

Homework Due April 10th, 2025 - LAST OFFICIAL HOMEWORK OF THE YEAR!!!

The Immune System!



Notes from your Mentors: The immune system is like the body's defense army. It includes organs, tissues, and cells that work together to protect you from harmful invaders like bacteria, viruses, and other pathogens. Key players in this system are white blood cells, which patrol your body looking for threats. When they find something harmful, they attack and destroy it. The immune system also remembers past invaders, so it can respond more quickly if they try to attack again. It's like having a personal security team that keeps you healthy and safe. For discussion, we will review the chapter and discuss the things that make us sick. We will give a brief description of viruses, cancer, allergies, bacteria, and fungal infections. Fun times as we discuss how complex the human immune system is and how it defends us against these threats.

We'll also have a pathologist come to visit us in class. A pathologist is like a medical detective. In a lab, they examine tissues, cells, and bodily fluids to diagnose diseases. They use microscopes and other tools to look for abnormalities, such as cancer cells or infections. Pathologists also perform autopsies to determine the cause of death. Their work is crucial for guiding doctors in choosing the right treatments for patients. Essentially, they help uncover the hidden clues in our bodies to keep us healthy. Cool, right?

Biology Song of the Week: It's a little hokey, but we'll let it pass this time (because unfortunately, yet somehow appropriately, I am really sick and just don't have energy to keep trying for something better). 🎧 **20. Cells in the Fight.mp3**

Homework:

- [Penguin Book](#): Ch. 40 The Immune System. Diagram: F40.3
- [Iguana Book](#): Ch. 31 The Body's Defense System. Diagrams: F31.6
- NO WORKSHEET!
- Catch up on ALL your previous homework

- Try to finish your semester project

Technically Optional videos - but you should really watch these! I know, I added A LOT of videos here. But the immune system is very complex - there are so many players! I put these in order of how I think they should be watched - first Amoeba Sisters, then Professor Dave, and then Crash Course, and lastly something fun. I think it is very much worth it to READ your book FIRST, and then watch these videos.

▶ Immune System

▶ The Immune System: Innate Defenses and Adaptive Defenses

▶ Immune System, Part 1: Crash Course Anatomy & Physiology #45

▶ Immune System, Part 2: Crash Course Anatomy & Physiology #46

▶ Immune System, Part 3: Crash Course Anatomy & Physiology #47

▶ Your Immune System under a microscope.

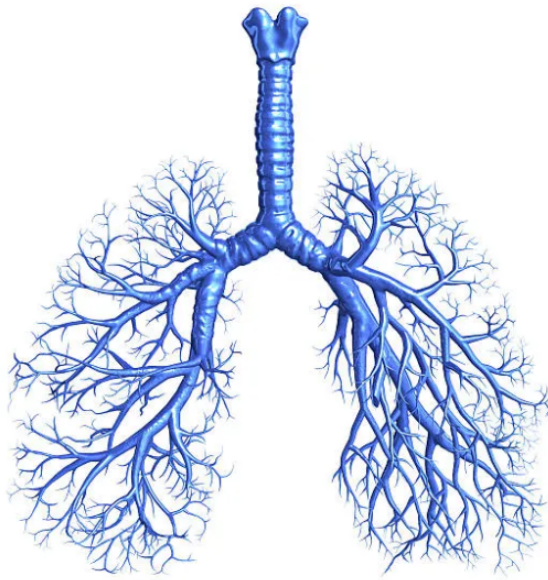
ACTION ITEMS:

- Do your homework: read, draw, teach. Watch the videos for extra enrichment.
- Finish all past homework and work on/finish your semester project.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you after the break!

Homework Due March 27th, 2025

The Respiratory System!



Notes from your Mentors: The human lungs are a pair of essential organs located in the chest cavity that play a crucial role in the respiratory system. Their primary function is to facilitate gas exchange, which means taking in oxygen from the air we breathe and removing carbon dioxide, a waste product produced by cells during metabolism. The lungs are protected by the ribcage and are surrounded by a double-layered membrane called the pleura. Air enters the body through the nose or mouth, travels down the trachea (windpipe), and branches into smaller airways called bronchi, which divide further into bronchioles. At the end of these small airways are tiny air sacs called alveoli, where oxygen passes into the blood, and carbon dioxide is removed.

The lungs are highly specialized to perform this gas exchange efficiently. The alveoli are surrounded by a network of tiny blood vessels called capillaries, allowing oxygen to move into the bloodstream and carbon dioxide to move out. This exchange is driven by differences in concentration levels of gases (oxygen and carbon dioxide) between the air in the alveoli and the blood in the capillaries. The diaphragm, a large muscle beneath the lungs, plays a key role in breathing by contracting and expanding, allowing the lungs to fill with air and expel it.

I am SO excited for next week's class!!!! Yes, 5 exclamation marks! In fact, I've been preparing for it for MONTHS!! We're going to make an enormous model of the respiratory and circulatory systems - one that YOU can crawl through and carry the oxygen around the body and bring the carbon dioxide back to the lungs. This activity is going to require ENTIRE class participation - and lots of duct tape. And more ping pong balls. And yoga mats. ;)

Biology Song of the Week: Not surprisingly (or accidentally) this style of music is called "atmospheric" and "organic ambient." That felt appropriate for a song about the lungs. Take a listen -  [19. Breathe Easy.mp3](#)

Homework:

- [Penguin Book](#): Ch. 39 Respiration: The Exchange of Gases. Diagrams: F39.13 Inspire/Expire
- [Iguana Book](#): ch 30 The Circulatory and Respiratory Systems pg 667-673. Diagrams: F30.16 inhale/exhale
- Worksheet to memorize.  [Respiratory System Labeling.pdf](#)

Technically Optional videos - but you should really watch these!

-  [Respiratory System of the Human Body - How the Lungs Work! \(Animation\)](#)
-  [How Smoking Kills](#)

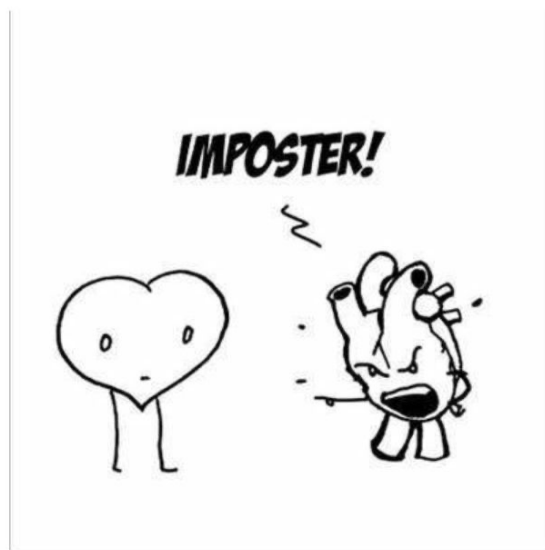
ACTION ITEMS:

- Do your homework: read, draw, teach. Watch the videos for extra enrichment.
- Hopefully you are about half way done with your semester project! It will be due mid-April, so you've got about 2-3 weeks.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due March 20th, 2025

The Circulatory System!



JUST A REMINDER: If you didn't get your homework recorded today, please bring your notebook next week so I can record it then. Also, don't forget to start your semester project! Get it done early so it doesn't stress you out at the end of the semester.

Notes from your Mentors: The human heart is like the body's engine. It's a muscular organ located in the chest, slightly to the left. The heart's main job is to pump blood throughout the body. It has four chambers: two atria on the top and two ventricles on the bottom. Blood flows into the atria, then into the ventricles, which pump it out to the lungs and the rest of the body. The heart's rhythmic contractions ensure that oxygen-rich blood reaches every part of the body and that waste products are carried away. It's like a powerful pump that keeps everything running smoothly.

Get your gloves on! This week we will group up and dissect sheep hearts. be sure you are very familiar with the anatomy here, make sure you watch the videos too. We are looking for surgical care as we open up real hearts and peek at this amazing organ!

Biology Song of the Week:  [18. Heart in Motion.mp3](#)I told it to make me a slow dance song, but AI apparently doesn't slow dance.

Homework:

- [Penguin Book](#): Ch. 38 Circulation. Diagrams: F38.7 human circulatory, but NOT the private parts
- [Iguana Book](#): ch 30 The Circulatory and respiratory Systems pg 652-666. Diagrams: F30.6.
- Worksheet to memorize.  [Circulatory System Labeling Worksheet.pdf](#)
You may print these worksheets off to practice, but you may NOT share them with anyone.

