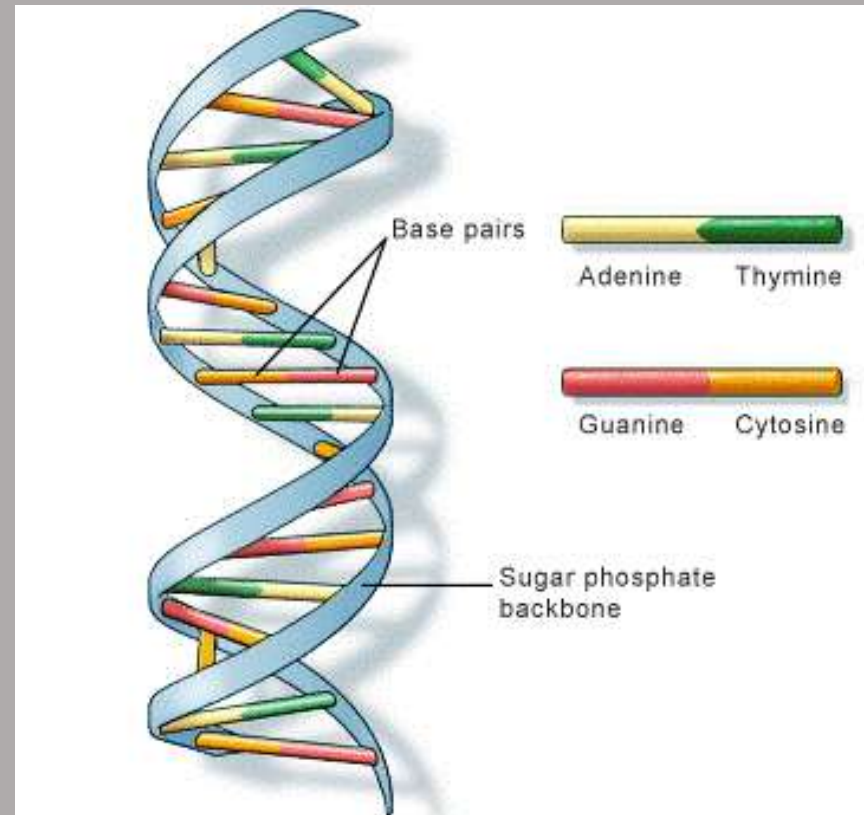
1. What is transcription?
2. Where does Transcription happen?
3. Why is a codon important to making a protein?

HW – Study for the DNA Quiz tomorrow

Cell Lab is due Thursday/ friday

DNA/ RNA Beads p. 59NB

- Backbone= Phosphate & Sugar (Red & White)
 - Nitrogen Bases= Adenine (Blue)=Thymine (Green)
Cytosine (Yellow)=-Guanine (Orange)
Uracil (Pink) RNA
 - Hydrogen bond (clear barbell)
 - <http://learn.genetics.utah.edu/>
- WS - DNA Model Discussion questions



Protein Synthesis

Transcription Practice p. 65NB

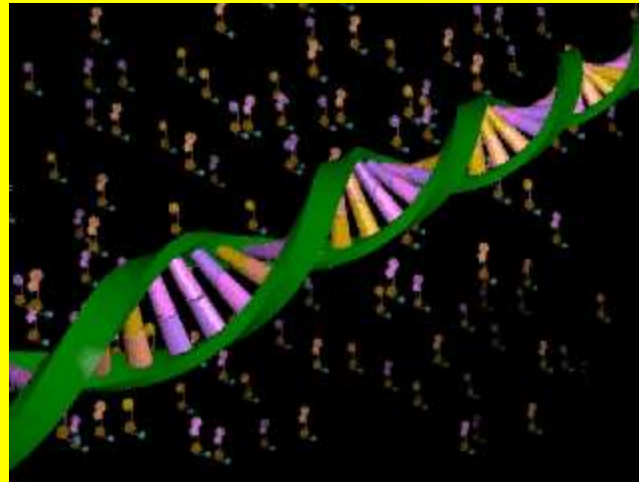
- **Directions:** Using the DNA strand as a template, transcribe mRNA. Make sure to use the correct Nitrogen bases.
1. ATA CCT TAA CGC GTC
 2. TAT TAG GCA AAA TTC
 3. GTG TGA TTA ATA GCC
 4. CTA AAG GAA TAG GAT
 5. GAT GAA TAC CCA CGA
 6. TAA TAT GCA CAT TAC
 7. GAA CCT TAC GGG GTG
 8. TAT AAC CAG GAG TTT
 9. ATC CGT AGT GTA AAT
 10. GGA TTA CCC TTA CCA

Cracking the Code

- Students will take a page of notes on Notebook Paper and tape into their NB page 71 NB

Transcription

In the nucleus, enzymes make an RNA copy of a portion of a DNA strand in a process called **transcription**.

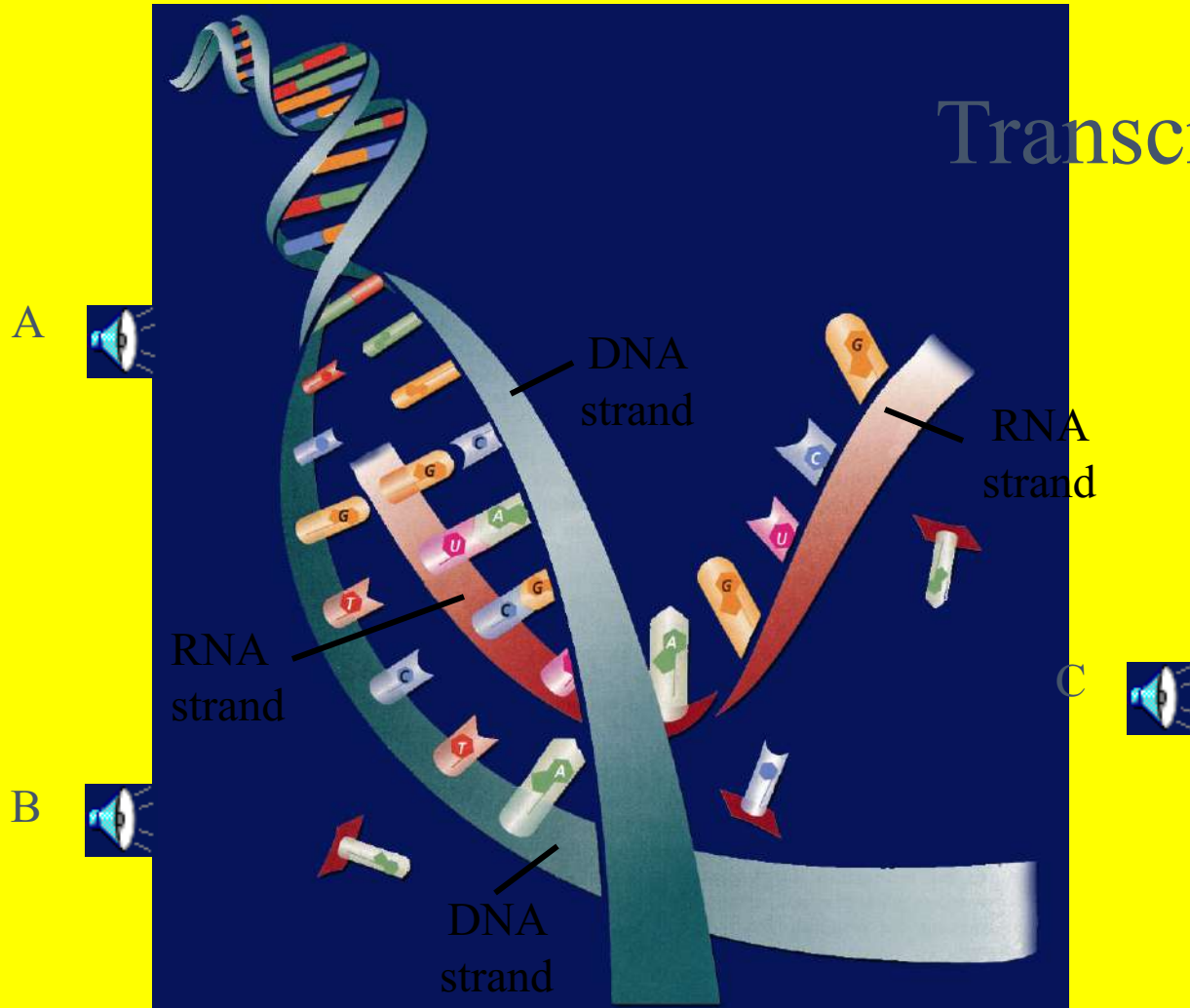


Click image to view movie



RESOURCES

Transcription



END OF
SLIDE



RESOURCES

Transcription

The main difference between transcription and DNA replication is that transcription results in the formation of one single-stranded RNA molecule rather than a double-stranded DNA molecule.



RNA Processing = Gene Expression

Not all the nucleotides in the DNA of eukaryotic cells carry instructions—or code—for making proteins.

Genes usually contain many long noncoding nucleotide sequences, called introns, that are scattered among the coding sequences.

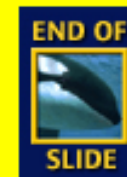


Protein Synthesis Biology

- 1 large bag M &M's – Brea & Lilly
- 1 large bag of Gummy Bears – Daniella
- 4 Bags of Marshmallows – Jose, Tyra, Brea
- 1 Box of Rice Krispy Cereal – Angel
- 1 stick of Butter – Johnell

How does DNA control the structures and functions of a cell?

DNA determines the structure of proteins. Some proteins become important cell structures. Other proteins, such as enzymes, control chemical reactions that perform key life functions.



CA: Biology/Life Sciences
5a



RESOURCES

HW CH 11 DNA & Genes p.41 NB

1. Deoxyribose
2. Nitrogenous Base
3. Nucleotide
4. Base Pair
5. Hydrogen Bond
6. Phosphate
7. Adenine (A) & Nitrogen Bases
8. Cytosine
9. *Nucleotides
10. DNA Replication
11. Double Helix

HW CH 11 DNA & Genes*

1. DNA – Double RNA – single
2. DNA – Deoxyribose RNA – Ribose
3. DNA – ATCG RNA – AUCG
4. Amino Acids
5. Amino Acids
6. Proteins
7. Codon*
8. Threonine

QUIZ

8. What is DNA Replication?

9. What are the two functions of DNA?

10. What are three differences of RNA from DNA?

11. What RNA has stop codons, and what is their function?

12. How are codons and anticodons different?

13. Write the equation for Protein Synthesis.

14. Transcribe & Translate the DNA sequence: ATC, TCA, TAC

DNA Quiz

7. What is the backbone of the molecule made of?

8. What is a gene?

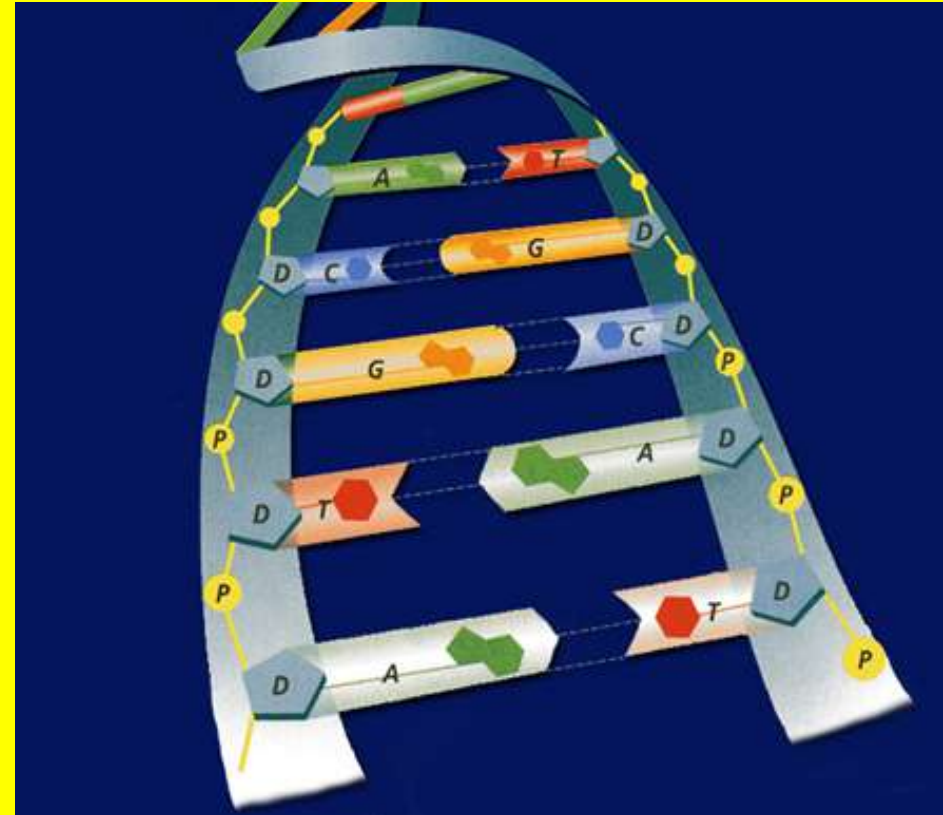
9. What does DNA code for? What is its purpose?

10. Write the formula for Protein Synthesis

When you are finished turn your paper upside down and wait quietly to have me pick it up.

POP QUIZ Write your name on your binder paper.

1. What is this molecule? Spell it out.
2. What is the shape of the molecule?
3. What are the two purposes/ functions of this molecule?
4. Write the three names for the parts of a nucleotide. Be specific.
5. The Nitrogen bases are: Adenine, Cytosine, Guanine, & Thymine – Base Pair them together correctly.
6. What holds the Nitrogen bases together?
7. DNA is a Nucleic Acid, write an example of another one.
8. Can a Nucleic Acid leave the nucleus?
9. What is DNA Replication?
10. What is the name for how DNA Replications?



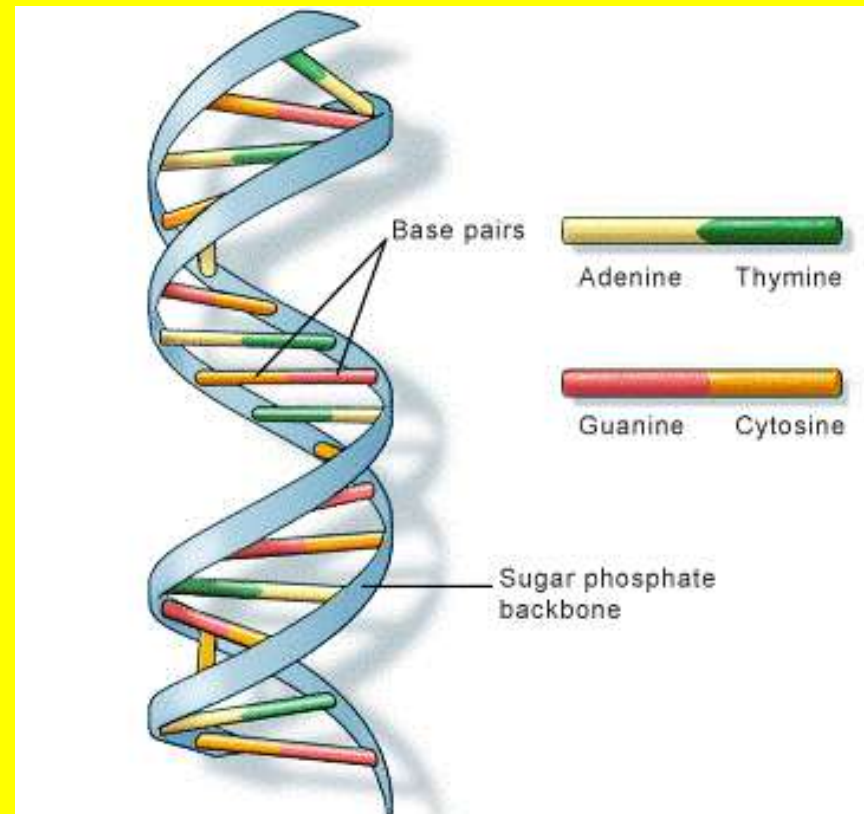
How is RNA different from DNA? P.65 NB

- DNA
 - Double stranded
 - Deoxyribose Sugar
 - 4 Nitrogen Bases: Thymine, Adenine, Guanine, Cytosine
 - Must stay in the Nucleus
- RNA
 - Single Stranded
 - Ribose Sugar
 - 4 Nitrogen Bases: Uracil, Adenine, Guanine, Cytosine
 - RNA leaves the Nucleus to the Ribosomes to assemble Proteins

