

BIO 1305 – Modern Concepts in Bioscience I – Campbell Textbook  
Week 15 – Final Review

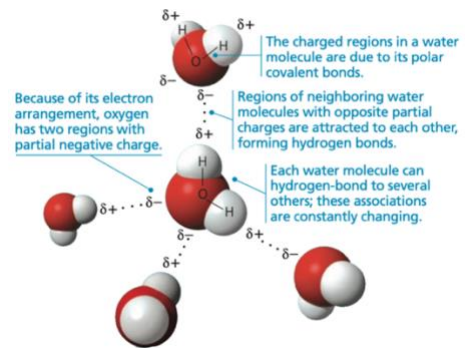
Hi guys! Can you believe it's already the end of the semester? I hope you've enjoyed your biology class and are excited to flex your knowledge on the final exam! This resource will be a review of the most important concepts from the semester in order to help direct your studying. Gabriel and I are having our *last* weekly group tutoring session this **Thursday from 5-6 pm**. I highly encourage you to come to the session and get some help before finals! Sign up to join us here: <https://baylor.edu/tutoring>. We would love to see you there!

**Keywords: Review of Key Concepts**

Instead of linking videos throughout the resource, here's the link to ALL of the YouTube videos for biology 1: [Biology Videos](#)  
Here is the link to all of the the previous resources from this semester: [Resources](#)

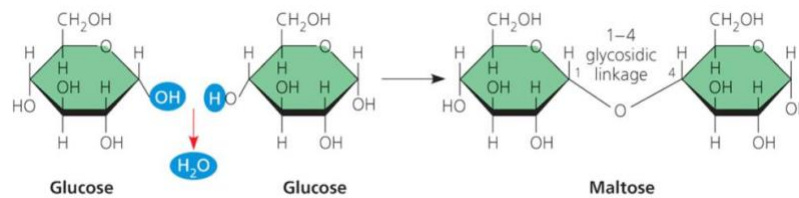
**Water and It's Properties (Week 3)**

Water is a polar molecule  
Hydrogen bonding gives water its unique properties and makes it the universal solvent  
Remember to review the special properties of water including surface tension, high specific heat, and heat of vaporization!

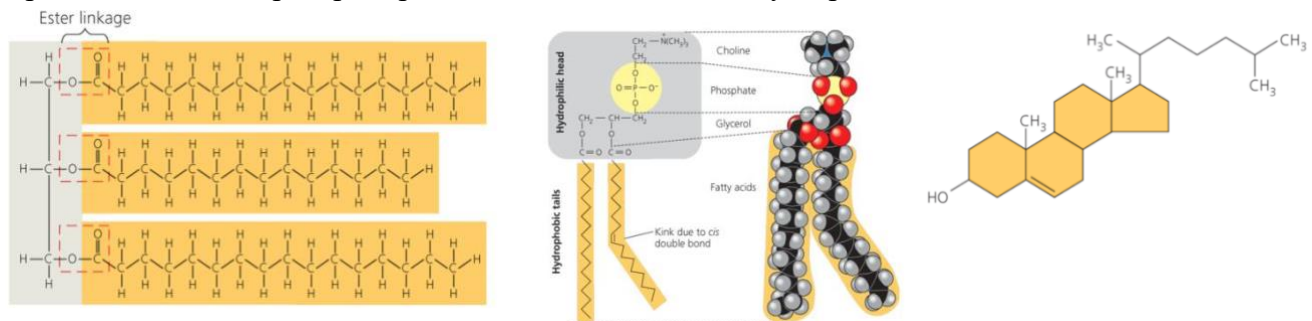


**Macromolecules (Week 4)**

Carbohydrates: polysaccharides made of monosaccharides connected through glycosidic linkages



Lipids: includes fats, phospholipids, and steroids that have hydrophobic character