- Be able to show/explain the path blood takes into the heart, then into the lungs, then back into the heart, then around the body.
- **HEART DISSECTION INSTRUCTIONS: MUST WATCH**
 - <https://www.youtube.com/watch?v=HNxSC244Bpo>
 - <https://www.youtube.com/watch?v=9ghU9CzJGK4>
 - <https://www.youtube.com/watch?v=sUjLbDyW2gw>

Technically Optional videos - but you should really watch these!

- ▶ Circulatory System and Pathway of Blood Through the Heart
- ▶ Heart Conduction System & ECG (EKG)
- ▶ How the Heart Works (Animation)

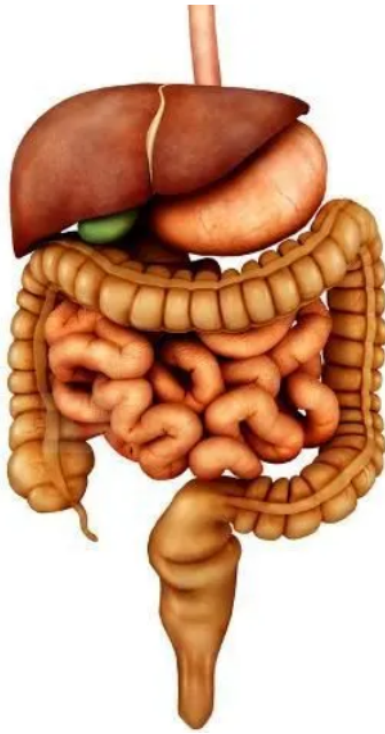
ACTION ITEMS:

- **GET FAMILIAR WITH THE DISSECTION VIDEOS**
- Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.
- **START YOUR SEMESTER PROJECT!** It will be due mid-April, so you've got about 4 weeks.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due March 13th, 2025

The Digestive System!



JUST A REMINDER: If you didn't get your homework recorded today, please bring your notebook next week so I can record it then. Also, don't forget to start your semester project! Get it done early so it doesn't stress you out at the end of the semester.

Notes from your Mentors: The digestive system is like the body's food processing plant. It includes the mouth, esophagus, stomach, intestines, liver, pancreas, and gallbladder. When you eat, food travels down the esophagus to the stomach, where it's broken down by stomach acids. The partially digested food then moves to the small intestine, where nutrients are absorbed into the bloodstream. The liver, pancreas, and gallbladder help by producing digestive juices and enzymes. Finally, the remaining waste moves to the large intestine and is eventually excreted. This system helps your body get the nutrients it needs to function and grow.

This week we will talk about the importance of digestion, and nutrition. we will have a guest speaker explain her profession in the biology field and why the digestive system is so important to human life.

Biology Song of the Week: 🎧 17. Digest and chill.mp3 I'm not sure what exactly I was expecting, but my prompt was "soul and blues mix, deep voiced male vocalist, smooth and steady, add some acoustic guitar," and this is what we've got! I do like the idea of just eating and lounging around in the sunshine, though!

Homework:

- Penguin Book: Ch 37 Digestion and Nutrition. Diagrams: F37.13, stomach, F37.14 small intestine, but NOT the female body.
- Iguana Book: ch 29 Nutrition and Digestion. Diagrams: F276 stomach, F29.7 small intestine.
- Worksheet to memorize.  **Digestive System Labeling Worksheet.pdf**
You may print these worksheets off to practice, but you may NOT share them with anyone.
- Be ready to explain how we get nutrients into our bloodstream.

Technically **Optional** videos - but you should really watch these!

- <https://www.youtube.com/watch?v=Og5xAdC8EU> THIS video is about 5 minutes long if you are in a hurry.
-  Digestive System, Part 1: Crash Course Anatomy & Physiology #33

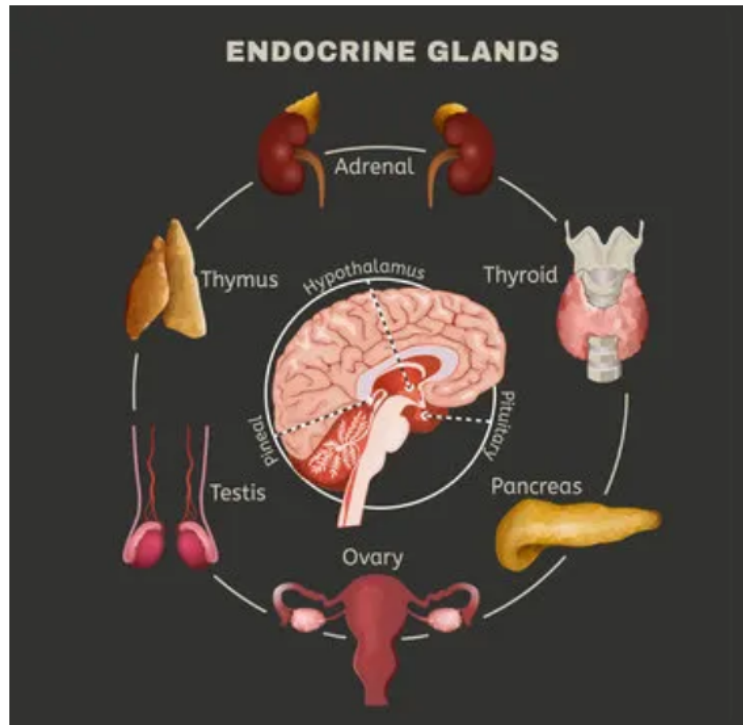
ACTION ITEMS:

- Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.
- **START YOUR SEMESTER PROJECT!** It will be due mid-April, so you've got about 5 weeks.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due March 6th, 2025

The Endocrine System!



JUST A REMINDER: Every week you should be reading your chapter, copying by hand your diagrams, teaching one or more concepts to someone in your home, AND studying for your anatomy quiz. The videos are technically optional, but you should really watch those as well.

Notes from your Mentors: The endocrine system is like the body's chemical messenger system. It includes glands such as the pituitary, thyroid, and adrenal glands, as well as the pancreas and reproductive organs. These glands produce hormones, which are chemicals that travel through the bloodstream to different parts of the body. Hormones help regulate many important functions, including growth, metabolism, and mood. For example, the thyroid gland produces hormones that control how fast your body uses energy, while the pancreas produces insulin to help control blood sugar levels. The endocrine system works together with the nervous system to keep everything in balance and ensure your body functions smoothly.

The endocrine system also includes reproductive organs. We've chosen not to cover reproduction in this class, not because it's not literally vitally important or because it's not absolutely fascinating, but because this can be a sensitive topic that includes many other aspects of life that parents often prefer to teach themselves. From a biological standpoint, however, I want to point out that both of the textbooks for this class do a fabulous job at describing the reproductive hormones, organs, and functions - and even early human development, from the egg and sperm, to the embryo, fetus, and then little baby! If you have questions about the biology of these systems and you feel comfortable asking us, we are happy to help you understand them better. I acknowledge that it's a little ironic that I love biology and botany so much because of the **MIRACLE that is LIFE**, while simultaneously choosing to not

discuss how life enters this world in our class. However, I respect you and your parents and your family cultures enough to let that broad and personal topic be covered within your own families. Plus, we just don't have time to cover everything, so many things had to be left out.

Biology Song of the Week: 📁 **16. Endocrine Symphony (Hormones of the Heart).mp3** This week it's 1980s Monster Ballads!! One of my very favorite music genres!!! I'm not going to claim that this particular monster ballad makes my top 10, but it does make me laugh... and start singing the chorus... to the dismay of all of my kids. Sorry, not sorry.

Homework:

- [Penguin Book](#): Ch 36 Hormonal Control. Diagrams: F36.9 endocrine system
- [Iguana Book](#): ch 32 Regulation of the Internal Environment pg 707-717. Diagrams: F32.13
- Worksheet to memorize.  **Endocrine System Labeling.pdf** You may print these worksheets off to practice, but you may NOT share them with anyone.
- Be ready to explain why people are sometimes so "afraid" of hormones, or maybe why they have a bad reputation, especially during puberty. Think about the concepts of homeostasis and feedback loops to help you with your answer.

Technically Optional videos - but you should really watch these!