DNA/ RNA Beads p. 59NB

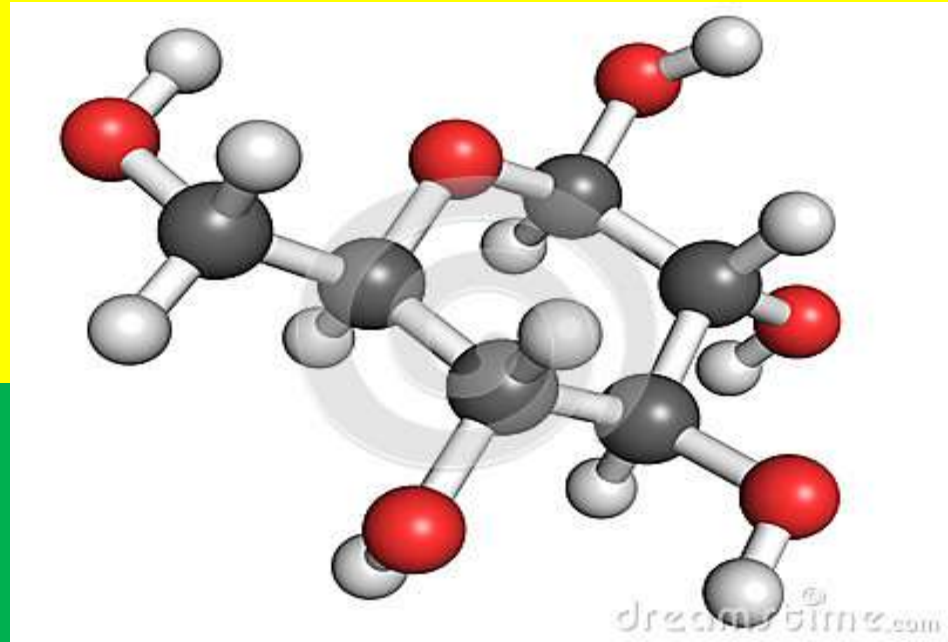
- Backbone= Phosphate & Sugar (Red & White)
- Nitrogen Bases= Adenine (Blue)=Thymine (Green)
Cytosine (Yellow)=-Guanine (Orange)
Uracil (Pink) RNA

- Hydrogen bond (clear barbell)
 - <http://learn.genetics.utah.edu/>
- WS - DNA Model Discussion questions



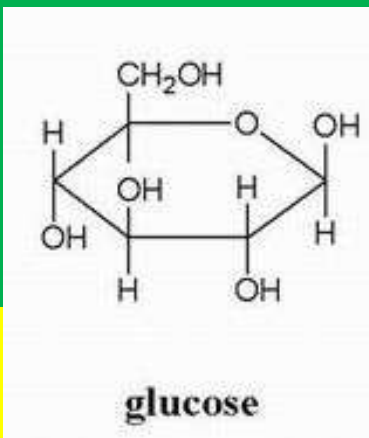
Molecular Models

You may work with a partner.



- With the molecular models make and show Mrs. McAllister
- Carbon Dioxide = CO₂
- Water = H₂O
- Oxygen = O₂
- Glucose = C₆H₁₂O₆

- CH₄
- CARBON = Black
- HYDROGEN = White
- OXYGEN = Red



The process through which the order of bases in messenger RNA codes for the order of amino acids in a protein is:

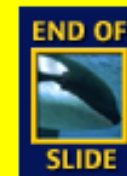
- A. transcription
- B. translation
- C. replication
- D. point mutation

The answer is B.



Why would scientists use nucleotide sequences to identify bodies of crime victims?

In comparing nucleotide sequences in the DNA of a crime victim with nucleotide sequences from a possible close relative of the crime victim, scientists can determine if the two are related.



HW CH 11

9. Phenylalanine Codon are (UUU) (UUC)

10. Codon

11. Amino Acid

12. Amino Acid

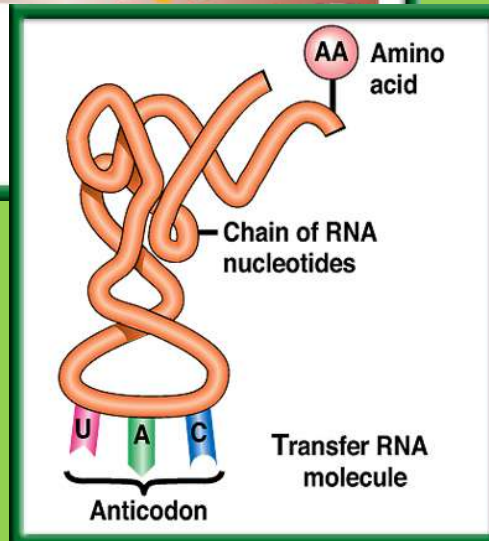
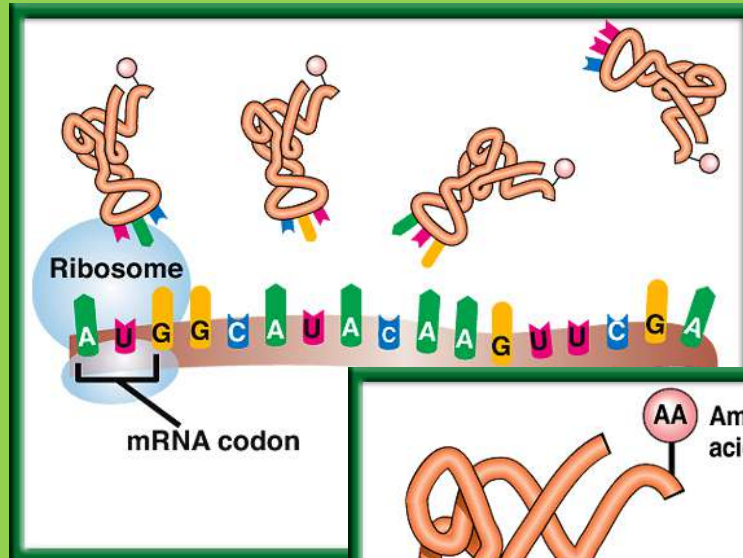
13. Stop codons = UGA, UAG, UAA

14. Tryptophan & Methionine

3/20 Protein Synthesis: Translation 11.2

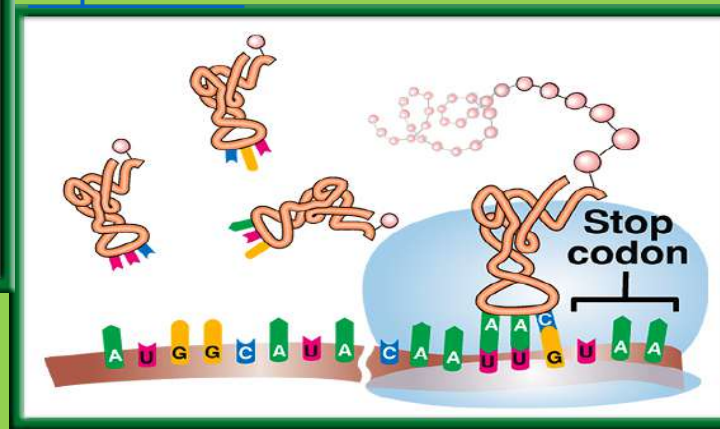
Obj. TSW explain the process of Protein Synthesis by drawing it in their notebooks. p.8 NB

Learn.genetics.utah.com.edu/



1. Compare & Contrast Codon and Anticodon.
2. What is the role of tRNA in Protein Synthesis?
3. Why are Stop Codons important in Translation?

<http://www.dnatube.com/video/3448/DNA-Replication>

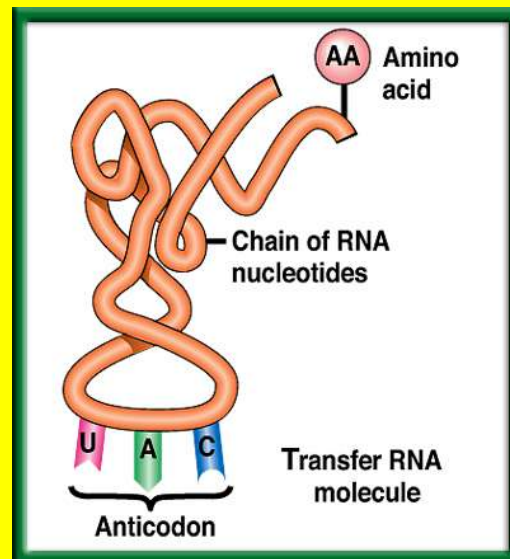


#2. The role of transfer RNA - tRNA

As **translation** begins, a ribosome attaches to the starting end of the mRNA strand. Then, **tRNA** molecules, each **carrying a specific amino acid**, approach the ribosome.

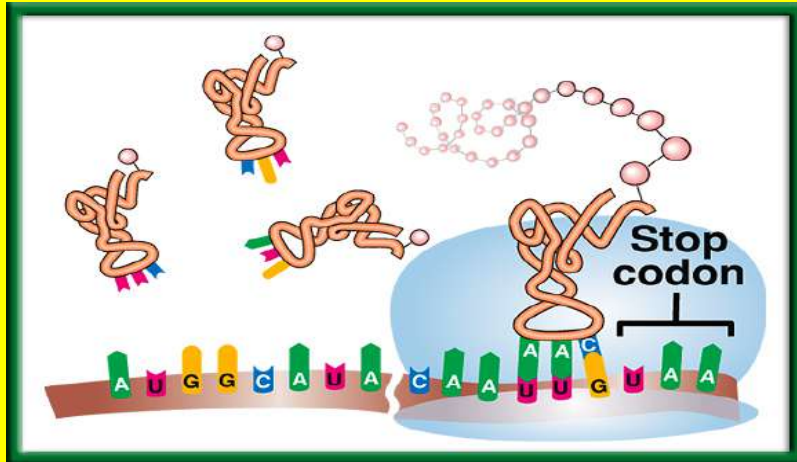
When a **tRNA anticodon pairs with the first mRNA codon**, the two molecules temporarily join together.

Usually, the first codon on mRNA is AUG, which codes for the amino acid methionine.



RESOURCES

#3. Stop Codons



- Without the stop codon, the protein would continuously be made.
- More Protein is not necessarily better.
- Name the 3 codons for STOP:
 - UAA, UAG, UGA

The Genetic Code P.292 BB p. 67 NB

The Messenger RNA Genetic Code

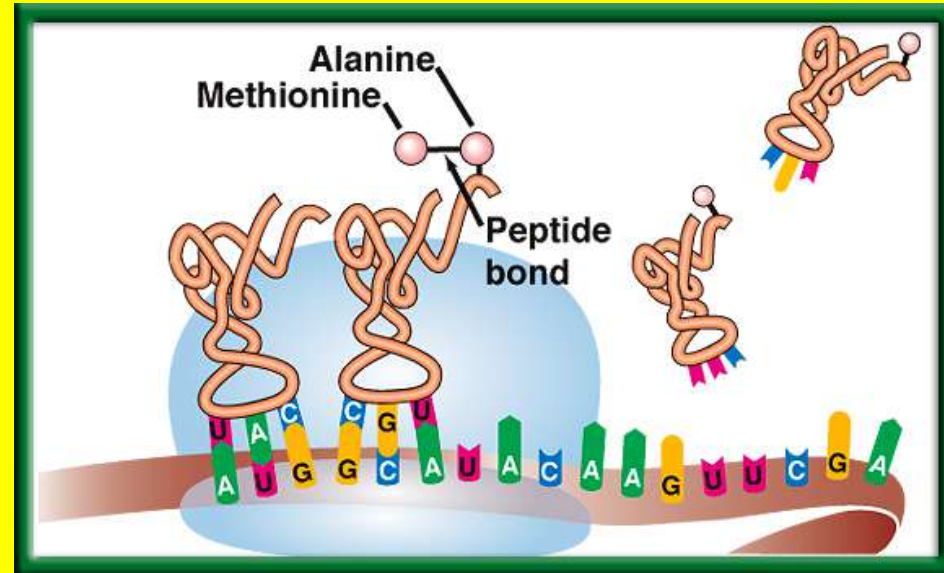
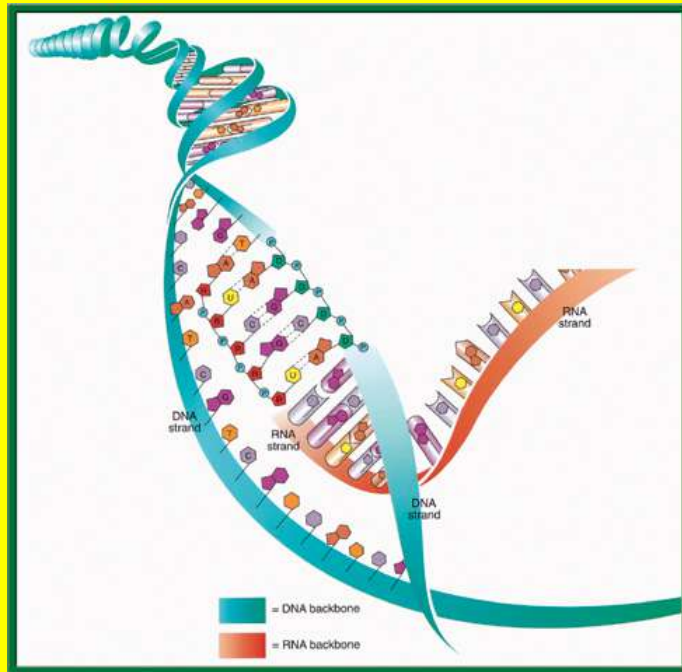
First Letter	Second Letter				Third Letter
	U	C	A	G	
U	Phenylalanine (UUU)	Serine (UCU)	Tyrosine (UAU)	Cysteine (UGU)	U
	Phenylalanine (UUC)	Serine (UCC)	Tyrosine (UAC)	Cysteine (UGC)	C
	Leucine (UUA)	Serine (UCA)	Stop (UAA)	Stop (UGA)	A
	Leucine (UUG)	Serine (UCG)	Stop (UAG)	Tryptophan (UGG)	G
C	Leucine (CUU)	Proline (CCU)	Histadine (CAU)	Arginine (CGU)	U
	Leucine (CUC)	Proline (CCC)	Histadine (CAC)	Arginine (CGC)	C
	Leucine (CUA)	Proline (CCA)	Glutamine (CAA)	Arginine (CGA)	A
	Leucine (CUG)	Proline (CCG)	Glutamine (CAG)	Arginine (CGG)	G
A	Isoleucine (AUU)	Threonine (ACU)	Asparagine (AAU)	Serine (AGU)	U
	Isoleucine (AUC)	Threonine (ACC)	Asparagine (AAC)	Serine (AGC)	C
	Isoleucine (AUA)	Threonine (ACA)	Lysine (AAA)	Arginine (AGA)	A
	Methionine; Start (AUG)	Threonine (ACG)	Lysine (AAG)	Arginine (AGG)	G
G	Valine (GUU)	Alanine (GCU)	Aspartate (GAU)	Glycine (GGU)	U
	Valine (GUC)	Alanine (GCC)	Aspartate (GAC)	Glycine (GGC)	C
	Valine (GUA)	Alanine (GCA)	Glutamate (GAA)	Glycine (GGA)	A
	Valine (GUG)	Alanine (GCG)	Glutamate (GAG)	Glycine (GGG)	G



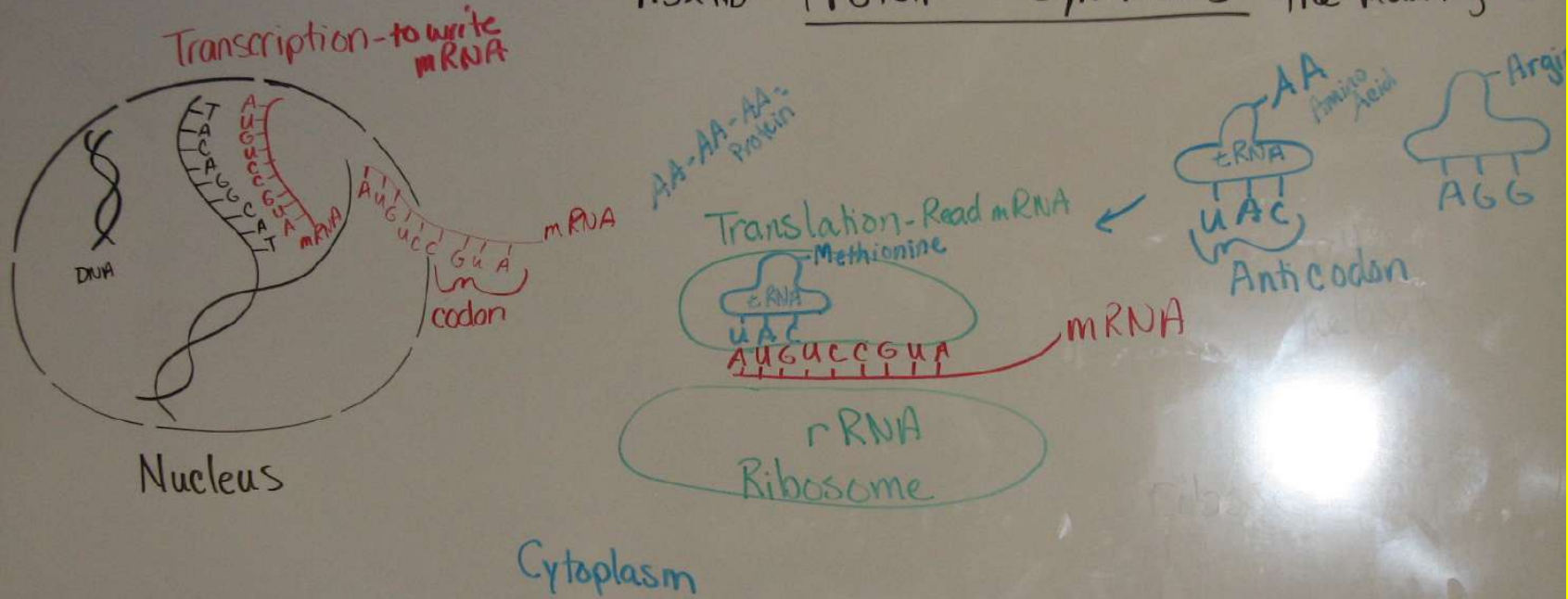
RESOURCES

Protein Synthesis p. 9 NB

DNA -> **transcription** -> RNA -> **translation** -> Proteins



P.52 NB Protein Synthesis - the making of



Molecular Genetics p. 11NB

DNA Replication – make more DNA for more cells to replace other cells.