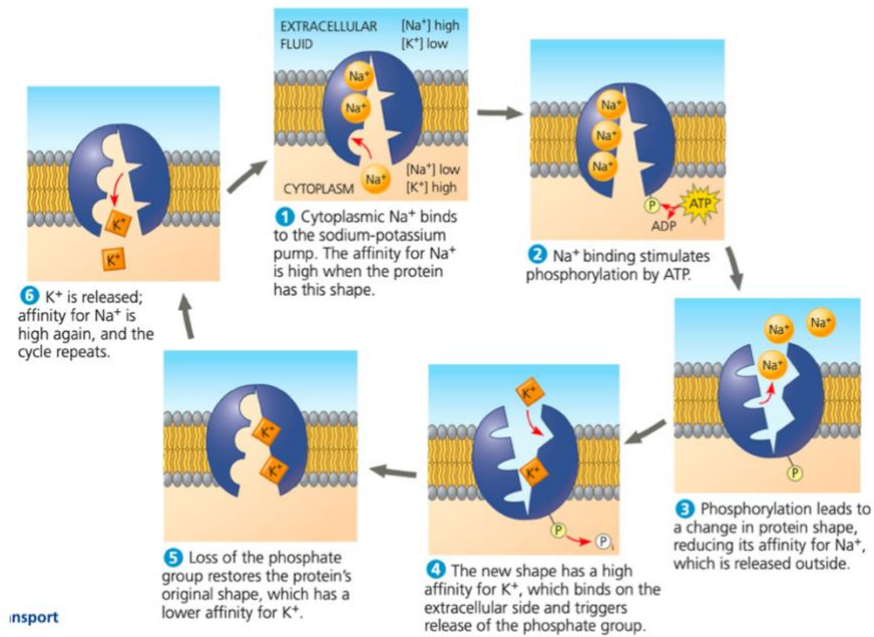
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Proteins: polypeptides made of amino acids connected through peptide bonds. They have primary, secondary, tertiary, and quaternary structure

Nucleic acids: polynucleotides, including DNA and RNA, made of nucleotides. Remember to review the distinctions between DNA and RNA!

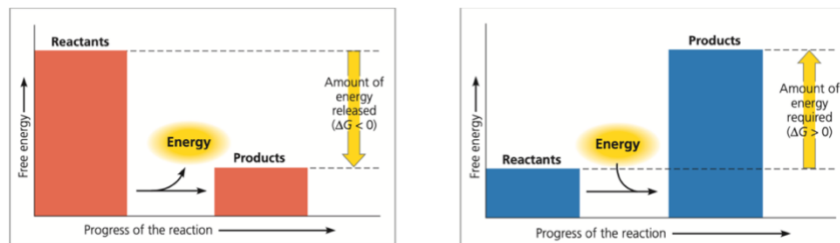
### Membrane Transport (Week 5)

Simple diffusion, facilitated diffusion, and active transport are the main types of membrane transport. Diffusion does not require energy but instead relies of a concentration gradient. However, active transport requires ATP to move things against their concentration gradient. An example of active transport is the Sodium-Potassium Pump.



### Energy (Week 5)

Remember that a negative delta G is associated with an exergonic, spontaneous process, while a positive delta G is associated with an endergonic, non-spontaneous process