- ▶ Endocrine System Amoeba Sisters
- ▶ Homeostasis and Negative/Positive Feedback Also Amoeba Sisters
- ▶ The Endocrine System SO MANY BIG WORDS - but watch it anyway

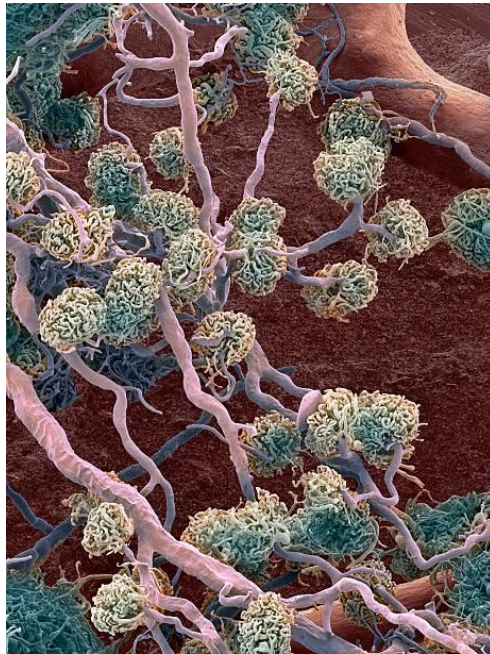
ACTION ITEMS:

- Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.
- **START YOUR SEMESTER PROJECT!** It will be due mid-April, so you've got about 6 weeks.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due February 27th, 2025

Kidneys!



Notes from your Mentors: The urinary system is like the body's plumbing system. It includes the kidneys, ureters, bladder, and urethra. The kidneys filter waste and extra fluids from the blood to create urine. The urine then travels down two thin tubes called ureters to the bladder, where it's stored until you're ready to go to the bathroom. When you urinate, the urine leaves the bladder through another tube called the urethra. This system helps keep your body's internal environment stable by getting rid of waste and balancing important minerals and water. It's like a super-efficient waste management system!

Biology Song of the Week: 📁 15. Kidney Love.mp3 I'm getting smarter, guys! We had mentor training all about using AI last week, so instead of relying on Suno to make our less-than song lyrics, I used ChatGPT for the lyrics and Suno for the music. HUGE improvement. Let me know what you think.

Homework:

- Penguin Book: Ch 35 Thermoregulation, Osmoregulation, and Excretion. Diagrams: F35.18 but NOT the female body (Feel free to cover that part of the diagram up if it is uncomfortable for you.)

- [Iguana Book](#): Ch 32 Regulation of the Internal Environment pg 696-706. Diagrams: F32.5 BOTH pages kidney, nephron capillaries
- Worksheet to memorize.  [Urinary System Labeling Worksheet.pdf](#) You may print these worksheets off to practice, but you may NOT share them with anyone.
- Be ready to explain the process of how waste gets from the bloodstream into urine.

Technically Optional videos - but you should really watch these!

▶ [Excretory System and the Nephron](#) Amoeba Sisters

▶ [Urinary System, Part 1: Crash Course Anatomy & Physiology #38](#)

<https://www.youtube.com/watch?v=CShAIAD-ask> - Again, I don't know why this one doesn't get a cool little button, but honestly, this blue link is fabulous! The narrator speaks pretty slow compared to Crash Course and Amoeba Sisters, but take the three and a half minutes to watch this one for sure! Maybe watch it twice!

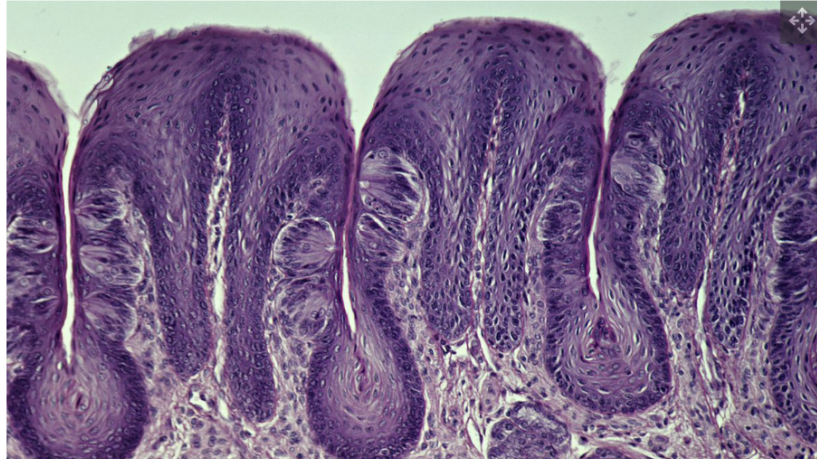
ACTION ITEMS:

- Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.
- START thinking about your semester project. Scroll down to (almost) the very bottom of this document for details about the semester project.

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Homework Due February 20th, 2025

Nervous and Sensory Systems



Oval-shaped taste buds in our mouth, pictured under the microscope above, allow us to sense taste.
(Image credit: Ed Reschke via Getty Images)

Notes from your Mentors: The nervous system is like the body's communication network. It includes the brain, spinal cord, and nerves. The brain is the control center, sending and receiving messages through the spinal cord and nerves to different parts of the body. Neurons, which are special cells in the nervous system, act like messengers, transmitting information through electrical and chemical signals. This system helps us think, feel, move, and react to the world around us. It's like a super-fast messaging system that keeps everything in our body working smoothly.

In class next week we're going to spend most of our time focusing on our senses - sight, taste, touch, smell, and hearing. Be ready to mess around a little bit with them and see what they can (or can't) do. But please do take your time learning about the different systems - Central, Peripheral, and Automatic. Some books have more information about each system than others, and the videos may feel overwhelming, but just do your best. We'll provide access to a bunch of info, and then we'll work through it all and play around with it together in class.

Biology Song of the Week: 🎧 [14. Connections.mp3](#) Good luck understanding the lyrics on THIS one. But I promise he's talking about what we're talking about this week.

Homework:

- [Penguin Book](#): ch 34 neural control 2: Nervous and sensory systems
Diagrams: F34.9 lobe and specialization
- [Iguana Book](#): ch 28 The Nervous System pg 620-633. Diagrams: F28.12 a,c
- Worksheet to memorize. [Nervous System Labeling worksheet.pdf](#) **ONLY LABEL THE BRAIN - YOU ALREADY DID THE NEURON.** You may print these worksheets off to practice, but you may NOT share them with anyone.

- Be ready to teach someone in class about ONE (or more if you want) of the following: 1) how vision works, 2) how hearing works, 3) how tasting works, 4) how smelling works, and/or 5) how our sense of touch works. Include appropriate vocab. Feel free to use your own simple diagrams to help you if you'd like.

Technically Optional videos - but you should really watch these!

- ▶ The Central Nervous System: The Brain and Spinal Cord
 - ▶ The Peripheral Nervous System: Nerves and Sensory Organs
 - ▶ The Autonomic Nervous System: Sympathetic and Parasympathetic Divisions
- These three videos above are Professor Dave videos. As always, he goes into more depth than we expect you to learn, but I do like his videos and always think they are worth watching. Don't stress if you feel it's going way over your head. Just get out of it what you get out of it. If you only have time for one, watch the Peripheral Nervous System.

- ▶ Taste & Smell: Crash Course Anatomy & Physiology #16

<https://www.youtube.com/watch?v=le2j7GpC4JU>

I don't know why that blue link above doesn't come up like the others, but that is Crash Course #17 which is about hearing and balance.

- ▶ Vision: Crash Course Anatomy & Physiology #18
- ▶ The Sense of Touch - Senses for Kids

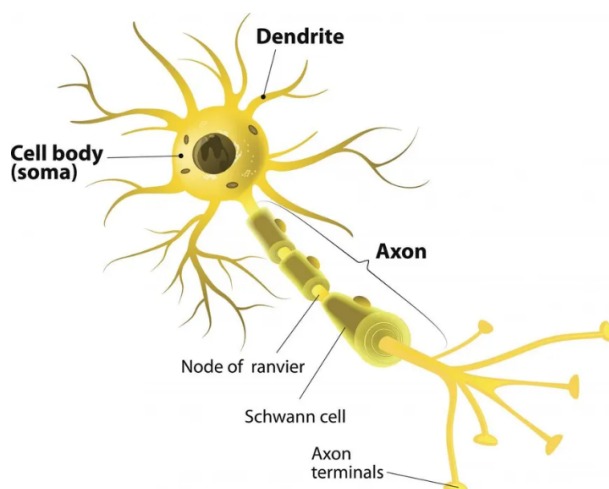
ACTION ITEMS:

- **Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.**
- **START thinking about your semester project. Scroll down to (almost) the very bottom of this document for details about the semester project.**

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due February 13th, 2025

Neurons



Notes from your Mentors: Alright, this week we will take a look at the smallest unit of the nervous system! The Neurons are like tiny messengers in our brains. They send signals to each other, which helps our brain do everything from thinking to moving our bodies. Think of neurons as a big network of friends passing notes to each other in class, making sure everyone gets the message! They're super important for everything our brain does. Neurons act as messengers that transmit information through electrical and chemical signals. These cells communicate with each other to coordinate every function of the human body. Cool, right?