DNA-DNA

A = T

T = A

C ≡ G

G ≡ C

Protein Synthesis

DNA: TAC CAC AAC

Transcription (nucleus)

mRNA: AUG GUG UUG

Translation (ribosome)

Protein: Methionine, _____, _____ Amino Acid Sequence

Protein Synthesis – to make proteins

DNA RNA

A = U

T = A

C ≡ G

G ≡ C

Protein Synthesis – Gene Expression Practice

P. 11NB

1. DNA: ATA CCT TAA CGC GTC

2. DNA: TAT TAG GCA AAA TTC

Start Epigenetics

How does the environment influence how your genes are expressed?

Page 17 NB

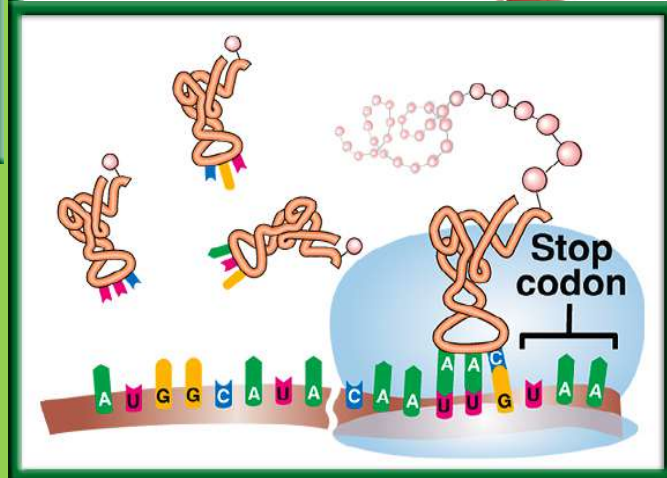
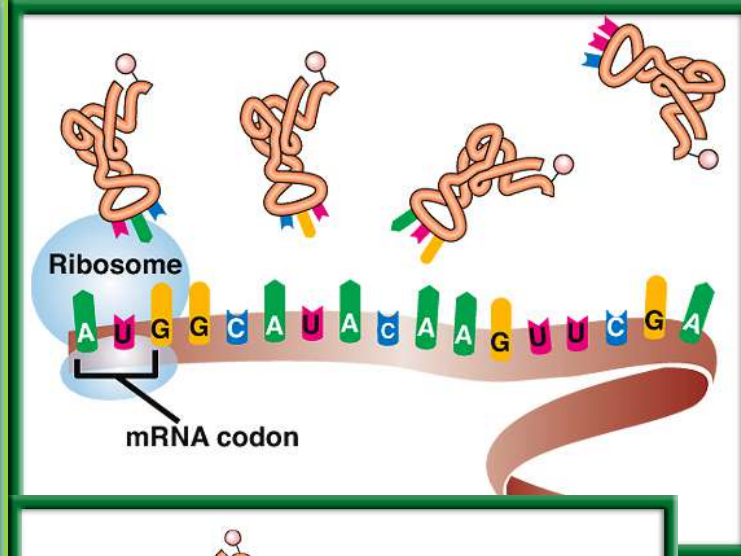
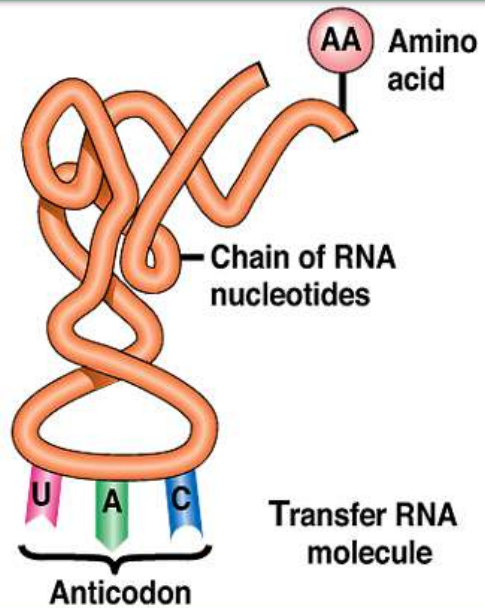
Take $\frac{1}{4}$ page of Notes & write 3 Questions.

3/21 Protein Synthesis: Translation 11.2

Obj. TSW explain the process of Protein Synthesis Completing a Problem Solving Lab 11.2. P. 10 NB

Learn.genetics.utah.edu/

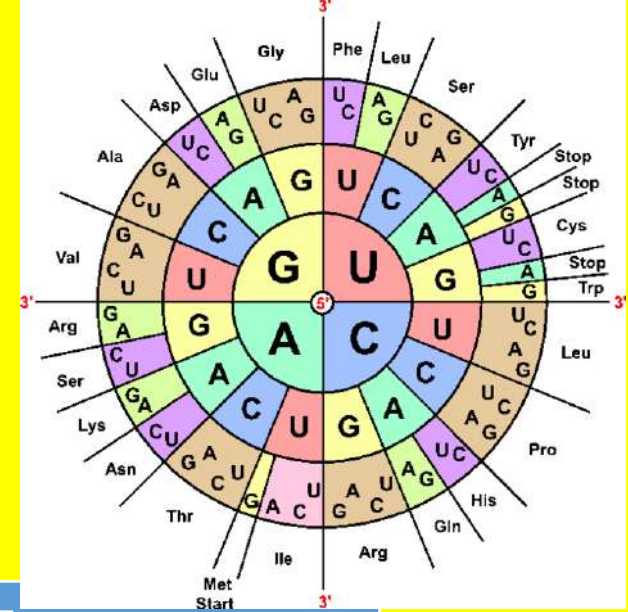
1. When making proteins, If a template DNA strand read: TAC GGT, AGT what would a complementary strand of mRNA be?
2. What Amino Acids would the 3 codons code for?
3. Do the same for: GCA, TGC, ATC (DNA).



		Second letter				
		U	C	A	G	
U	UUU } Phe	UCU } Ser	UAU } Tyr	UGU } Cys	U	
	UUC } Phe		UAC } Tyr	UGC } Cys	C	
	UUA } Leu		UAA Stop	UGA Stop	A	
	UUG } Leu		UAG Stop	UGG Trp	G	
C	CUU } Leu	CCU } Pro	CAU } His	CGU } Arg	U	
	CUC } Leu		CAC } His	CGC } Arg	C	
	CUA } Leu		CAA } Gln	CGA } Arg	A	
	CUG } Leu		CAG } Gln	CGG } Arg	G	
A	AUU } Ile	ACU } Thr	AAU } Asn	AGU } Ser	U	
	AUC } Ile		AAC } Asn	AGC } Ser	C	
	AUA } Ile		AAA } Lys	AGA } Arg	A	
	AUG } Met		AAG } Lys	AGG } Arg	G	
G	GUU } Val	GCU } Ala	GAU } Asp	GGU } Gly	U	
	GUC } Val		GAC } Asp	GGC } Gly	C	
	GUA } Val		GAA } Glu	GGA } Gly	A	
	GUG } Val		GAG } Glu	GGG } Gly	G	

Mini Lab 11.1 P. 13 NB P. 292 BB
 DNA → transcription → RNA → translation → Protein

- Copy this table in your notebook.



	A	B	C	D	E
DNA Base Sequence	Process	mRNA Codon	Process	tRNA Anticodon	Amino Acid
AAT					
GGG					
ATA					
AAA					
GTT					

Mini Lab 11.1 P. 13NB P. 293 BB

DNA → transcription → RNA → translation → Protein

	A	B	C	D	E
DNA Base Sequence	Process	mRNA Codon	Process	tRNA Anticodon	Amino Acid
AAT	Transcription	UUA	Translation	AAU	Leucine
GGG		CCC		GGG	Proline
ATA		UAU		AUA	Tyrosine
AAA		UUU		AAA	Phenylalanine
GTT		CAA		GUU	Glutamine

Answer Analysis Questions 1 – 3

1. a. DNA instructions are located in the nucleus.
b. Transcription happens in the nucleus.
c. Translation happens in the Ribosome.
4. tRNA looks like a triangle with an Amino Acid on the end, and the other side has the Anticodon that base pairs with the codon on the mRNA.
5. Mutations would be more common, if the sequence of DNA was not strictly adhered to.

The Genetic Code

	U	C	A	G	
U	<p>UUU Phenylalanine</p> <p>UUC Phenylalanine</p> <p>UUG Leucine</p> <p>UUA Leucine</p>	<p>UCU Serine</p> <p>UCC Serine</p> <p>UCA Serine</p> <p>UCG Serine</p>	<p>UAU Tyrosine</p> <p>UAC Tyrosine</p> <p>UAA Stop</p> <p>UAG Stop</p>	<p>UGU Cysteine</p> <p>UGC Cysteine</p> <p>UGA Stop</p> <p>UGG Tryptophan</p>	<p>U</p> <p>C</p> <p>A</p> <p>G</p>
C	<p>CUU Leucine</p> <p>CUC Leucine</p> <p>CUA Leucine</p> <p>CUG Leucine</p>	<p>CCU Proline</p> <p>CCC Proline</p> <p>CCA Proline</p> <p>CCG Proline</p>	<p>CAU Histidine</p> <p>CAC Histidine</p> <p>CAA Glutamine</p> <p>CAG Glutamine</p>	<p>CGU Arginine</p> <p>CGC Arginine</p> <p>CGA Arginine</p> <p>CGG Arginine</p>	<p>U</p> <p>C</p> <p>A</p> <p>G</p>
A	<p>AUU Isoleucine</p> <p>AUC Isoleucine</p> <p>AUA Isoleucine</p> <p>AUG Methionine</p>	<p>ACU Threonine</p> <p>ACC Threonine</p> <p>ACA Threonine</p> <p>ACG Threonine</p>	<p>AAU Asparagine</p> <p>AAC Asparagine</p> <p>AAA Lysine</p> <p>AAG Lysine</p>	<p>AGU Serine</p> <p>AGC Serine</p> <p>AGA Arginine</p> <p>AGG Arginine</p>	<p>U</p> <p>C</p> <p>A</p> <p>G</p>
G	<p>GUU Valine</p> <p>GUC Valine</p> <p>GUA Valine</p> <p>GUG Valine</p>	<p>GCU Alanine</p> <p>GCC Alanine</p> <p>GCA Alanine</p> <p>GCG Alanine</p>	<p>GAU Aspartic acid</p> <p>GAC Aspartic acid</p> <p>GAA Glutamic acid</p> <p>GAG Glutamic acid</p>	<p>GGU Glycine</p> <p>GGC Glycine</p> <p>GGA Glycine</p> <p>GGG Glycine</p>	<p>U</p> <p>C</p> <p>A</p> <p>G</p>

Rice Krispie Treat

Protein Synthesis Lab – Thursday

- 1 Boxes of **Rice Krispies**
- 4 Bags of **LARGE MARSHMELLOWS**
- 1 large bag of **Mini M&M's**
- 1 large bag of **Gummy Bears**
- 1 stick of **Butter**
- **1 Microwave?**

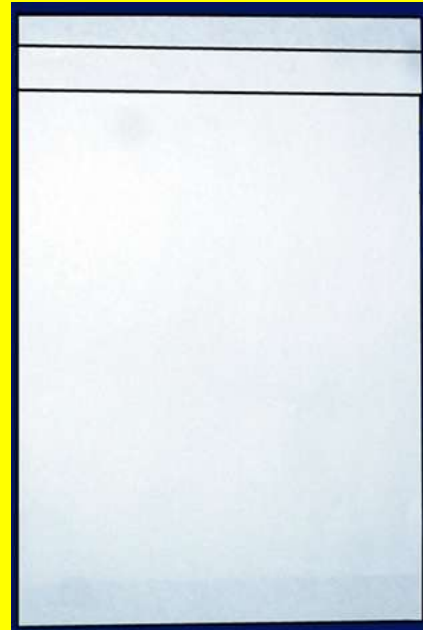
Protein Synthesis P. 13 NB

- Write a paragraph after building your DNA molecule that include the vocabulary words: Double helix, Nitrogen bases, Hydrogen bond, Nucleotide, Backbone, Deoxyribose, Phosphate, Adenine, Thymine, Cytosine, Guanine.

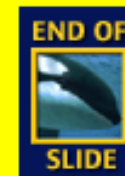
STEP 1

Collect 3 sheets of paper and layer them about 1.5 cm apart vertically. Keep the edges level.

P. 53 NB

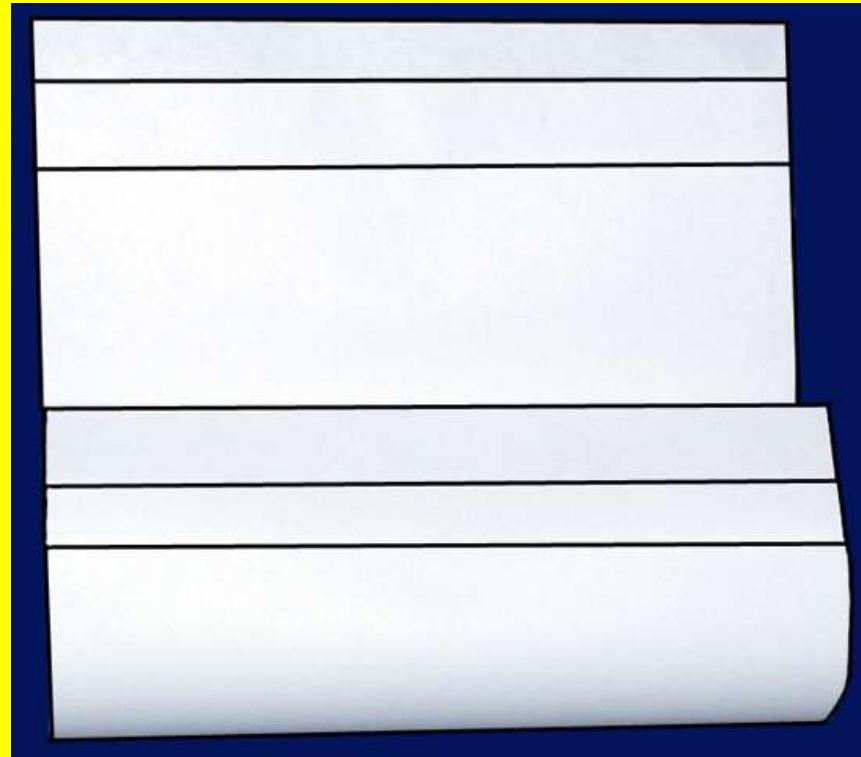


To return to the chapter summary click escape or close this document.