### Cellular Respiration (Week 6)

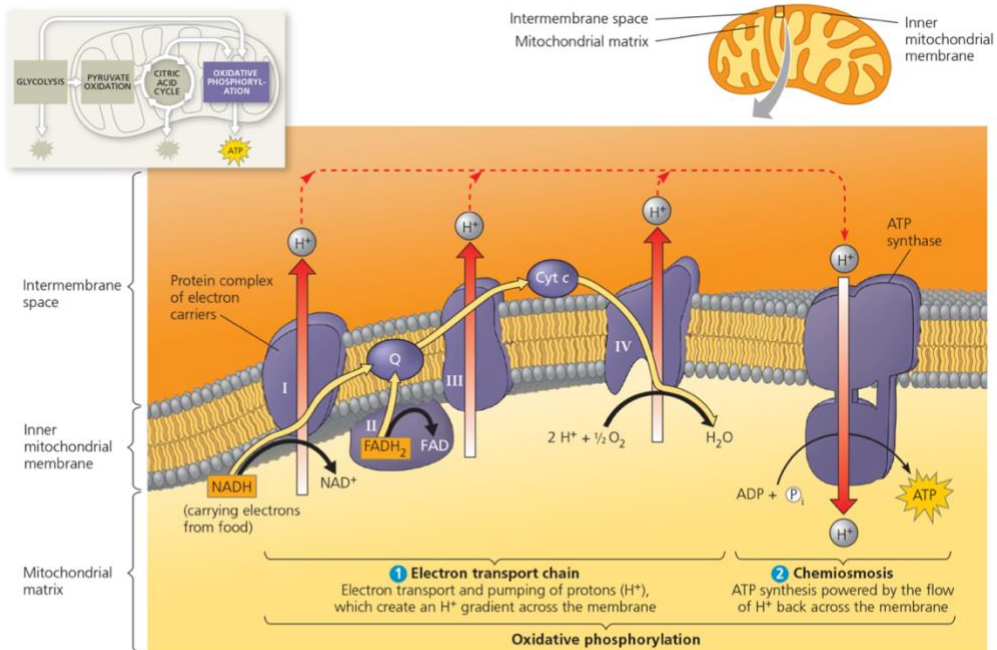
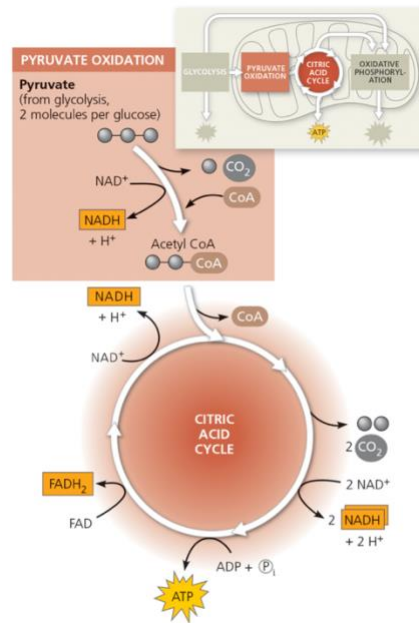
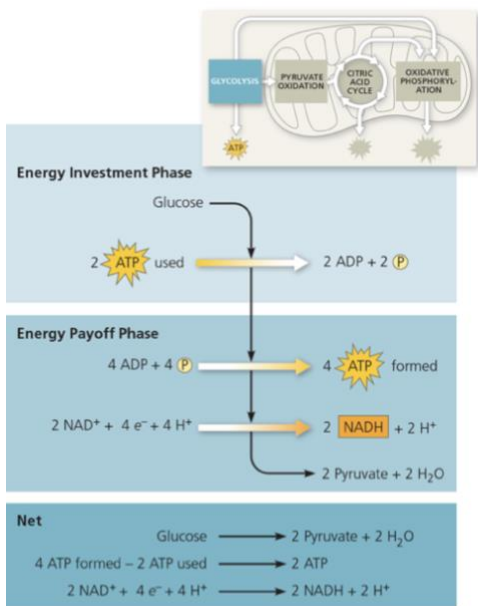
This is a HUGE topic to focus on as you are studying for your final exam! Make sure you can “tell the story” of cellular respiration to your friends – that is how you know you are familiar with the information!

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Glycolysis: takes place in the cytosol, oxygen independent, two phases: energy investment and energy payoff. The goal is to make electron carriers that go to the rest of cellular respiration.

Pyruvate oxidation: oxidization of pyruvate and addition of Co-enzyme A.

Electron Transport Chain: final portion of cellular respiration where ATP is created by a proton gradient. Electron carriers from other parts of cellular respiration bring their electrons to the chain, allowing protons to be pumped into the intermembrane space.



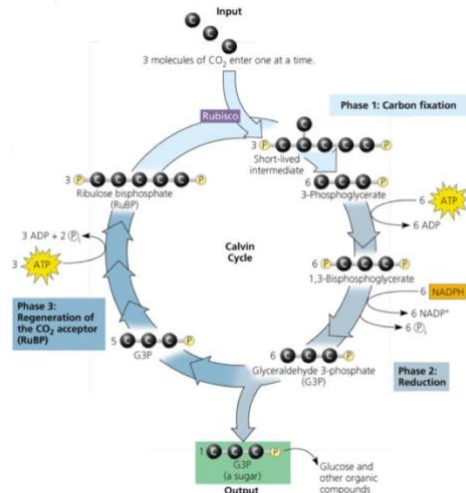
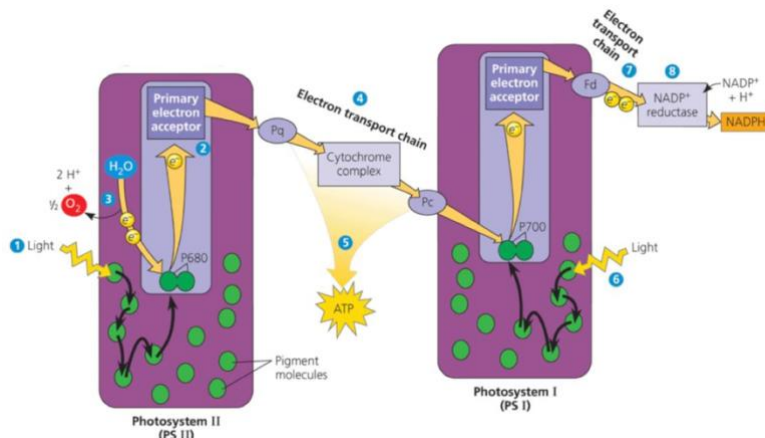
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## Photosynthesis (Week 7, 8)

Two main stages of photosynthesis: light reactions, Calvin cycle

In the light reactions, light is converted into ATP and NADPH. Chlorophyll is excited.