In class we will review the anatomy. For discussion we will talk about some of the neurotransmitters and what happens to these tiny structures in the addicted brain. Bring all your questions. It will be a good time!

Biology Song of the Week: Here's a little dream music to help you sleep. I mean, help you focus as you study about neuron anatomy and neuron function. The lyrics are kind of dumb, but we haven't had a nice relaxing song in a while. 🎧 [13. Synapse Serenade.mp3](#)

Homework:

- [Penguin Book](#): ch 33 Neural Control 1: The Neuron. Diagrams: F33.2 (motor neuron only) and F33.11 synapses
- [Iguana Book](#): ch 28 The Nervous System pages 608-619. Diagrams: F28.3 and 28.7

- Worksheet to memorize.  Nervous System Labeling worksheet.pdf **ONLY DO THE NEURON - YOU DO NOT NEED TO MEMORIZE THE BRAIN THIS WEEK.** You may print these worksheets off to practice, but you may NOT share them with anyone.
- Be ready to explain how electrical impulses move down the neuron AND how chemical signals cross the gulf between different neurons.

Technically Optional videos - but you should really watch these!:

<https://www.youtube.com/shorts/Rvmvt7gsclM> - WATCH THIS CRAZINESS!

 The Chemical Mind: Crash Course Psychology #3 This goes a bit into the endocrine system, too. You can watch that if you want, but we won't cover the endocrine system for a couple weeks.

 THE NEUROTRANSMITTER SONG This is AWFUL and I'm sharing it because I can't stop laughing!!!!

The following are more in depth - if you are interested in this stuff, watch these.

 What is a Neuron? Parts and Function Here is a teacher teaching neuron anatomy.

 Action Potential - Firing of a Neuron - Depolarization Same teacher teaching action potentials.

 Synaptic transmission I The Synapse I How Neurons Communicate Same teacher again teaching, this time synaptic neurotransmitters.

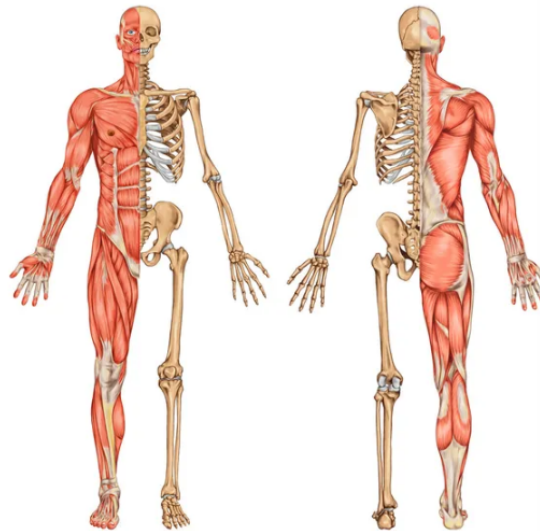
ACTION ITEMS:

- **Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.**
- **START thinking about your semester project. Scroll down to (almost) the very bottom of this document for details about the semester project.**

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due February 6th, 2025

Muscles and Bones



Notes from your Mentors: Welcome to Biology Second Semester! Sister Mock and I will do our best to inspire you with the complex and beautiful nature of the human body. This year you will speak to several professionals working in various fields of biology. You will see microscopic tissue slides, as well as dissect sheep hearts and frogs to gain a front row understanding of these complex structures. Weekly you will be given basic anatomy worksheets pertaining to the systems we will study. You are expected to memorize each worksheet and know the anatomical structures by heart. (Don't panic, it's pretty simple) The reading and diagramming will be about the same, if not a little simpler and easier to understand. Let's get started with week one!

Muscles and bones are best friends in our bodies! They work together to help us move. Bones give us structure, kind of like a frame for a building. Muscles are attached to these bones, and when they contract, they pull on the bones, making them move. It's like a puppet show, with your muscles as the strings and your bones as the puppets! Try moving your arm and feel your muscles and bones working together. We will visit in class for a short time then we will pack up for an interesting field trip to The Healthsource Clinic where we will meet with Doctor Miller, a chiropractor. He will give you a tour of his clinic. He will teach you some basic principles of bone and joint health. He will explain what he does as a professional focusing mainly on bone, joint, and muscle health and rehabilitation.

Since we are studying two systems you will need to memorize the basic bones of the body as well as the muscles. **Below you will find the worksheets you will need to study and memorize so as to be prepared for a mini quiz at the beginning of class. Make sure you can explain how muscle fibers function and the internal structure of bones as well as label the diagrams from memory that are provided below.**

Thanks! Have a fun week! We can't wait to see you again on the 6th!

Biology Song of the Week: I was going for a pirate sea shanty, but instead you'll have to put up with this little ditty. 📁 12. Muscle and Bone_ A Pirate's Tale.mp3

Homework:

- Penguin Book: ch 32 Support and Movement, Diagram F-32.15
- Iguana Book: ch 27 The Human Organism, an Overview, pg 587-605, Diagram F-27.18 (two pages)
- Worksheets to memorize. 📄 Muscular System Labeling.pdf AND 📄 Skeletal System Labeling.pdf You may print these worksheets off to practice, but you may NOT share them with anyone.
- Be ready to explain how muscle fibers function.
- Be ready to describe the internal structure of bones.

Technically Optional videos - but you should really watch these!:

<https://www.youtube.com/watch?v=Ktv-CaOt6UQ> (crash course)

▶ Your Muscle Screams in Agony

▶ Skeletal System (amoeba sisters)

▶ Muscle Tissues and Sliding Filament Model (amoeba sisters)

This one is SUPER intense - lots of vocab, but also worth it if you are interested in bones - <https://www.youtube.com/watch?v=-bWjC55CPSk>

ACTION ITEMS:

- Do your homework: read, draw, teach - and anatomy memorization (the worksheets) Watch the videos for extra enrichment.
- START thinking about your semester project. Scroll down to (almost) the very bottom of this document for details about the semester project.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you Thursday!

Homework Due November 21st, 2024

wrap it UP!



Biology Song of the Week: I just barely realized you probably couldn't access the song from LAST week - so here is the Folk Ballad you missed. Nice and calm to get you through...

📎 9. The Ballad of the Genetic Code.mp3

And then here is the Seattle grunge era song to celebrate that we are DONE with the semester - practically. Keep reading for a reminder of what you still need to do to finish the semester and be prepared for class tomorrow. 📎 10. Hats Off, It's Christmas.mp3 (ok, I know it's not really Christmas, but it's a very extended Christmas break so just humor me and go with it.)

ACTION ITEMS:

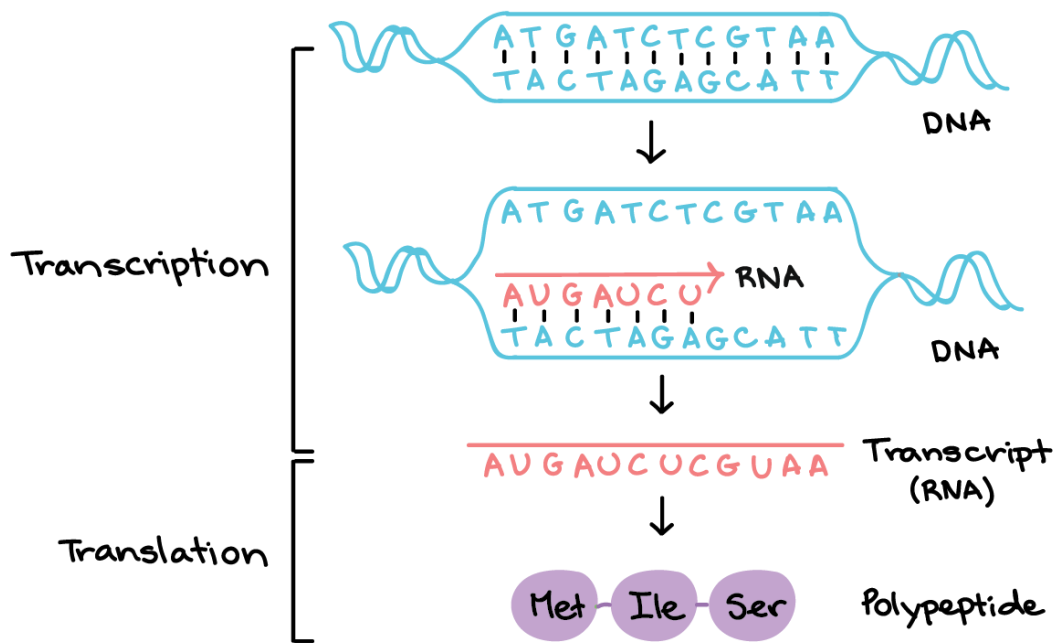
- **Due: ALL your homework. Complete any unfinished diagrams, readings, and teaching experiences BEFORE coming to class on Thursday. I'll record all your homework in class so bring your notebooks.**
- **Due: Your Semester Project. Turn in your semester project on Thursday.**

- Review ALL your material, even your labs, for a comprehensive biology competition. Prizes will be underwhelming, but the GLORY and PRAISE of your peers and mentors will more than compensate.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due November 14th, 2024

Genes in Action



If you are interested in the differences between the A, B, and Z forms of DNA, you can watch these videos. They were helpful. These do NOT talk about the cruciform and i-motif shapes, though. All of these concepts are WAY above what we are going for in class, so I won't be offended if nobody watches these.