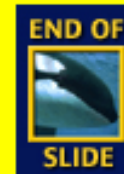


STEP 2

Fold up the bottom edges of the paper to form 6 equal tabs. P. 53NB



To return to the chapter summary click escape or close this document.

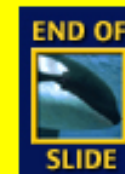


STEP 3

Fold the papers and crease well to hold the tabs in place. Staple along the fold. **Label** each tab. P. 53NB

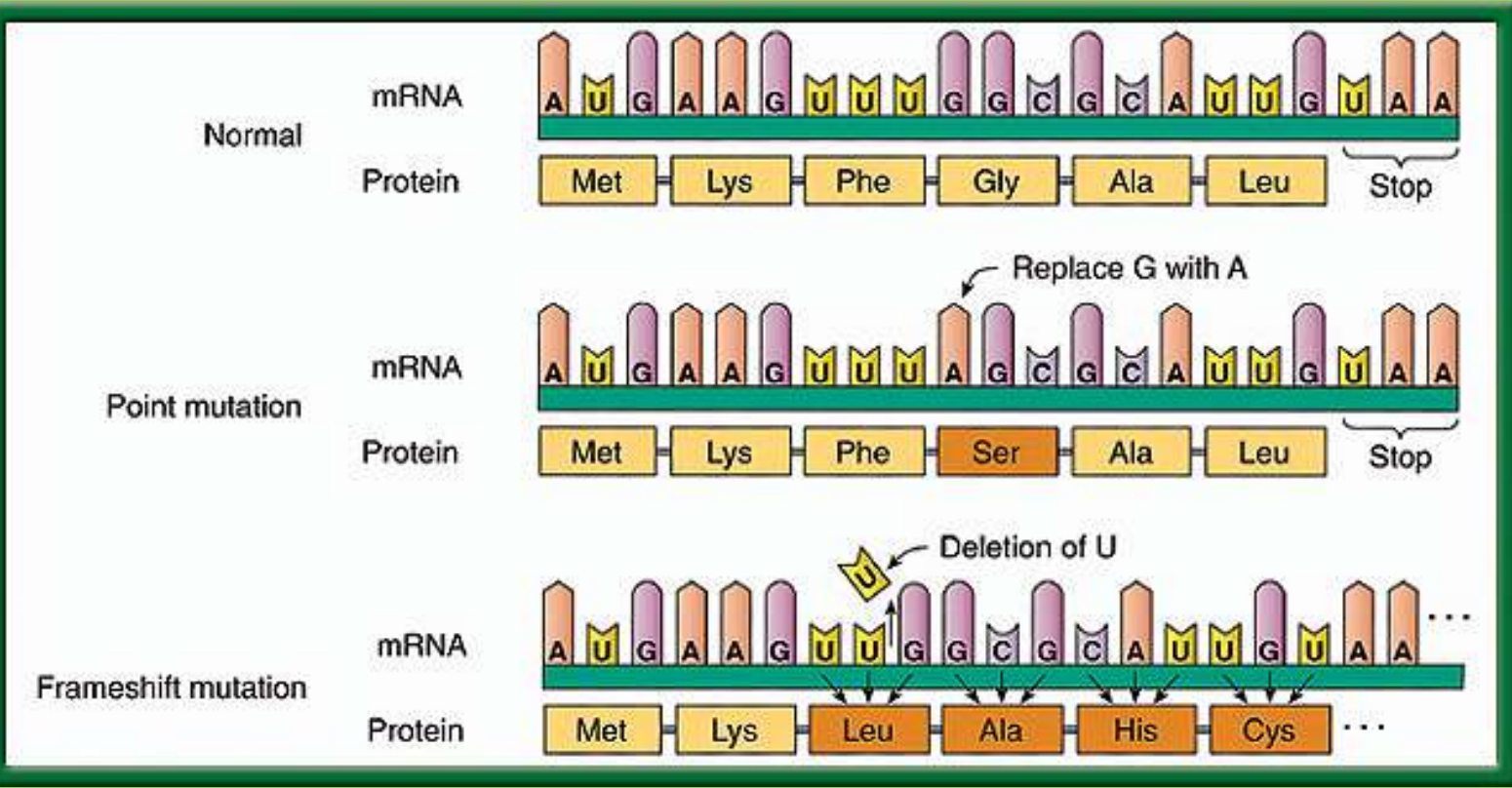
RNA – draw & label 3 differences from DNA	p. 289
TRANSCRIPTION: from DNA to RNA	P. 290
RNA Processing (Introns & Exons)	P.291
The Genetic Code	p. 291 - 292
TRANSLATION: from mRNA to PROTEIN	p. 294 11.9A
PROTEIN SYNTHESIS DNA->transcription->RNA ->translation->Protein	

To return to the chapter summary click escape or close this document.



3/22 Mutations: A change in a gene 11.3

Obj. TSW learn how mutations happen, and explain the difference between Point & Frameshift mutation from WU, notes & conclusion of Protein Synthesis Lab. P. 12 NB



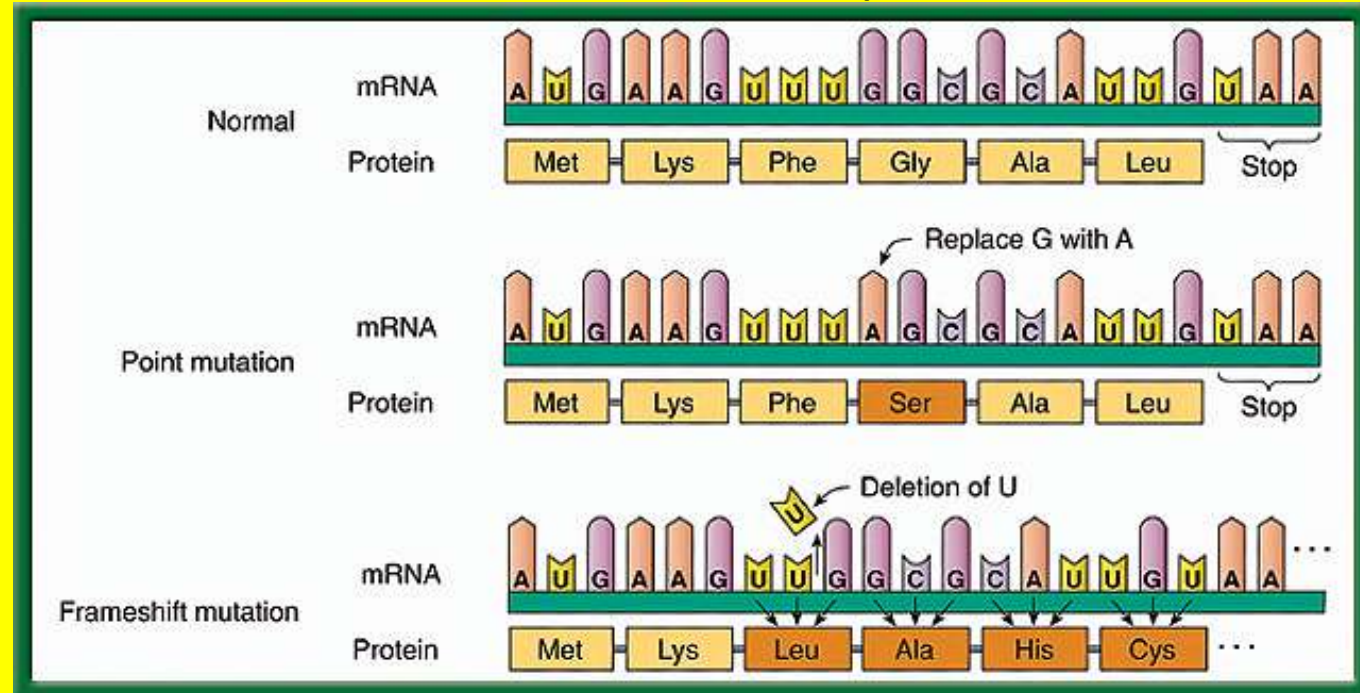
1. What are some causes of mutations?
2. Compare & Contrast the effects of a point mutation & a frameshift mutation.
3. Which mutation is worse and why?

#1. Causes of Mutations

- **Mutagens**- change in the DNA caused by the Environment – Pollution, UV Radiation, Drugs, Stress
- **Random mistakes**- proofreading enzymes are not working

#2. Gene Mutations – Point & Frameshift Mutations p.298 BB

Which
mutation is
worse?
Why?



#3. Frameshift Mutation is worse because it changes every amino acid after the deletion or addition of the nucleotide.

Rice Krispy Protein Synthesis P.15 NB

1. My protein looks like: Round, Flat, Color, M&M or Gummi Bears
2. Deleting the fifth nucleotide of your DNA will cause a **frameshift** mutation that changes every amino acid after the deletion. Change how many marshmallows were used.
3. Changing the 11th nucleotide of your DNA sequence from G to T would be a **point mutation** and will change the amino acid **Serine** to **STOP codon**, however, this is bad because the protein is not complete. Marshmallows would not be smooth.
4. If the 19th, 20th, 21st nucleotides of your DNA sequence were deleted the 7th codon were deleted the rice krispie treat would not have color.
5. Two proteins are different by some were flat, round, some were red, some blue, some M&M's &/ gummy bears.

The protein can be different by the number and the sequence of amino acids.

Conclusion

- 1.If you were given the

Classwork – Transcription & Translation p. 53

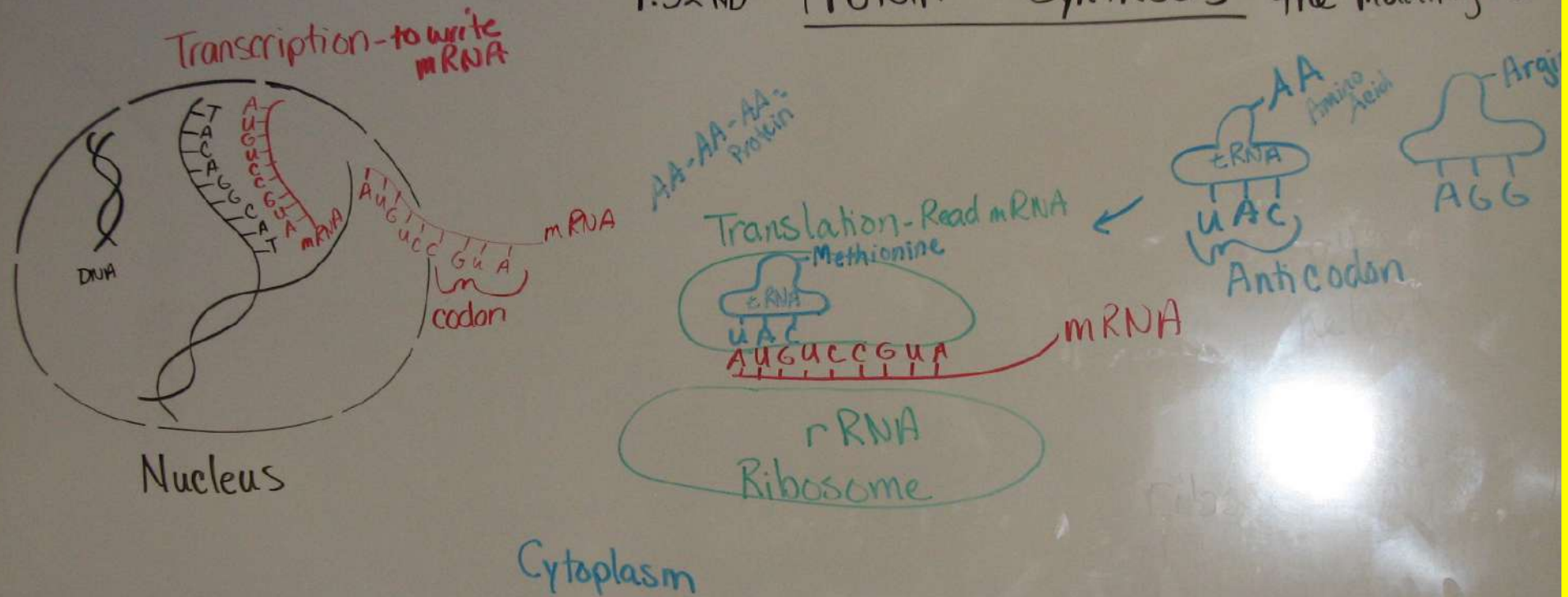
NB

- Work on worksheet about Protein Synthesis.
- Transcribe the DNA sequence.
- Then, translate the Amino Acid sequence to the right of the Codons.

Draw Protein Synthesis

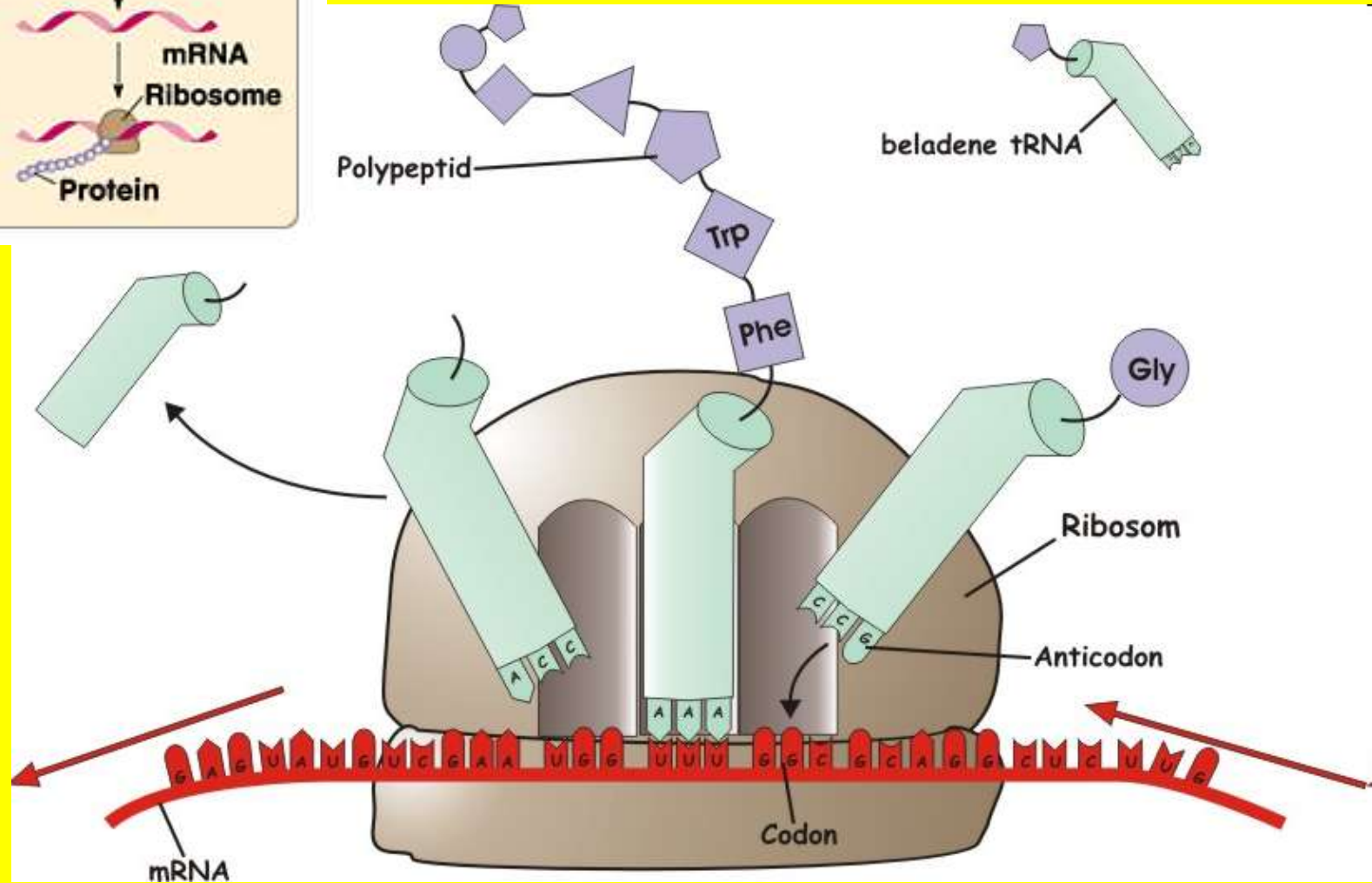
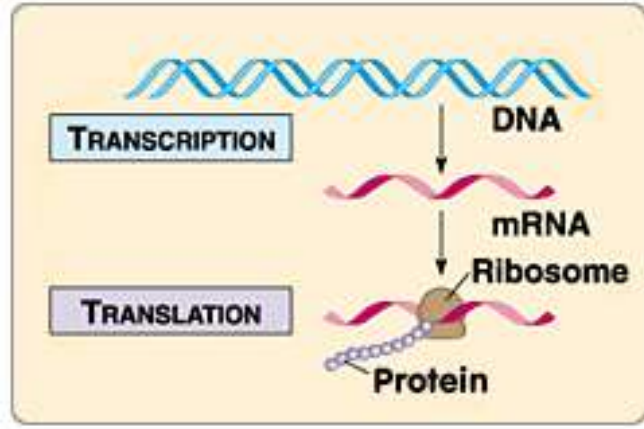
- P. 73 NB
- Turn your book Landscape Style ←-----→
- Have 4 different colored pencils.
- Write on the **RED** line at the top: **Protein Synthesis: the making of Proteins**
- Use $\frac{3}{4}$ of the page
- The last $\frac{1}{4}$ of the page will be a summary/ AXES paragraph.