In the Calvin cycle, there are three phases: carbon fixation, reduction, and regeneration of RuBP



## The Cell Cycle (Week 9)

**Prophase**—DNA condenses, mitotic spindle begins to form

**Prometaphase**—nuclear envelope breaks down, kinetochore forms

**Metaphase**—chromosomes line up at the center

**Anaphase**—sister chromatids pull apart

**Telophase**—nuclei reform, chromosomes relax

**Cytokinesis**—cytoplasm divides and two daughter cells are formed

## Meiosis and Sexual Life Cycles

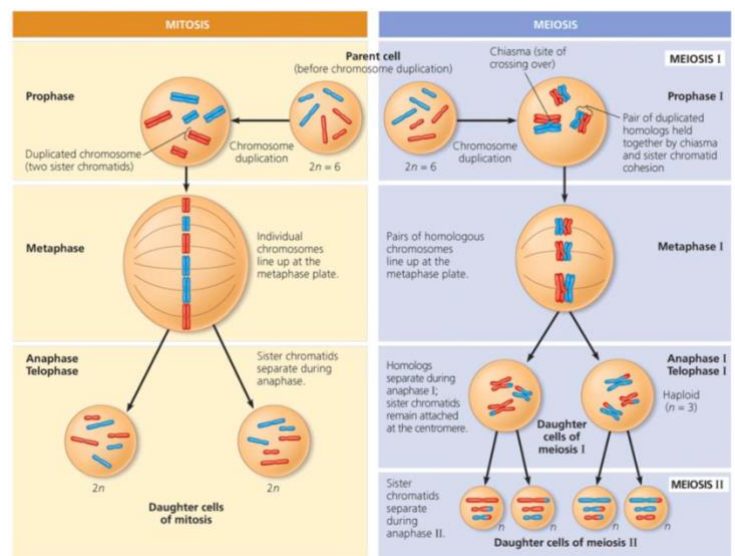
**Genes:** hereditary units

**Locus:** a gene's location on the chromosome

**Homologous chromosomes:** a pair of chromosomes where one comes from mom and one comes from dad

**Sex chromosomes:** chromosomes that determine sex

**Autosomes:** all other chromosomes besides sex chromosomes



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## Genetics (Week 10)

The Law of Segregation: alleles on a gene separate from each other and end up in separate gametes

## Inheritance of X-Linked Genes (Week 11)

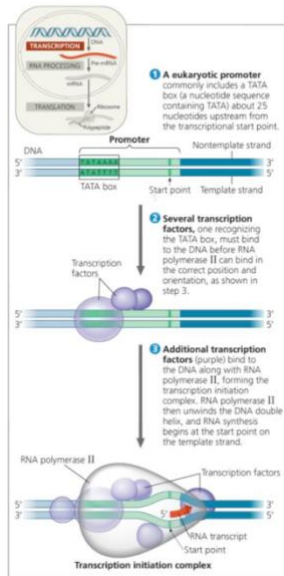
Genes found on the X chromosome exhibit interesting inheritance patterns. Here are some significant patterns:

- Fathers pass the trait to all daughters but no sons
- Mothers pass the trait to sons and daughters
- If the trait is recessive, a female will only express the trait if she is homozygous
- Heterozygous and homozygous are terms that do not apply to males since they only have 1 X chromosome
- **Deletion**: part of the chromosome is lost
- **Duplication**: broken piece becomes attached to a separate chromosome
- **Inversion**: part of the chromosome breaks but reattaches in the opposite orientation
- **Translocation**: a broken fragment attaches to a nonhomologous chromosome

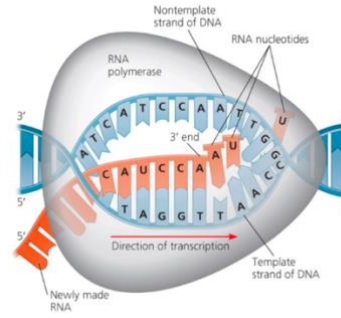
## Transcription and Translation (Week 13)

- **mRNA** – Remember RNA from a few resources back? RNA is the “*bridge*” between DNA and protein. Specifically, mRNA is the molecule used. mRNA is “*messenger*” RNA, because it is a “message” that comes from the DNA to be made into a protein.
- **Transcription** – creation of the mRNA molecule from the DNA template.
- **Translation** – creation of a polypeptide from the mRNA. Occurs on ribosomes