▶ [Structural Forms Of DNA](#)

▶ [Difference between A DNA, B DNA And Z DNA](#)

Also, here are images of [cruciform DNA](#) and the [i-motif](#) in DNA

Notes from your Mentors: Thank you Andrew and Cameron for taking those nasty peas off my hands. Thank you Marianne and Elizabeth for doing the extra Punnett Square problems. Thank you to everyone who participates in class. I hope this stuff amazes you as much as it amazes us!

Biology Song of the Week: [Biology Class Music](#) This is supposed to be a folk song ballad. I feel like AI did a fairly decent job with this one.

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: ch 13 Genes in Action pg 276-291, Diagrams F-13.6, F-13.16

Iguana Book: ch 11 DNA and the Language of Life part 2 pg 233-245, Diagrams F-11.17, F-11.19

Brief Synopsis of Your Reading: This week, I'm going to give you a video for your chapter synopsis. [How are Proteins Made? - Transcription and Translation Explain...](#) You are encouraged to watch this video before you read your chapter reading. Then, AFTER you've finished reading, check out the more detailed videos below. (This video does forget to mention "start" and "stop" codons, but the chapter reading and the videos below will make those concepts clear.)

Optional videos: I like these videos in this specific order, but you can bounce around if you want. Notice that the last video is sort of like an *optional* optional video.

[Protein Synthesis \(Updated\) Amoeba Sisters](#)

[Transcription and Translation: From DNA to Protein](#) Sometimes Professor Dave gets a little too deep, but I feel like he does a great job for our purposes in this video.

[Transcription and Translation - Protein Synthesis From DNA - Biology](#) Again, you don't need to stress about the 5' and 3' stuff unless you want to.

[DNA animation \(2002-2014\) by Drew Berry and Etsuko Uno wehi.tv #ScienceArt](#) Here's the animation of DNA doing ALL sorts of things. It's like a bunch of little protein factories. Try and see how many times you recognize what the DNA and proteins are doing in this animation. (I'm not sure how I feel about the sound effects.)

[Gene Expression and Regulation](#) We are not really going to talk about this, but it is SUPER interesting and might lead you down the DNA rabbit hole. There is just SO MUCH to learn about DNA and genes.

ACTION ITEMS:

- **Do your homework (read, draw, teach) This is the LAST WEEK this semester that you will have reading and diagrams!!!**
- **Semester projects are DUE November 21st, which means as of today as I'm typing this, you have slightly less than 2 weeks to have your project finished and ready to turn in. Scroll down to (almost) the very bottom of this document for details about the semester project.**

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due November 7th, 2024

DNA as the Genetic Material



Image by pikisuperstar on Freepik

Optional: Turn in completed Punnett Square worksheet packets for your choice of either a glucose reward or a fructose reward.

Notes from your Mentors: THIS IS SUPER CRITICAL THAT YOU READ THIS SECTION!!!

Sister Hopkins and I have revised the syllabus slightly for the next two weeks. Please Note the following. The tables below are the CORRECT syllabus that you should follow. **DO NOT USE THE PRINTED SYLLABUS IN YOUR NOTEBOOK FOR THE NEXT COUPLE WEEKS.**

Penguin Book

11/7	dna	ch 12 DNA and the Genetic Material pg 258-275	F-12.9, F-12.11
11/14	more dna	ch 13 Genes in Action pg 276-291	F-13.6, F-13.16
11/21	review	NO READING DUE: Semester Review in class	finish

			homework/semester project
		winterm extra - chapter 14-17 (pg 292 - 345) optional	

Iguana Book

11/7	dna	ch 11 DNA and the Language of Life part 1 pg 224-232	F-11.5, F-11.6, F-11.7
11/14	more dna	ch 11 DNA and the Language of Life part 2 pg 233-245	F-11.17, F-11.19
11/21	review	NO READING DUE: Semester Review in class	finish homework/semester project
		winterm extra - chapter 12-13 (pg 246-287) optional	

Biology Song of the Week: [8. Double Helix Blues.mp3](#) THIS ONE is my favorite!! It's just got Jack Johnson vibes flowing all over the place.

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: ch 12 DNA and the Genetic Material pg 258-275, Diagrams F-12.9, F-12.11

Iguana Book: ch 11 DNA and the Language of Life part 1 pg 224-232, F-11.5, F-11.6, F-11.7

Brief Synopsis of Your Reading: After taking a week to do bio-mathematics with probabilities and all those Punnett squares, we're back to biochemistry! I don't know if that makes anyone happy or not (besides me), but hopefully you at least feel more comfortable with the idea than at the beginning of the semester. Here are the most important things I'd like you to get out of your reading this week:

1. Watson and Crick - those dudes are important. Figure out why and file that information in your brain right next to van Leeuwenhoek, Schleiden and Schwann, and Mendel. Watson and Crick are probably my favorites.
2. DNA is a double helix that has two sugar backbone strands (a pattern of phosphate group, deoxyribose, phosphate group, deoxyribose, etc.) Those two sugar backbones (Ribose-phosphate backbones) are attached in the middle by nitrogenous base pairs. Each deoxyribose attaches to a nitrogenous base, which in turn attaches to its complementary nitrogenous base, which then attaches to the second sugar backbone.

3. One phosphate group attached to one deoxyribose (sugar) which is attached to the one nitrogenous base = a nucleotide. See your books for a diagram to help you picture that.
4. In DNA there are only FOUR nitrogenous bases and they form two complementary “base pairs.” Thymine (T) and Cytosine (C) are pyrimidines (they have just single rings) and Adenine (A) and Guanine (G) are called purines (they have double rings.) To form the hydrogen bonds that hold everything together, a pyrimidine and a purine bond together. But Thymine will ONLY bond with Adenine and Cytosine will ONLY bond with Guanine.
5. We talked about DNA replication in mitosis and meiosis (to prepare for cell reproduction.) Your chapter reading will go into how different enzymes carry that process out. It is less important to me that you know HOW that works, than that you know THAT it works.
6. If your book talks about 5’ and 3’ ends of the backbone strands and it’s confusing you, don’t worry about it. It confuses me too and I’ve managed to live a very productive and happy life without ever thinking about it ever.

Optional videos: Just TWO short videos this week.

▶ DNA Structure very basic, very good video.

▶ The Structure of DNA This is a great video, but goes into more depth than we will go through in class. If you are reading the Penguin Book, this video may help you understand some of that 5’ and 3’ stuff.

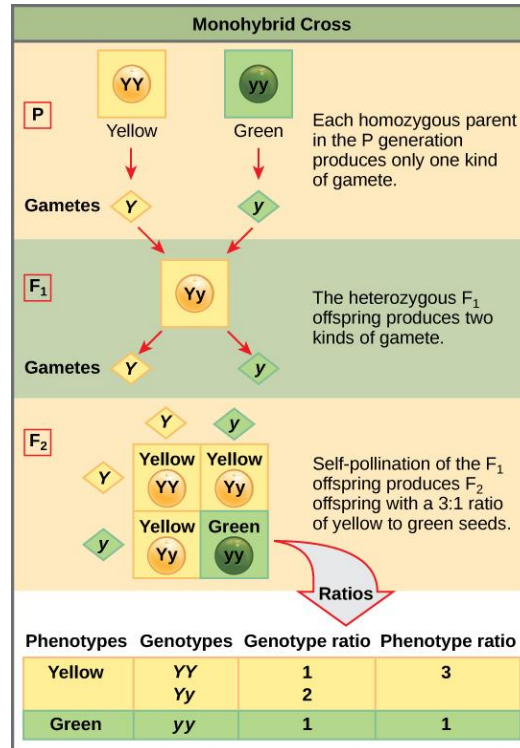
ACTION ITEMS:

- Do your homework (read, draw, teach)
- If you haven’t already, **START** your semester project. If you are confused about what this is, please contact me **ASAP**. Scroll down to (almost) the very bottom of this document for details about the semester project.
- If you want to finish your Punnett Square worksheet packets from last week, you can bring them to class and I will have something yummy for you. (A glucose option and a fructose option ;))

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due October 31st, 2024

Mendelian Genetics and Inheritance (and Punnett Squares)



Notes from your Mentors: I have to apologize because I feel like instead of making last class's lecture EASIER, I made it more complicated. So let's do this again but in a much simpler way - Mitosis/Meiosis take 2. (Just let me redeem myself here.)