P.52 NB Protein Synthesis - the making of



Schematic of protein synthesis

(© 1999, Addison Wesley Longman Inc.)



p. 187 BB

p. 77 NB

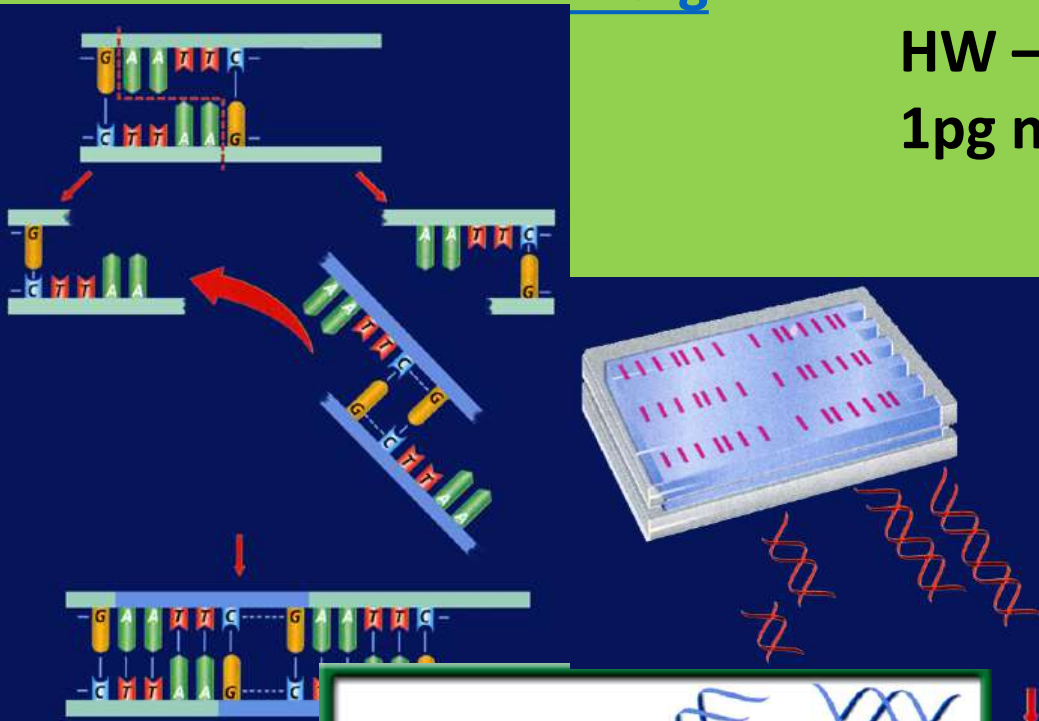
Write the functions for each of the following Cell Organelles:

- Plasma Membrane
- Nucleus
- Cytoplasm
- Rough ER
- Golgi Apparatus
- Mitochondria
- Vacuole
- Ribosome

3/23 Applied Genetics 13.2

Obj. TSW be able to explain how basic DNA technology is used to construct recombinant DNA molecules in a Minilab 13.1 p.14 NB

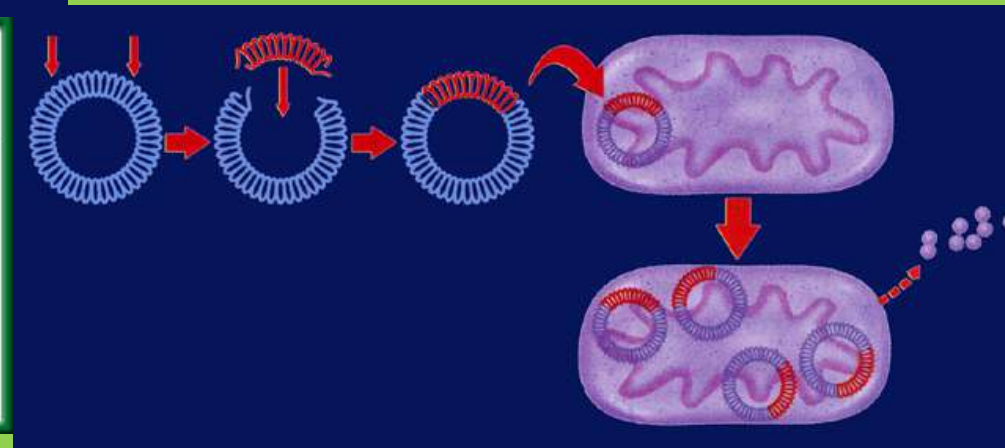
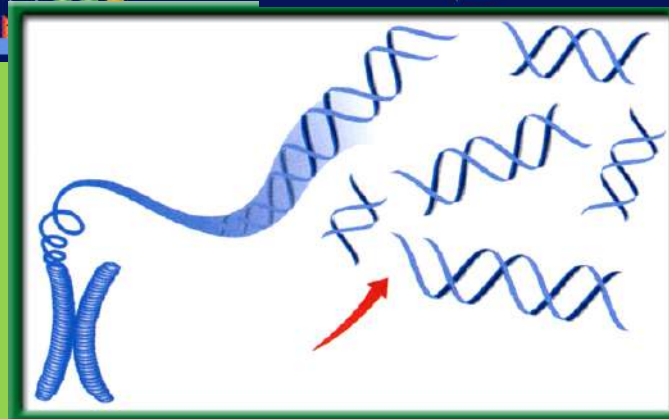
HHMI.org



NOVA.pbs.org

HW – Read CH 13
1pg notes P. 21 NB

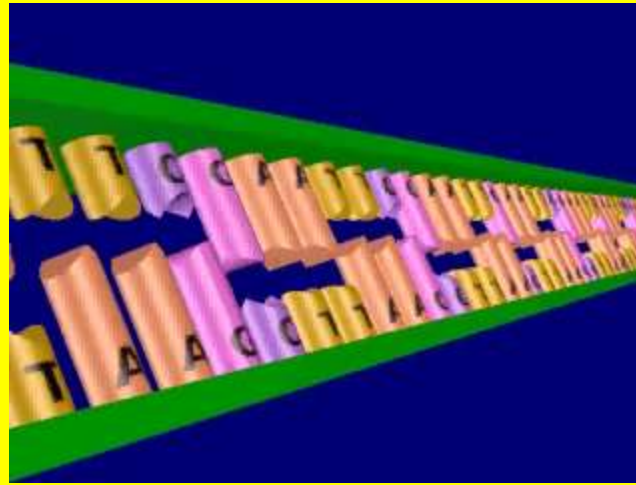
1. Genetic Engineering uses Recombinant DNA, explain.
2. Explain a transgenic organism.
3. Explain two ways in which recombinant bacteria are used for human applications.



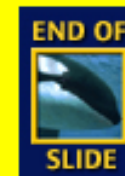
Genetic Engineering

- #1. Recombinant DNA is DNA that has one or more genes from another organism in it's genome.
- #2. A transgenic organism has Recombinant DNA.
- #3. Bacteria is a transgenic organism that can have the gene to make insulin for people who have Diabetes. They also can have the gene for Growth Hormone to help people who have Dwarfism be a more normal range of height.

Restriction enzymes cleave DNA




Click image to view movie



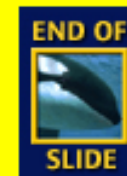
RESOURCES

Vectors transfer DNA

- Biological vectors include viruses and plasmids. A **plasmid**, is a small ring of DNA found in a bacterial cell. 



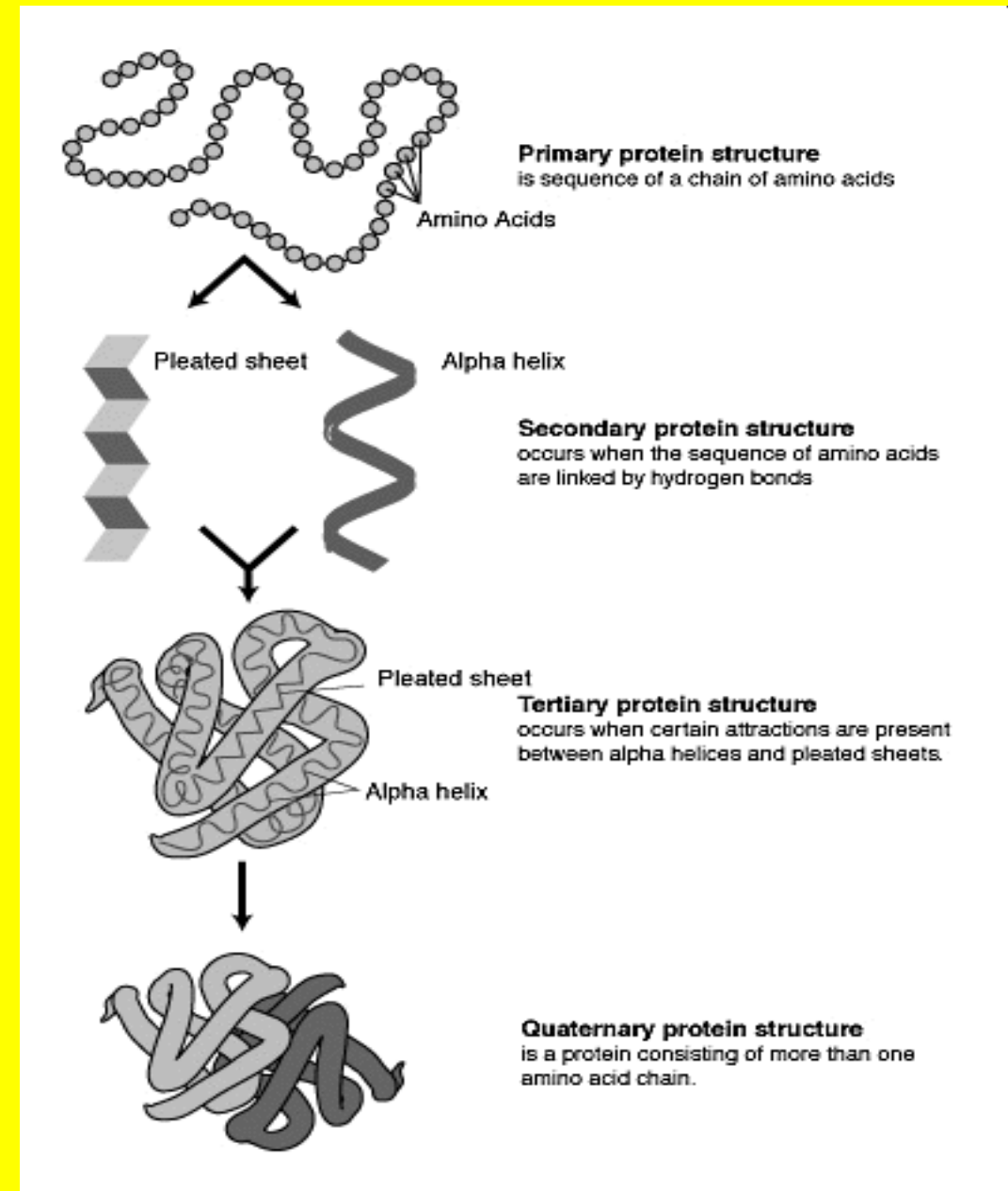
Click image to view movie



RESOURCES

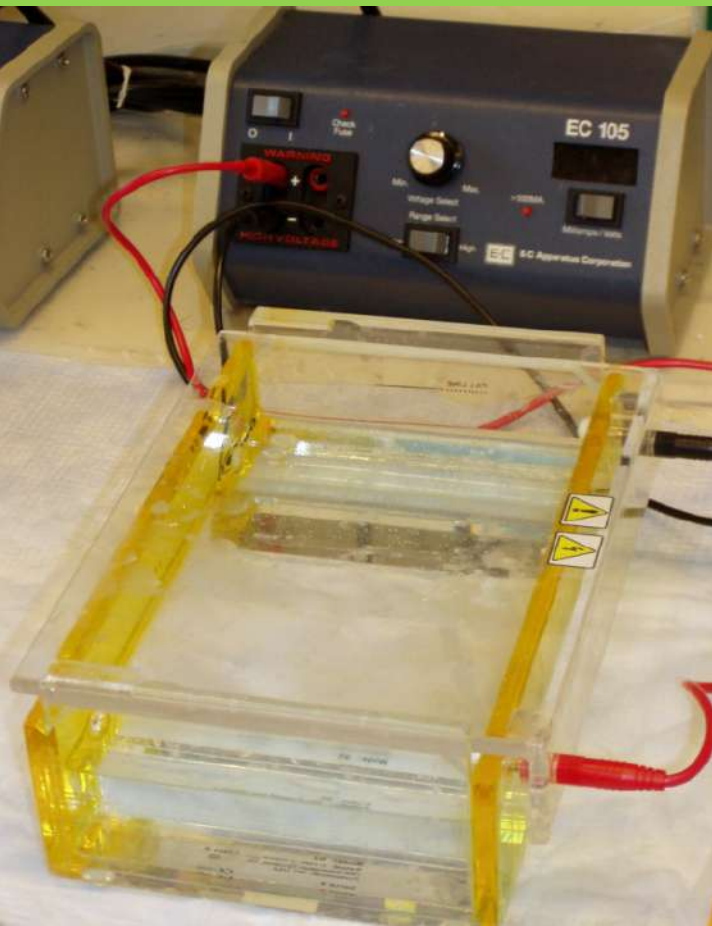
Proteins Notes P. 15 NB

- Proteins can come in many different shapes and sizes.
- The number & sequence of amino acids determine its a proteins shape.
- An example of proteins: ENZYMES!
- Proteins must have a specific structure in order to function properly.



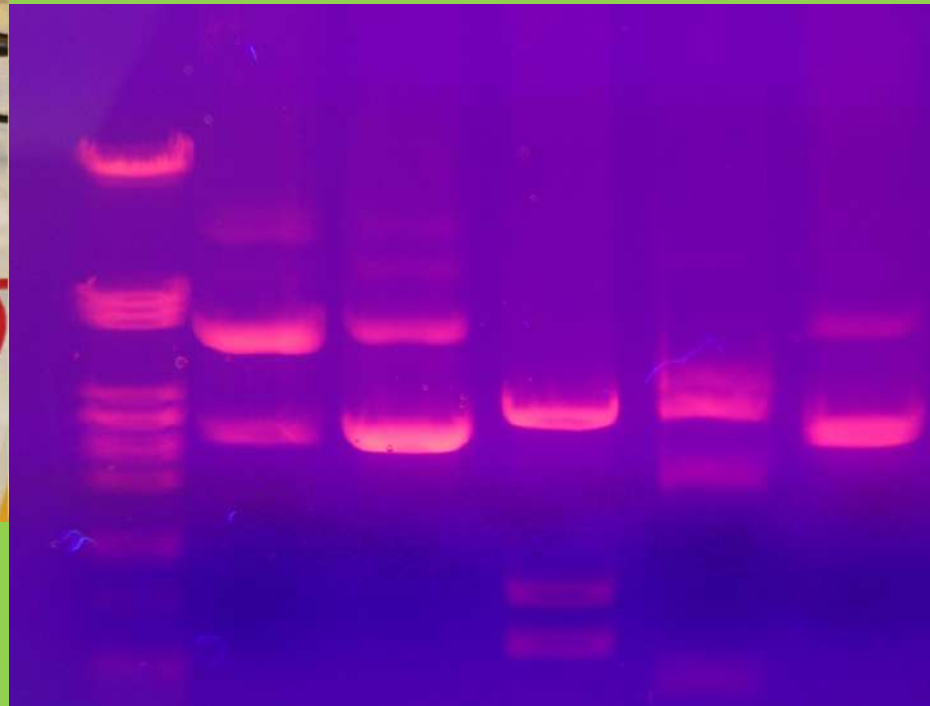
10/10 Gel Electrophoresis CH 13.1

Obj. TSW learn how to build a protein from an amino acid sequence using the hydrophobic and hydrophilic properties of the amino acids. P. 74 NB



Watch Gel Video
HW CH 13
HW Study Guide
Final 10/15

1. What is Gel Electrophoresis?
2. Why is DNA fingerprinting important?
3. Explain the field of Genetic Engineering and how a Gel Electrophoresis applies.