### Initiation



### Elongation



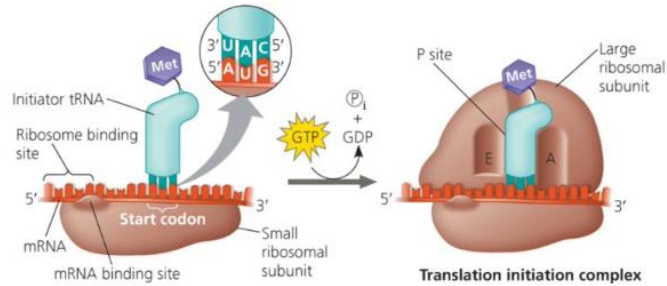
### Termination

This stage is different for bacteria and eukaryotes.

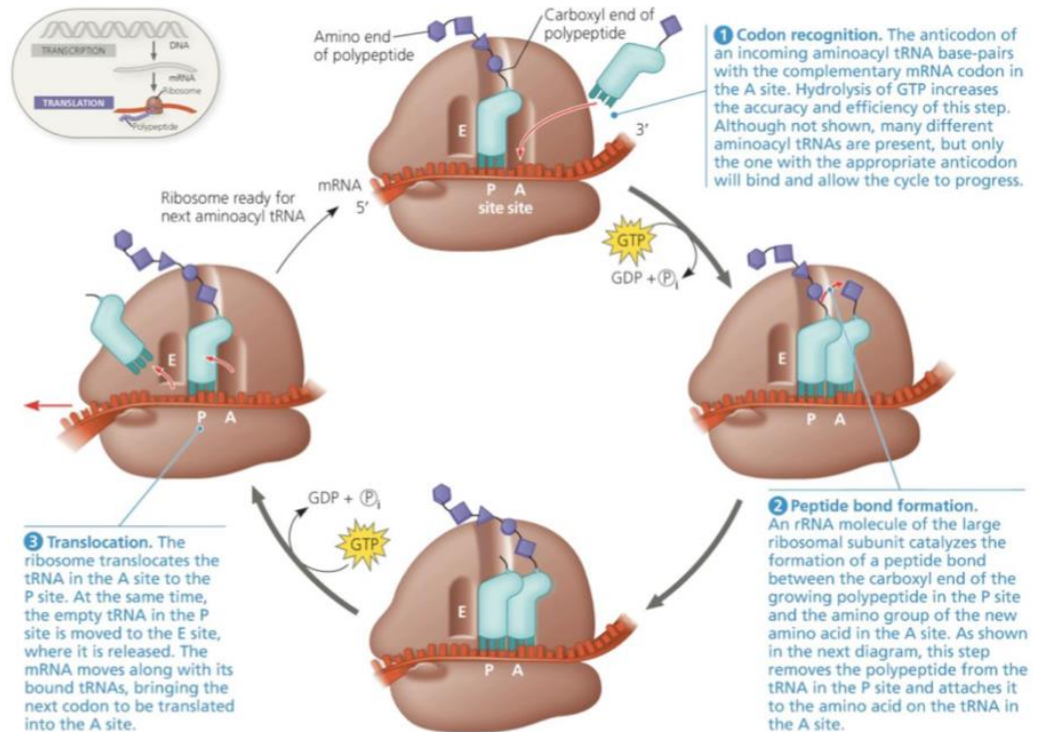
In *bacteria*, a terminator sequence stops the RNA polymerase.

In *eukaryotes*, the RNA polymerase transcribes a **polyadenylation signal**. Proteins bound to this area cut the mRNA from the polymerase.

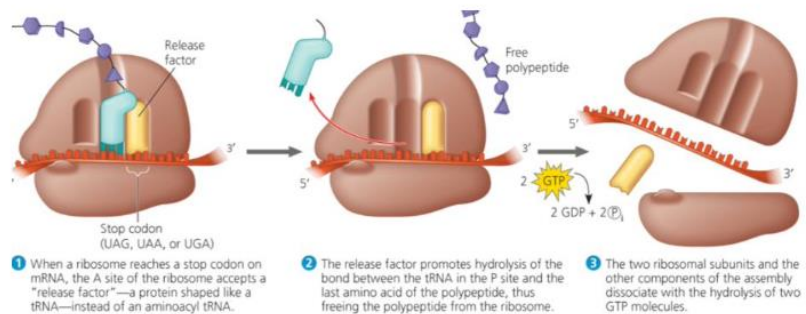
## Initiation



## Elongation



## Termination



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