Mitosis (in my toes-ies) - this is how body cells (also called somatic cells) divide and multiply so your body can grow and heal from injury. [Interphase](#) (before Mitosis, the cell grows, the DNA duplicates - the 46 little stick guys duplicate to become an 46 little X guys, the cell grows some more and does normal cell stuff.) [Prophase](#) (The DNA condenses into even denser Xs, the centrioles and spindle fibers form - the cowboys, and the nucleus membrane fades away), [Metaphase](#) (the 46 chromosomes that look like little Xs line up single file down the middle. [Anaphase](#) (the chromosomes split down the middle - one chromatid from each side gets "lassoed" and pulled away, so your Xs are now little stick guys again.) [Telophase](#) (the chromosomes are on the far sides of the cell). [Cytokinesis](#) (the cells gets "pinched" and splits into two cells) - [PMAT](#)

Meiosis (in my ovaries) - this is how cells become gametes (eggs or sperm cells) that have only HALF the genetic material of regular somatic (body) cells. Basically it's just like Mitosis 2x EXCEPT during **Metaphase 1** the 46 Xs line up in PAIRS so instead of 46 single file Xs, you

have two columns of 23 Xs each, then the crossing over happens where the genetic material gets swapped. Then during **Anaphase 1**, the PAIRS get separated. After Meiosis 1, you have two cells with 23 Xs each. Meiosis 2 looks exactly like Mitosis. You end up with 4 gametes (cells) total that each have 23 little stick guys. 23 little stick guys is only HALF the genetic material needed to grow a human person. Once an egg and a sperm fuse together, you again have 46 little stick guys (23 from mom and 23 from dad and this makes a brand new original person) This zygote (that's just what a newly formed fertilized egg is called for a while) is now just like every other somatic cell - and that fertilized egg can undergo a ridiculous amount of MITOSIS in order to grow. $P_1M_1A_1T_1$ THEN $P_2M_2A_2T_2$

Ok. I feel like I've redeemed myself.

Biology Song of the Week:  **7. Genetics on the Dance Floor.mp3** Ha ha ha ha ha!!! This song is crazy. After we play our slow dance song at Graduation, we're going to play this one and everyone is going to lose their minds! Bwa ha ha!

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: ch 10 AND 11 Mendelian Genetics/Going Beyond Mendel pg 220-257, Diagrams F-10.7, F-11.13

Iguana Book: ch 10 Patterns of Inheritance pg 204-223, Diagrams F-10.5, F-10.14

Brief Synopsis of Your Reading: Abbot Gregor Mendel (1822-1884) was REVOLUTIONARY in his science and it's a shame that nobody paid attention to him when he was alive. In your reading this week you are going to read about his hereditary experiments with peas. He noticed the peas in the monastery garden were sometimes green, sometimes yellow, sometimes smooth, and sometimes bumpy, and he wanted to find out more about that. After manipulating the fertilization of the flowers (he pollinated THOUSANDS if not MILLIONS of flowers by hand), he tracked the traits through many generations of pea plants and came up with his theory of genetic inheritance. Keywords to pay attention to are **traits**, **alleles**, **dominant**, **recessive**, **heterozygous** (different), **homozygous** (same), **incomplete/intermediate dominance**, **codominance**, **phenotypes** and **genotypes**. (This is the stuff that Esther was talking about in class.) Mendel's peas were the perfect test subjects because their genes were pretty straightforward. He found that mathematically, he could predict which traits (color, smoothness) would show up in which peas and how often. And even though HE didn't know anything about meiosis and crossing over, YOU do and so you'll see how that all plays a large part of what Mendel was seeing. Hundreds of years later, a guy named Punnett created the... wait for it... Punnett Square, which helps us mathematically and visually show how simple genetics and inheritance works. Oftentimes the alleles are more complicated than what Mendel was seeing, so we'll talk about how that works, too a little bit. Using math and probability, if you've got pretty simple genes and alleles you

are working with, you TOO can predict the character traits of multiple generations of things/people like fruit flies and hemophiliacs and color blind people and albino people! So exciting! (Also you can figure out your blood type.)

Optional videos: LOTS of videos, but worth your time.

- ▶ Gregor Mendel
- ▶ How Mendel's pea plants helped us understand genetics - Hortensia Jiménez Díaz
- ▶ Alleles and Genes This one is a little complicated, but not too bad. It's Amoeba Sisters again.
- ▶ Monohybrids and the Punnett Square Guinea Pigs How to use a Punnett Square
- ▶ Incomplete Dominance, Codominance, Polygenic Traits, and Epistasis! (Non Mendelian traits)
- ▶ Multiple Alleles (ABO Blood Types) and Punnett Squares
- ▶ Punnett Squares and Sex-Linked Traits (UPDATED)

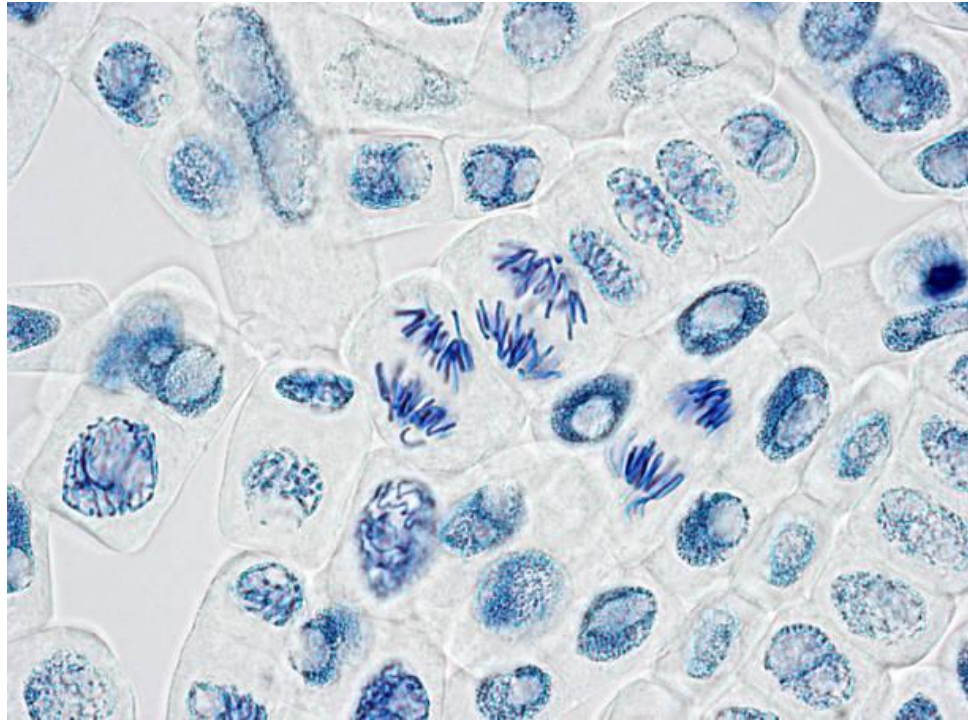
ACTION ITEMS:

- Do your homework (read, draw, teach)
- If you haven't already, **START** your semester project. If you are confused about what this is, please contact me ASAP. Scroll down to (almost) the very bottom of this document for details about the semester project.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due October 24th, 2024

Cell Division/Reproduction - Meiosis and Mitosis



As promised: [Here is a link to the Book List.](#) You can also find this copy and pasted at the VERY end of this document. (Scroll ALL the way to the bottom.)

Notes from your Mentors: I am SO amazed at the things you guys are learning. I really hope you are starting to develop the absolute awe and wonder at LIFE in general and the human body in particular that we have gained over years of study and experience. Life truly is an absolute miracle.