Learning to “Settle”

- Quiet focus
- It’s OK to not “multitask” every minute of every day.
- Deep Breath and relax the shoulders.

- This came out of my evaluation. There are too many distractions during class. Too many students out of class and/or going to the bathroom.
- Please make every effort to be on time. Set your clock 5 – 10 minutes earlier to help yourself get here on time. Go through the checklist before you leave home to make sure you did not forget anything.

Answers to Warm Up

1. Gel Electrophoresis is a technique to separate out different lengths of DNA to get a “fingerprint” of that sample.
2. DNA Fingerprinting (Gel Electrophoresis) is a way to ID a missing person or to ID a person involved in a crime, or if people are related.
3. Finding ways to change DNA, or use DNA to solve problems is an applied use of molecular genetics. For Example, we can cut a gene out of one organism and put it into the DNA of another organism to make that protein be expressed.

03/24 Genetically Modified Organisms (EEI Curriculum) CH 13.2 P. 348 BB
 Obj. TSW demonstrate the pros and cons of Genetically Modified Organisms. p. 16 NB

A GMO IS:
 the direct human manipulation of an organism's DNA in a laboratory environment.

GMO?

Genetically Modified Organism

A GMO IS NOT:
 Plants and animals that are traditionally bred to achieve specific characteristics such as breeding dogs or cross-pollination of plants.

SCIENCE OF GMOS

Genetic modification may include the **ADDITION OF DNA** from species that would **NOT BREED** in nature.

Genetic modification may also involve **REMOVING SPECIFIC STRANDS OF DNA**.

Cross-species—or transgenic—genetic manipulation has gone so far as to **COMBINE FISH DNA WITH STRAWBERRIES** and tomatoes.



GMO foods have only existed in groceries since the late 1990's.

GMO life can be patented.

GMO varieties of corn and potatoes are engineered to **PRODUCE THEIR OWN PESTICIDES**.

STUDIES OF GMOS

NO LONG-TERM TESTING.

It took decades for the dangers of Trans-Fats (another artificial food) to become understood.

Mice fed GM pesticide-producing corn over four generations showed **ABNORMAL** structural and chemical changes to various organs and significantly reduced fertility.

herbicide-resistant crops can cross-pollinate to create **HERBICIDE-RESISTANT WEEDS**.

Pesticide-producing GMO crops have led to **RESISTANCE IN INSECTS**.

TRANSGENIC DNA HAS BEEN FOUND IN **80% OF WILD CANOLA** IN NORTH DAKOTA.

PREVALENCE OF GMOS

You probably eat GMOs **EVERY DAY**.



30,000

different GMOs exist on grocery store shelves (largely because of how many processed foods contain soy).

PERCENT OF GMOS IN TOTAL CROP PRODUCTION 2011 (USA)



PUBLIC OPINION OF GMOS

Polls consistently show that a significant majority of North Americans would **LIKE TO BE ABLE TO TELL** if the food they're purchasing contains GMOs.

OUT OF A CBS NEWS POLL:



87% want GMOs labelled



53% would not buy genetically modified food

NATIONAL OPINIONS OF GMOS:

The USA is the **largest producer** of GMO crops and **does not mandate** labels for GMO food.

In 30 other countries, there are bans or restrictions on the production of GMOs, because they are **not considered proven safe**.

DESIGN BY MCKENZIE FOR KAY CARDINAL INNOVATIVE

1. What are the most common GMO crops?
2. What are some concerns you have about GMO's.
3. What are some benefits to GMO's that you read from the book: Recombinant DNA in Agriculture?

Genetically Modified Organisms

- Bt Corn – Concerns:
 - Benefits:
- Malaria Resistant Mosquitos: Concerns:
 - Benefits:
- Golden Rice Concerns:
 - Benefits:

Enzymes - Proteins

2015 Midterm Study Guide answers

1. A. Age in Years

b. Number of Teens

2. The trend is increasing for teens with phones.

3. As teens get older, more have cell phones.

4. A decrease in 60 teens who have cell phones.

5. Eukaryotic: Nucleus, Membrane Bound Organelle, Animal cell, Plant cell

Prokaryotic: No Nucleus, Bacteria

Both: DNA, Ribosomes, Cell Wall, Plasma Membrane,

Study Guide for Midterm Final Biology

6. a. Proteins: Carbon Hydrogen and Oxygen, Nitrogen, Sulfur
 - b. Lipids: Carbon, Hydrogen, Oxygen
 - c. Carbohydrates: Carbon, Hydrogen, Oxygen
 - d. Nucleic Acids: Carbon, Hydrogen, Oxygen, Phosphorus, Nitrogen, Sulfur
7. The Mitochondria converts Glucose into ATP (energy) and it produces Heat, CO₂ & H₂O.
8. The Chloroplast captures light energy and converts it to sugar (C₆H₁₂O₆), Chemical Energy.
9. An Enzyme is a Protein, that speeds up chemical reactions.
10. Draw 😊
11. Environmental Factors: Temperature, pH, Ionic Conditions
12. Plant – Cell Wall, Large Vacuole, Chloroplasts,
Animal – Small vacuole
- Both: Eukaryotic, Cell Organelles, Plasma Membrane, Nucleus, Mitochondria

1. A type of nucleic acid that has a double helix and contains thymine.
2. This process uses glucose and oxygen to produce ATP, CO₂ (carbon dioxide), and water.
3. This is a three nucleotide sequence found on **tRNA** that codes for a specific amino acid.
4. This macromolecule is composed of amino acid chains.
5. This type of macromolecule that includes glucose, fructose, and other saccharides. It has oxygen, carbon, and hydrogen atoms.
6. This type of eukaryotic cell does not have cell walls or chloroplasts.
7. This type of cell has cell walls, mitochondria, chlorophyll, and it utilizes both cellular respiration and photosynthesis to convert solar or organic energy into ATP.
8. This nucleic acid is single stranded and contains uracil.

- A three base sequence that corresponds with a specific amino acid for protein synthesis.
- This is a pathogen that infects other cells and it hijacks a host cell's machinery to replicate.
- This process uses carbon dioxide and water to produce glucose and oxygen.
- This is a change in a nucleotide sequence that can cause the readings of the codons after the change to code for different amino acids. Can cause an abnormally short or abnormally long amino acid chain.
- This molecule is a pigment found in the chloroplasts of plants and is vital in the process of photosynthesis.
- These proteins increase the rate of chemical reactions and are affected by environmental conditions.
- This is a type of RNA that makes up part of the ribosome and is essential in protein synthesis.

- A process that occurs in the cytosol and involves different forms of RNA. It occurs at the ribosome where the mRNA is read.
- This organelle is used in cellular respiration and it is found in both animal and plant cells.

Study Guide

13. AXES Paragraph about folded membranes:

Having folded membranes in cells is better. Organelles in the cell that have folded membranes are: Mitochondria, Golgi Apparatus, Endoplasmic Reticulum, and Chloroplasts. The folded membranes increase the chemical reactions in the cell because it has more surface area. In addition, the chemical reactions are more efficient due to the increased surface area. The chemical reactions help maintain homeostasis in the body.

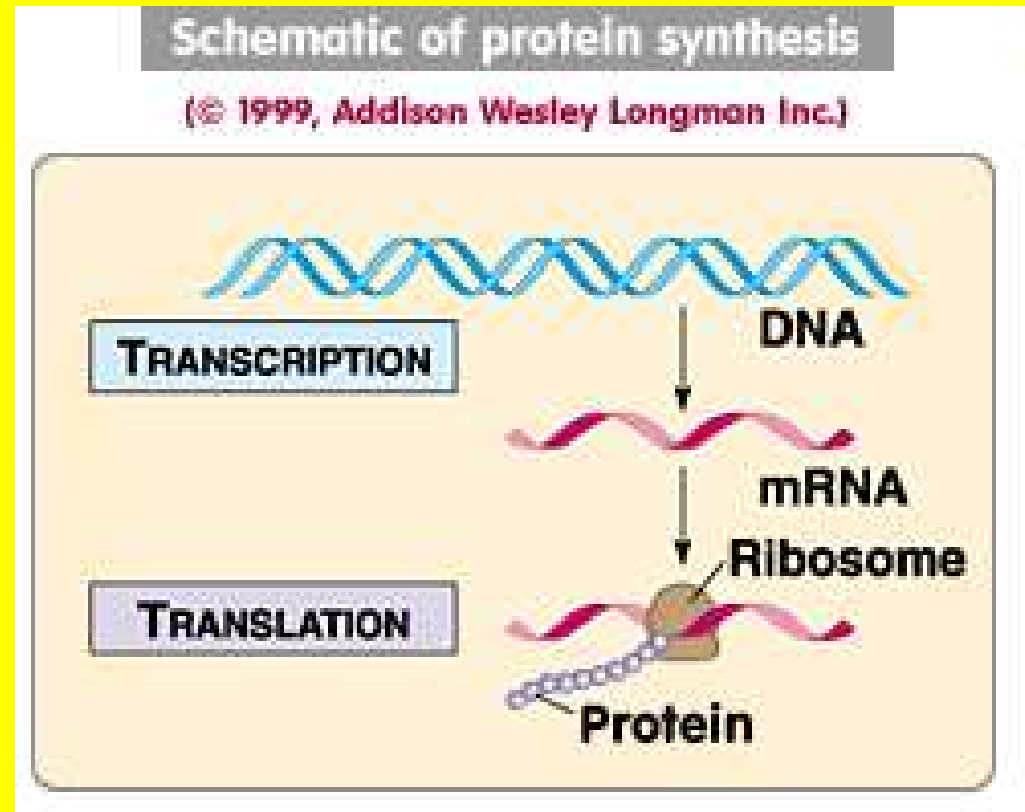
Study guide

14. Photosynthesis: Glucose & O₂ as a Product, Chloroplast, Needs Sunlight, CO₂ & H₂O as a reactant,

Cellular Respiration: Glucose & O₂ as a Reactant, animals, CO₂ & H₂O as a product,

Both: Mitochondria, Plants

15.



Study Guide

16. DNA: Adenine=Thymine

Cytosine=Guanine

17. RNA: Adenine= Uracil

Cytosine=Guanine

18. Frameshift Mutation: changes every amino acid after the addition or deletion, deletion of a nucleotide, addition of a nucleotide, is more severe

Point Mutation: changes one nucleotide, changes on amino acid,

Both: type of mutation

19. AXES paragraph:

Selective permeability allows some molecules in and out and other not. Glucose is a molecule that the cells need for energy. Carbon dioxide and water are released from the cell. Passive transport allows molecules across the cell membrane without energy. Active transport requires energy. Glucose provides energy for the body to perform cellular respiration, and maintains homeostasis for the body.

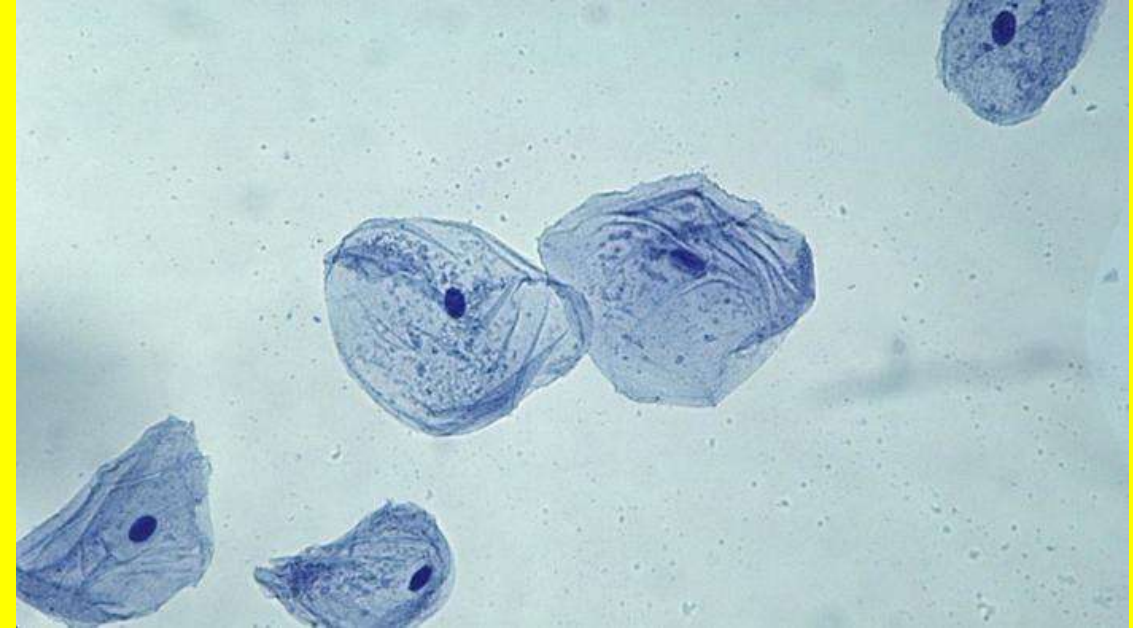
20. Virus – pathogen, needs a host cell to live and replicate.

Onion Cell

Locate and label: the Cell Wall, Plasma Membrane, Cytoplasm, Nucleus



Cheek Cell



10/12 Building Molecules & Enzymes CH 6.3

Obj. TSW identify the macromolecules living things are made of and describe their properties. P. 78NB

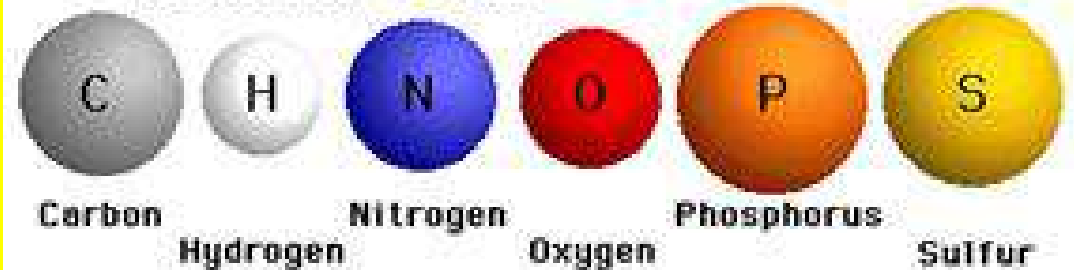
Organic Compounds

Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus and Sulfur are found in all living things

"CHONPS"



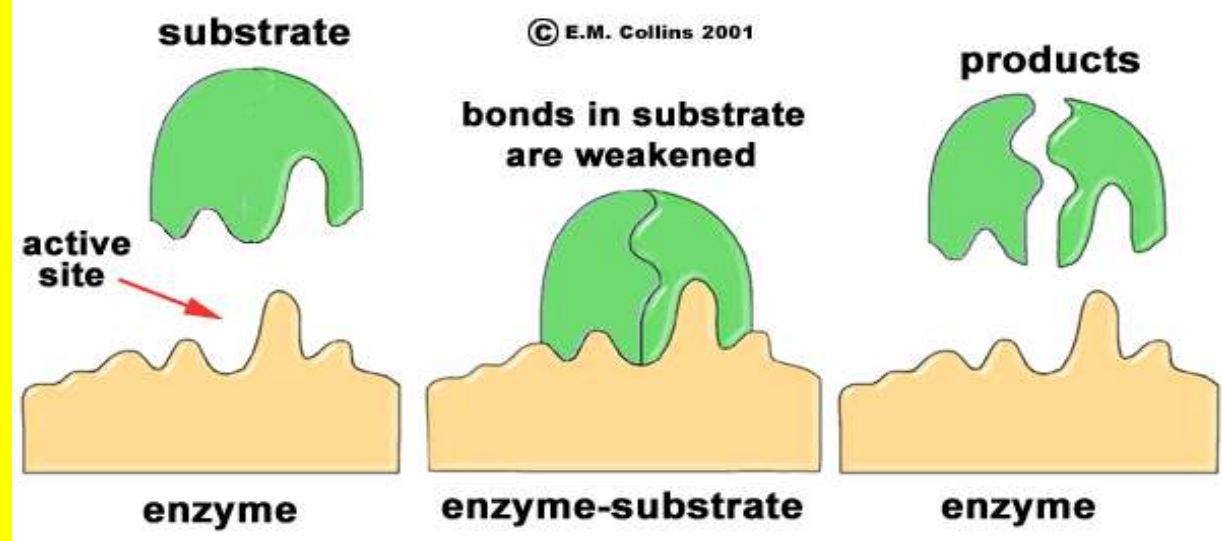
CHNOPS: The Six Most Abundant Elements of Life



1. What are the 6 main elements that make up the 4 macromolecules?
2. What is an Enzyme?
3. What three environmental factors determine the enzymes function?

Enzymes

1. CHONPS- Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus, & Sulfur.



2. Enzymes are a type of protein that **catalyze** chemical reactions. This means they **speed up** the rate of chemical reactions.

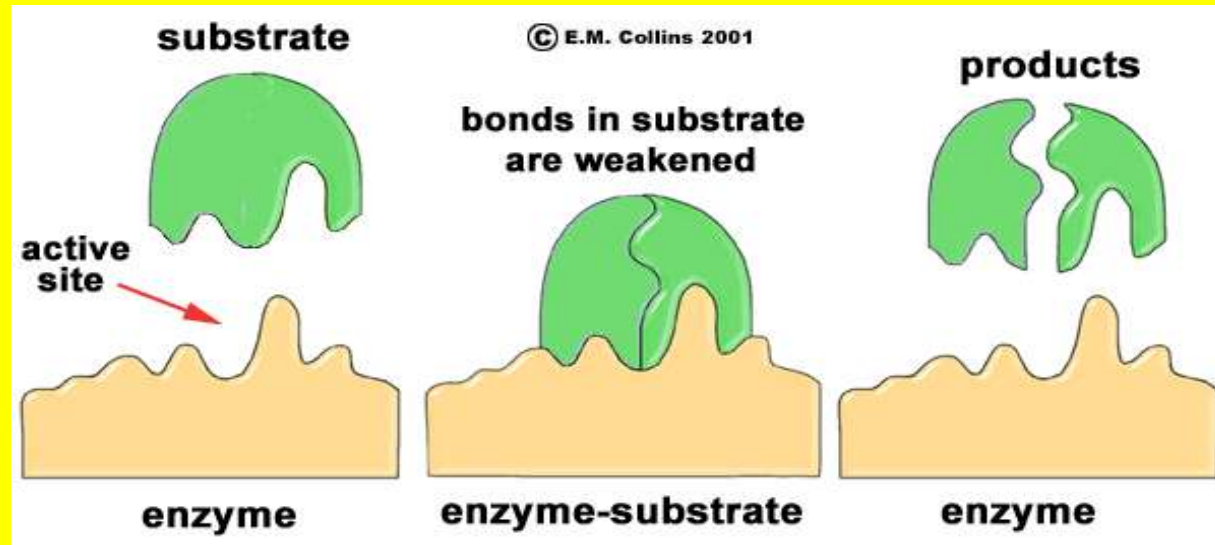
3. There are three things that impact how well an enzyme will work:

- pH
- Temperature
- Amount of Substrate &/or the amount of Enzyme

10/13 Enzymes CH 6.3

Obj. TSW learn how enzymes function and the environmental factors that influence them in and activity/ lab. P.80NB

1. What type of macromolecule is an enzyme?
2. What is the purpose of an enzyme?
3. Name 3 environmental factors that influence an enzymes function.



Take notes P. 85 NB

The structure of proteins

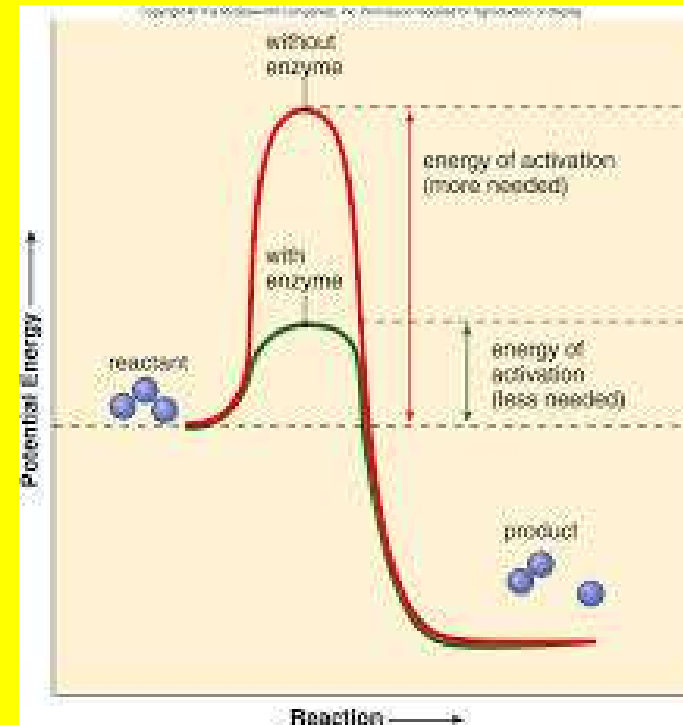
Enzymes are important proteins found in living things.

*An **enzyme** is a protein that changes the rate of a chemical reaction.

They speed the reactions
in digestion of food.

Made up of Amino Acids (20)

Enzymes can be used again
and again without being used
up.



END OF
SLIDE



RESOURCES

Macromolecules & Subunits Notes p. 45NB

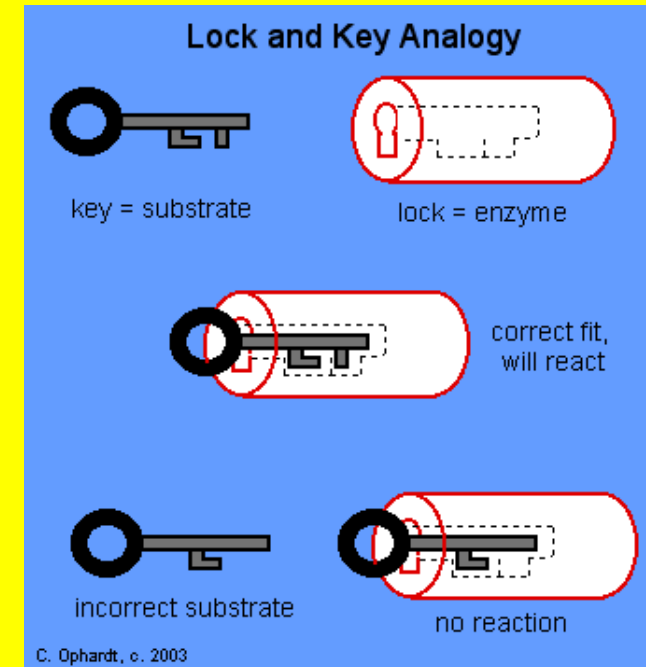
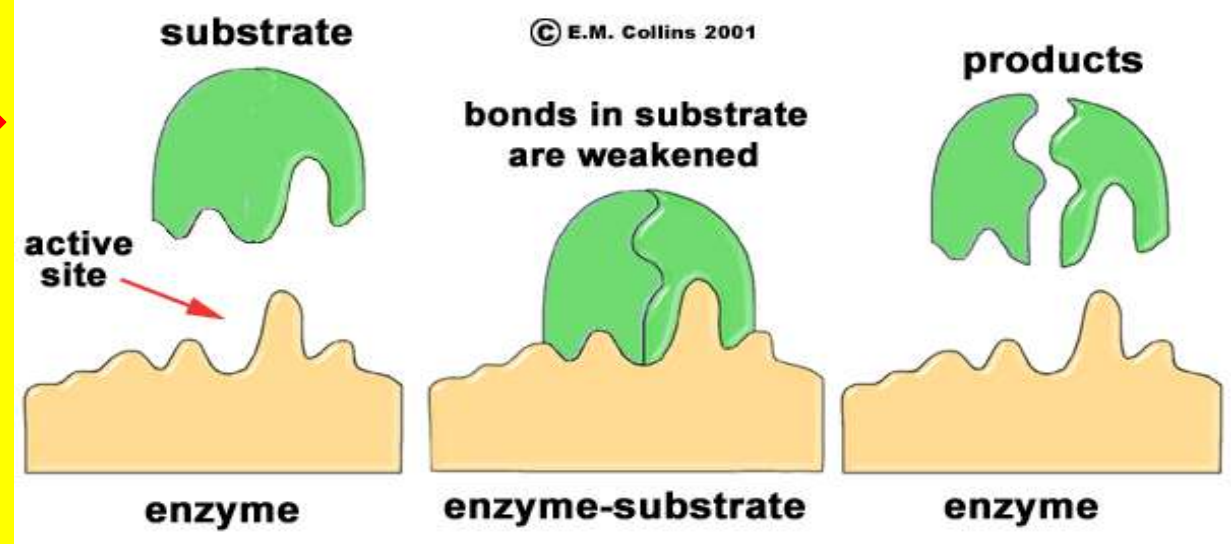
Write down these notes
below.



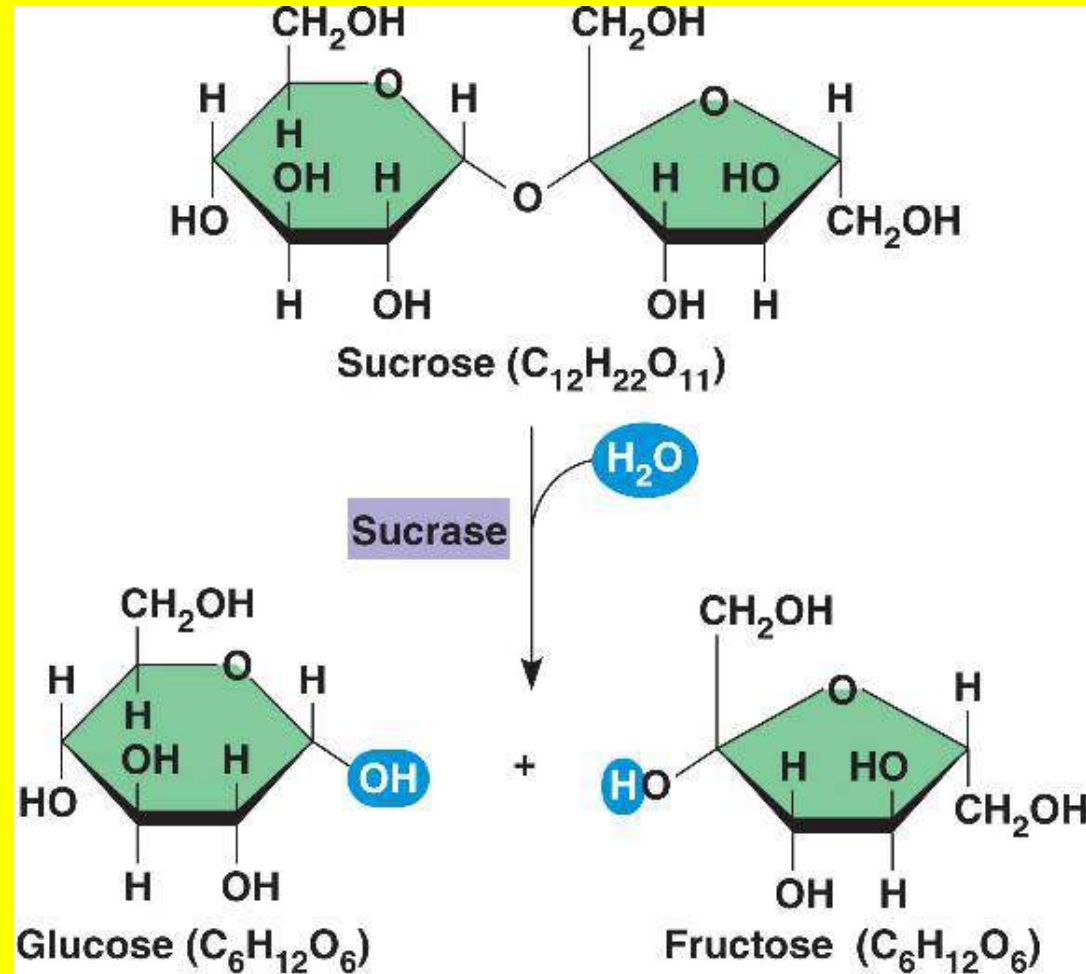
- **Lipid** – Fatty Acids
- **Carbohydrate**- Saccharides
- **Protein(Enzymes)**– Amino Acids
 - Temperature
 - pH
 - [Substrate] & [Enzymes]
 - [Salt]
- **Nucleic Acid** - Nucleotides

***[] means
concentration,
or amount.

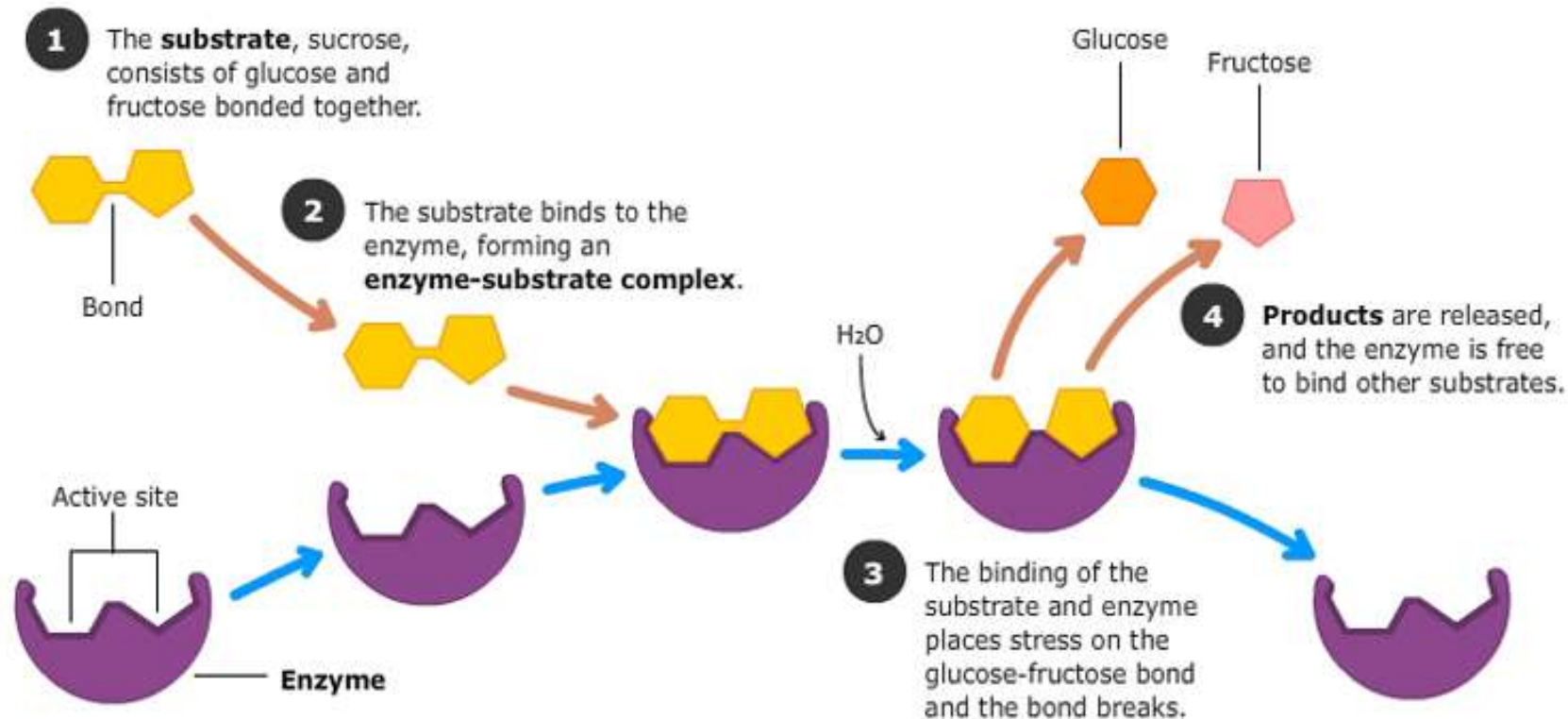
Draw this →



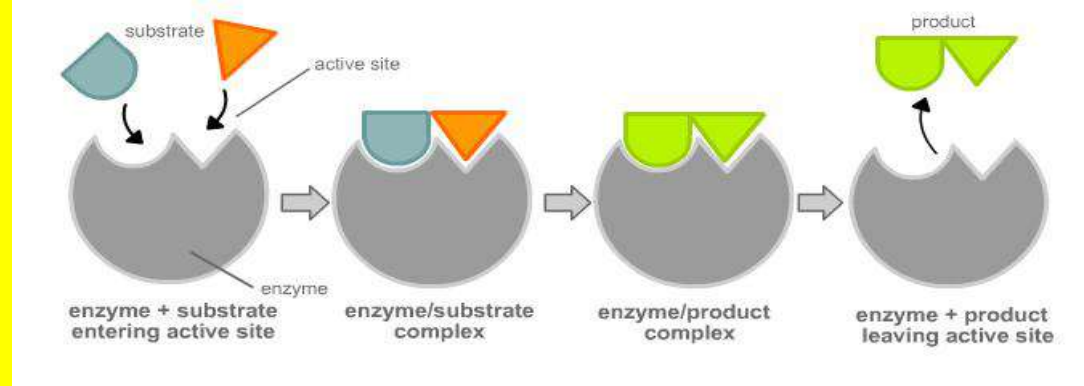
Enzymatic Reaction of Sucrase on Sucrose



Enzymatic Reaction of Sucrase on Sucrose



Enzyme Activity



- You will be given a substrate or a part of an enzyme.
- Find the matching part, that fits your active site.
- Bring your matching Enzyme/ Substrate combinations (Lock & Key) to McAllister
- I will quiz you on your knowledge of monomers and polymers in endergonic & exergonic reactions.