Biology Song of the Week: 6. Cell Division Rodeo.mp3 This song is actually one of my very favorites from our class play list. The AI lyrics actually make sense! After you've read the chapters and watched the videos, go back and listen to the words of this song again. It will be a good review. (Except both meiosis and mitosis happen regardless of whether it's day or not, so disregard that part.)

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: ch 9 Eukaryotic Cell Reproduction pg 200-219, Diagrams F-9.4, F-9.8 (F-9.10) Figure 9.10 is optional, but if you are having a hard time keeping meiosis and mitosis straight, I highly recommend you copy that one as well.

Iguana Book: ch 9 The Cellular Basis of Inheritance pg 178-203, Diagrams F-9.8, F-9.17, (F-9.20) Figure 9.20 is optional, but if you are having a hard time keeping meiosis and mitosis straight, I highly recommend you copy that one as well.

Brief Synopsis of Your Reading: This week you're going to cover how Eukaryotic cells reproduce (divide and make new cells). You'll remember from cell theory, all cells are made up of other existing cells. So the cells aren't just going to materialize out of thin air! The main concept here, though, is actually how your DNA - as chromosomes and chromatids - split and divide. You have TWO copies of every chromosome and we've got to split those so that each new "daughter" cell (which are produced from the original "parent" cell) can have all the DNA needed in order to know how they are supposed to function. All this takes place in the nucleus of the cell - remember that BIG (relatively) organelle in the middle (sort of) of every cell that holds all the jumbled up strands of DNA? (Last week the setting was the mitochondria, this week we're in the nucleus.) This is called Mitosis.

In Mitosis, there are a series of phases the cell goes through in order to get a copy of your DNA into each new cell: Prophase, Metaphase, Anaphase, Telophase, and Cytokinesis. You'll get to read about each one.

But *certain* of your cells don't *want* ALL your DNA. They only want HALF of your DNA. These are going to be the gametes that are the egg and sperm cells needed for reproduction. We're not covering reproduction in this class, but we are covering Meiosis, which is how the sperm cell from your dad had only HALF his DNA and the egg cell from your mom had only HALF her DNA, and how together that made YOU, a complete human being with again TWO copies of each chromosome. The process is *almost* identical, except twice as long. ;)

Besides the above mentioned ideas, please pay attention to the concept of homologous chromosomes, diploid vs haploid cells and "crossing over." We will discuss the makeup of DNA and ITS replication, the concepts of genes and alleles, phenotypes and genotypes in the next few weeks, so you don't need to stress out about those details this upcoming week.

Optional videos:

▶ Mitosis: The Amazing Cell Process that Uses Division to Multiply! (Updated) Amoeba Sisters - Just Mitosis

▶ Mitosis and the Cell Cycle Animation

▶ Meiosis (Updated) Amoeba Sisters, just Meiosis

▶ Chromosome Numbers During Division: Demystified!

▶ The Cell Cycle (and cancer) [Updated] The Cell Cycle, Checkpoints, and Cancer concepts (This is a very OPTIONAL optional video.)

▶ Meiosis, Gametes, and the Human Life Cycle **THIS is my favorite video, BUT** watch the others FIRST to make sure you have a solid(ish) understanding of how mitosis and meiosis works. AFTER you feel comfortable with that, watch this video. It

will probably confuse you a little bit, but it will be a GOOD confusion, that I will clear up in class.

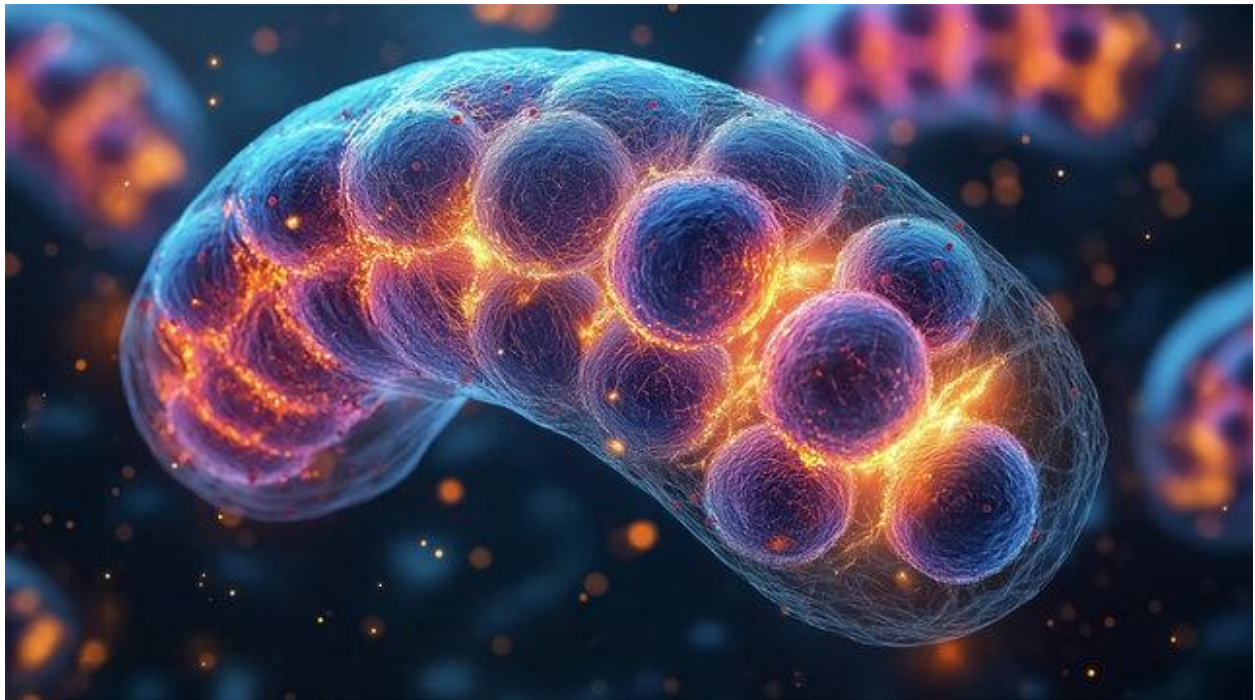
ACTION ITEMS:

- Do your homework (read, draw, teach)
- If you haven't already, **START** your semester project. If you are confused about what this is, please contact me ASAP. Scroll down to (almost) the very bottom of this document for details about the semester project.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due October 10th, 2024

Cellular Respiration



Notes from your mentors: Just so you know, I probably shouldn't admit this, but I think this next chapter can be very confusing - especially if you are reading from the Penguin book. There is A LOT of information here and it's easy to get bogged down. BUT the human body is a miracle and it is a gross understatement to even say it is a work of pure and complete genius. It is so complex and so beautiful, but so... very, very complex. We do NOT require you to memorize all the steps of cellular respiration, but if you read the Iguana book, take note that we are going to be MORE detailed in class than what you've been studying. And if you are reading the Penguin book, we'll stick to the more simplified diagrams. It would be a disservice to you (and frankly, an insult to your intelligence and capabilities) if we just skipped this part because it was "too hard" or "too complicated." Just take it slow. Ask questions. Take notes (of questions) in your book. Watch the videos - hopefully I'll find some really helpful videos. And try to narrate to yourself the things you are reading and watching (say it back to yourself in your own words.) I will be completely honest and admit that, unless you actually get some sort of job in the world of biology, this week may be the first and the last time you ever care about glycolysis and the Citric Acid cycle. But you SHOULD care about it. DO NOT sell yourself short and just skip it because you are too busy or it's hard. You are WAY too good for that. You can expect us, as your mentors, to always do our best to guide you along, and we always expect YOU to do your best as well.

Plus, this stuff is crazy interesting! So honestly, maybe the world would be a happier place if people knew how their bodies worked! Enjoy your homework this week and maybe consider yourselves blessed to have this opportunity to learn some of the mysterious ways God has organized his creations!

Biology Song of the Week:  [5. Glow Inside.mp3](#) Just a happy song to get you through.

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: Read ch 8 Cell Respiration pg 172-197, Diagrams F-8.3, F-8.4, F-8.8, F-8.12

Iguana Book: ch 7 The Working Cell: Energy from Food week 2 pg 145-157, Diagrams F-7.17, F-7.18, F-7.19

Optional videos: the first three talk about the three parts of aerobic cellular respiration in general. The last three talk about each step separately. I HIGHLY encourage all of you to watch ALL the videos. The last one, I think, is especially helpful.