Catalase Lab

ml H ₂ O ₂	Person 1	Person 2	Person 3	Person 4	Person 5
5	100				
6					
7		120			
8			120		
9				170	
10					140

Catalase Lab P. 27

- 1 flask / 2 people
- GLX
- Pressure Probe
- Yeast – 1 tsp.
- Hydrogen Peroxide 5ml
- Swirl
- Make observations.
- Write a summary paragraph about the function of enzymes with a picture of a substrate & enzyme & active site. What factors allow for the enzyme to function? What volume of H₂O₂ did Catalase work the best? Why does the enzyme speed up chemical reactions? Enzymes can be used again & again (Catalytic), how is this important in chemical reactions? At what volumes (ml) did the Catalase work the best? Write the chemical equation.

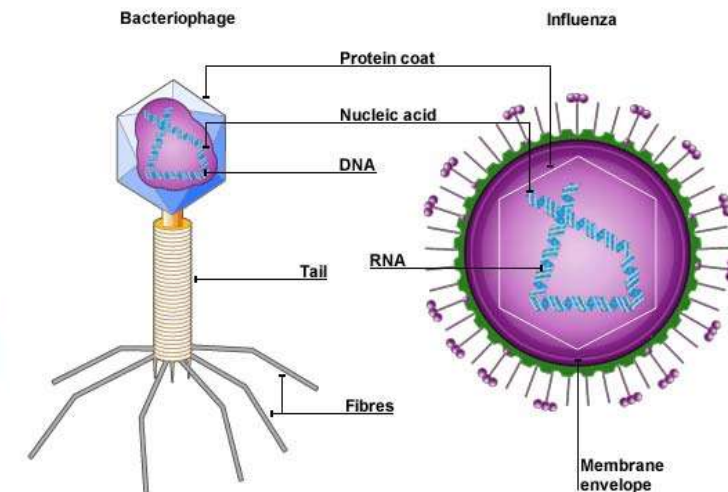
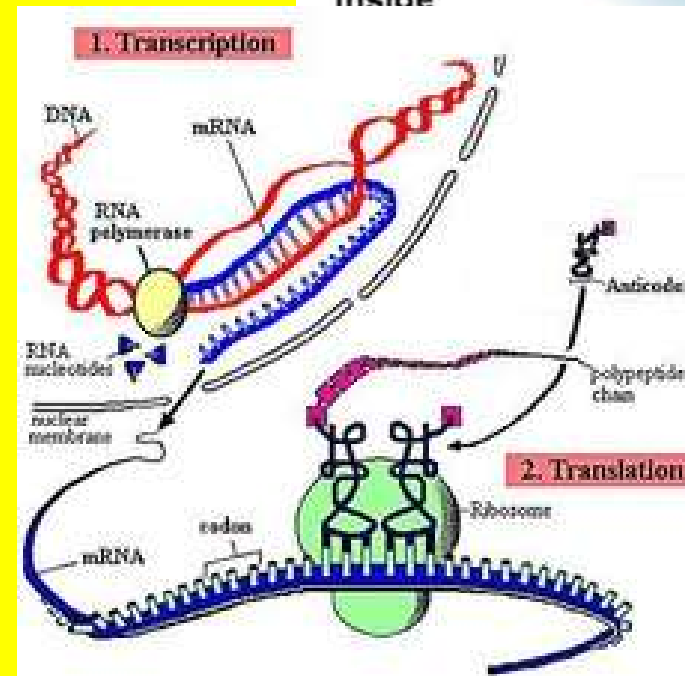
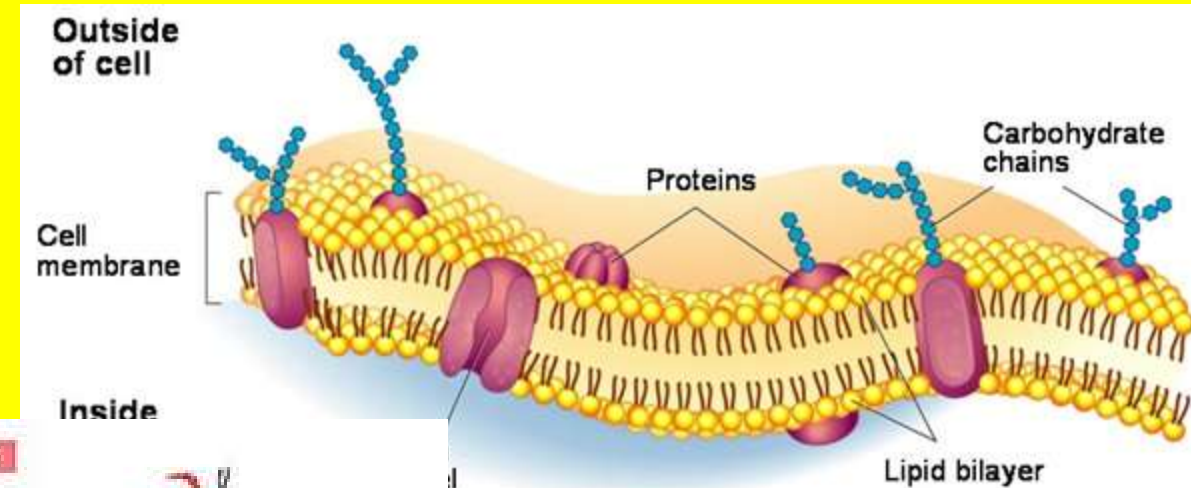
AXES Paragraph – Catalase Lab

- **Assertion** What is Exothermic Reactions? Use vocabulary.
- **eXample** Discuss an example of an enzyme.
 Include details from the lab.
- **Explanation** Describe the function of the enzyme,
 and factors that influence it.
- **Significance** Why are enzymes important for us?

10/14 Review for Midterm Test

Obj. TSW review for the midterm test by answering the following questions relating to their study guide. P. 82 NB

1. How does selective permeability relate to the plasma membrane?
2. What is a virus? How does it replicate?
3. Explain in 3 – 5 sentences the process of protein synthesis.



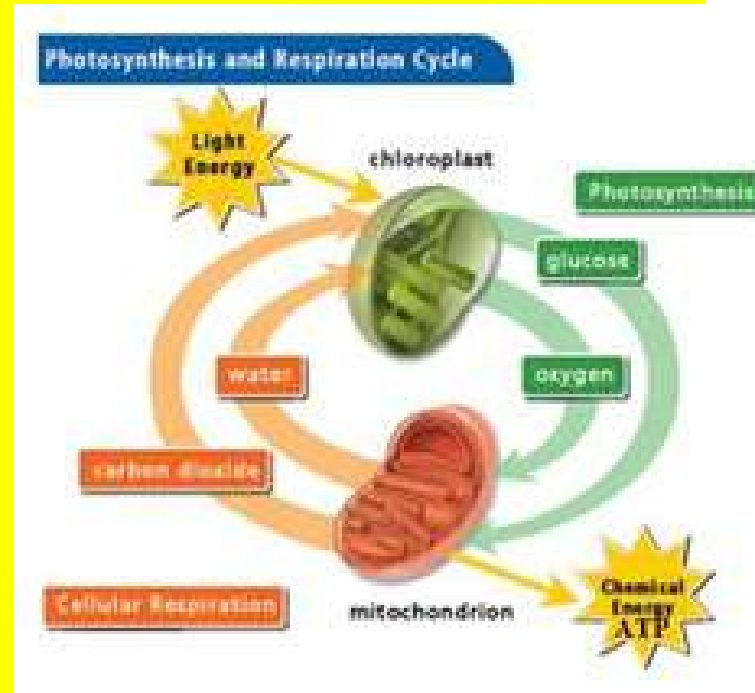
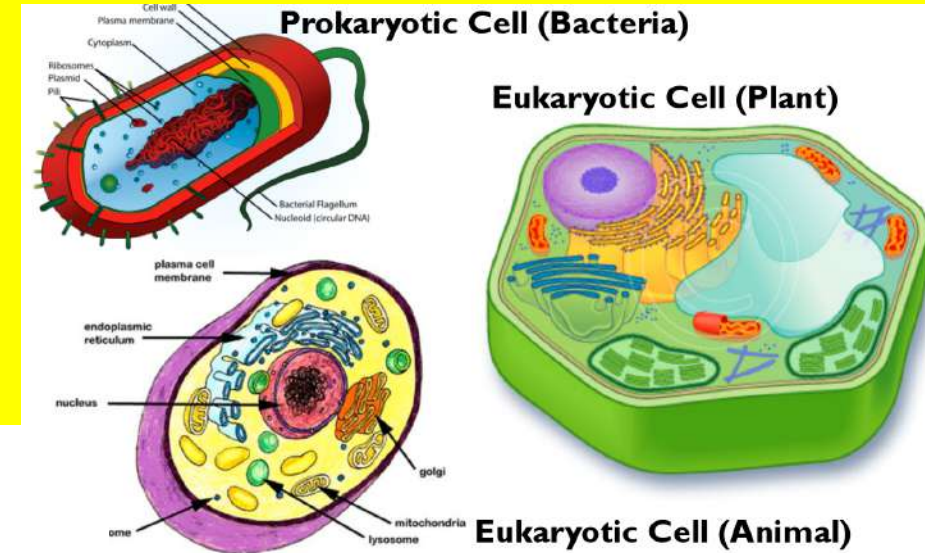
10/17 Review for Midterm

Obj. TSW learn compare and contrast major biological concepts for their study guide. P. 84 NB

1. Compare & Contrast Eukaryotic and Prokaryotic Cells.

2. Compare & Contrast Plant & Animal Cells.

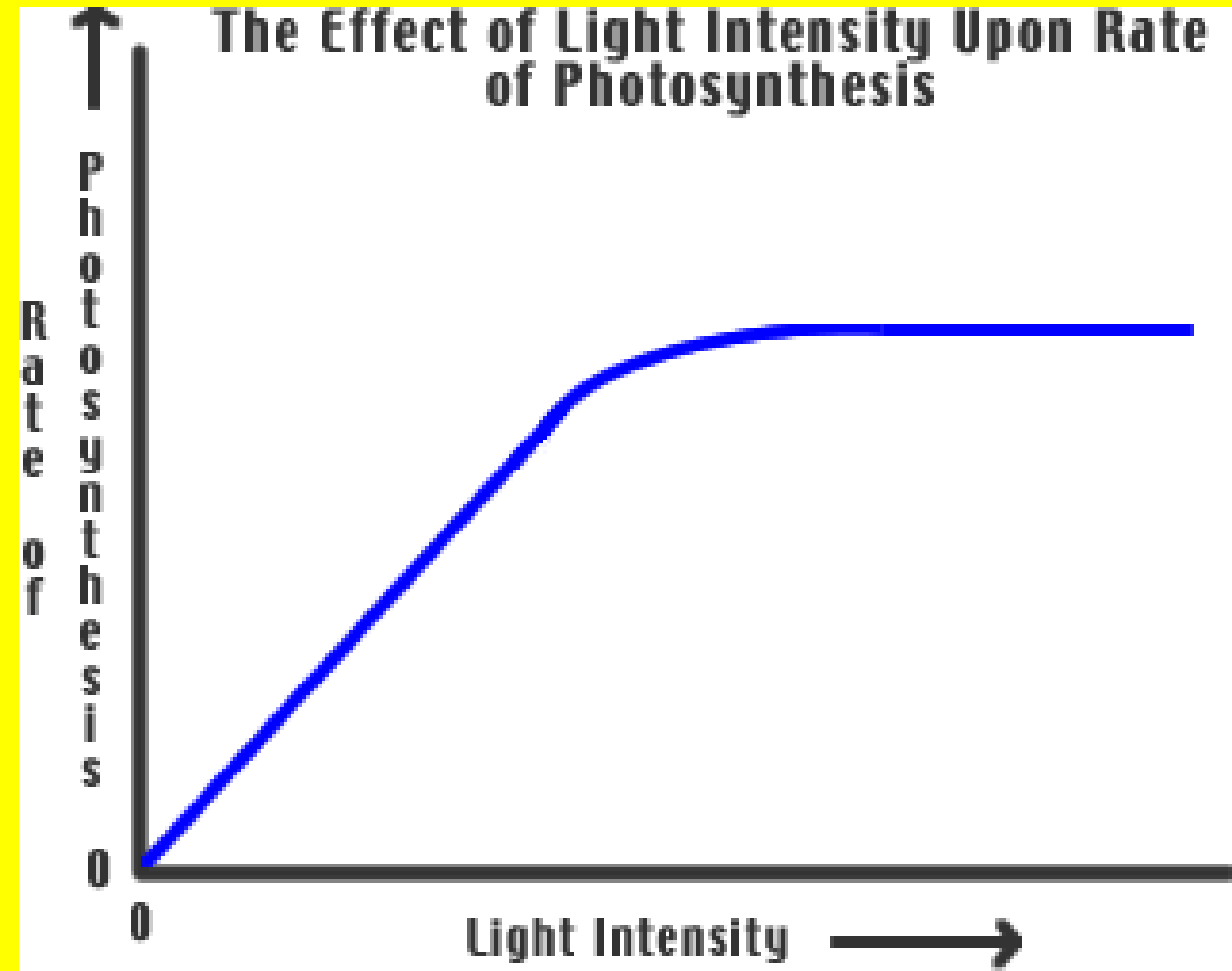
3. Compare & Contrast Photosynthesis & Cellular Respiration.



10/18 Review for Midterm

Obj. TSW review variables and the control in a lab and analyze the graph. P. 86 NB

1. Compare & Contrast Independent and Dependent Variables.
2. Why is the Control important?
3. Using the graph, what is the trend? How do you know?



10/19 Review for Midterm

Obj. TSW study for the midterm final on Friday. P. 88NB

1. Name the 4 Macromolecules:
2. Name the subunits for the 4 Biomolecules:
3. Polymers are made up of _____.

Taboo Person 1 describes the word, and Person 2 tries to guess the word.

- Photosynthesis
- Chloroplast
- Mitochondria
- Nucleus
- Plasma membrane

Taboo Person 2 Describes the words and
Person 1 tries to guess the word.

- Protein synthesis
- Ribosome
- Transcription
- Translation
- RNA

Taboo

- DNA
- Nucleotide
- Adenine
- Cytosine
- Hydrogen Bond