-  Cellular Respiration (UPDATED) Amoeba Sisters
-  ATP & Respiration: Crash Course Biology #7 Crash Course
-  Cellular Respiration Overview | Glycolysis, Krebs Cycle & Electron Transport Chain
-  Cellular Respiration Part 1: Glycolysis - This one is just about Glycolysis

▶ The Krebs Cycle Explained (Aerobic Respiration) - This one is just about the Krebs Cycle (the Citric Acid Cycle)

▶ Electron transport chain **THIS ONE IS SO GOOD** - About the Electron transport system

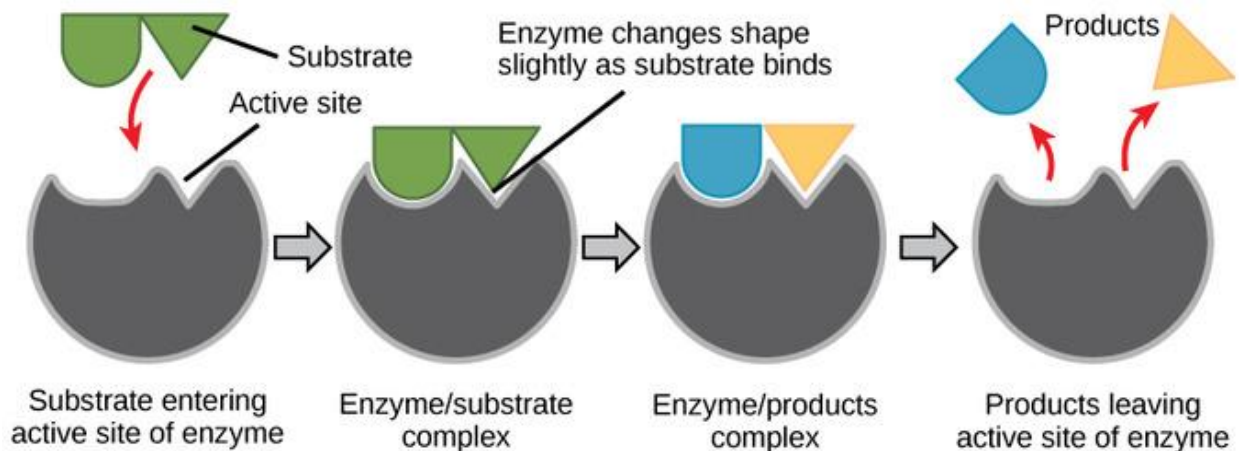
ACTION ITEMS:

- Do your homework (read, draw, teach)
- If you haven't already, **START** your semester project. If you are confused about what this is, please contact me ASAP.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due October 3rd, 2024

Energy and Enzymes



As promised, here's the video with exploding blood cells: explosions start around 2:50 but watch the **WHOLE** thing for a really great review! The video is less than 5 minutes.

▶ Osmosis Animation and Experiments

Notes from your mentors: Class is really fun. But it's MORE fun when you know what is going on. Please let us know if you are not understanding the readings. Please let us know when you have questions. We don't promise to know everything, but we try our best. This is an UPPER level journeyman class - so remember that it is geared for students at ASA who are 15-16 (although we are trying to accommodate everyone we can.) If you are feeling overwhelmed, let us know and let's find a way to help you be successful in class.

On the other hand (!!), if you don't take the time to read the chapter, *carefully* copy the diagrams, and watch the videos, and you come to class but don't pay attention, don't listen to instructions, and just play around, it will be VERY hard for us to help you at all. We are more than willing to do what we can to help, but you have to do your part first. This is another expectation of an UPPER journeyman class - that you take responsibility for your own learning and apply integrity and respect for yourself, your classmates, and your mentors. We will never shortchange you. Don't shortchange yourself.

And that brings me to what I really wanted to say! Next week we will be playing a fairly complicated game in the gym involving enzymes, substrates, and ATP. If you do not listen carefully to instructions and if you don't ask questions if the instructions don't make sense, it will be WAY less fun for everyone. I'm really excited for this game, but if we don't have full class participation, it could devolve and implode very quickly. Please commit to listening carefully to the instructions. Also - the more you understand enzymes and substrates (which for some, you will learn mostly through the videos this week because your book doesn't cover it quite yet) the more the instructions of the game will make sense.

It's going to be fun. I'm so excited! (Because who doesn't just thoroughly enjoy enzymes!?!?)

Biology Song of the Week:  4. Enzyme Groove.mp3 This one is ALMOST my favorite song. I'm planning on slipping it into the playlist for the graduation/end of year ASA celebration in May. I better see you ALL dancing!! Ha ha ha!!!

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: Read ch 6 Energy and Chemical Activity in the Cell pg 126-147, Diagrams F-6.13, F-6.16, F-6.17, F-22

Iguana Book: ch 7 The Working Cell: Energy from Food week 1 pg 134-144, Diagrams F-7.5, F-7.6, F-7.9

Optional videos: Only two (three if you can't the partial joke video at the end). Maybe watch them a few times if you have time.

 What is ATP? BEST video on ATP!

 Enzymes (Updated) Another Amoeba Sisters video.

So I'm spending HOURS trying to find the BEST videos and I just cannot find one that really talks about simple metabolic enzyme pathways in the way I want it to. So that's too bad. BUT I just found THIS guy and I am dying laughing. Just watch and get out of it anything you get out of it (mostly all the stuff AFTER the firehose of information about proteins), but don't worry too much if it doesn't make a ton of sense. It's actually a really

great video and you'll probably get good stuff out of it. Just laugh with him at his zany humor and DO NOT sign up for his surgery course.

▶ Enzymes - Catalysts - Structure & Function - Biochemistry 🧪

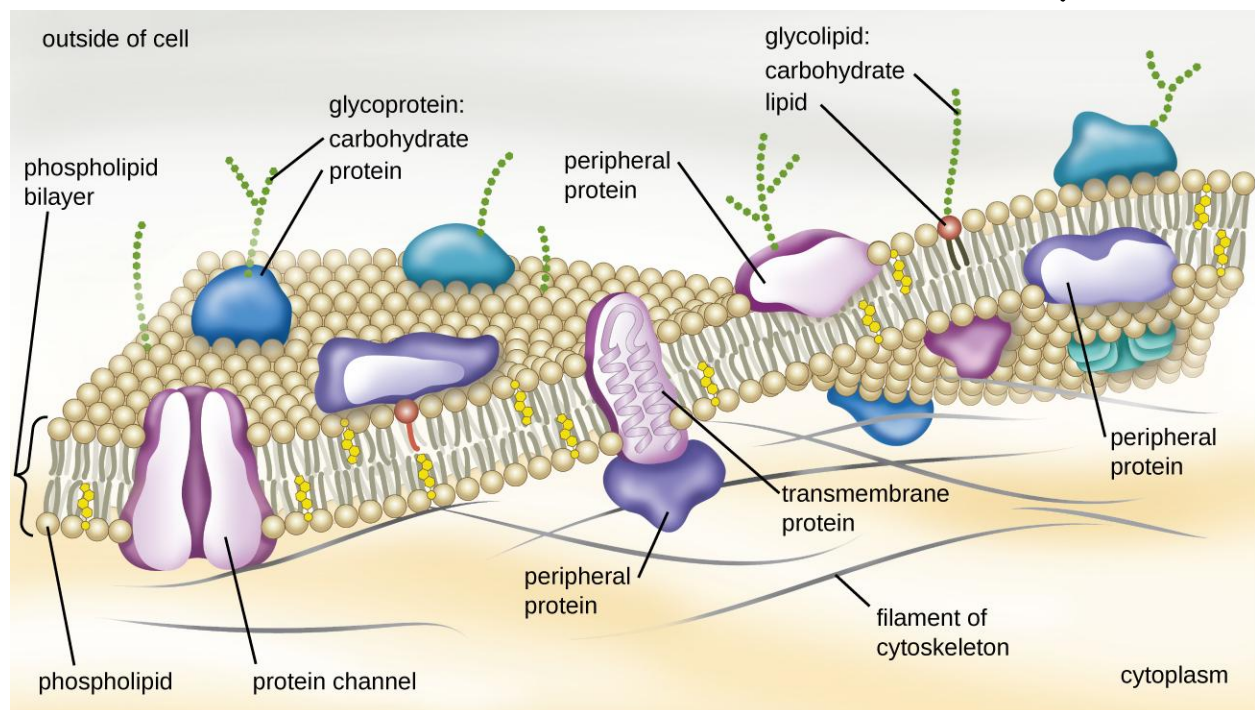
ACTION ITEMS:

- Do your homework (read, draw, teach)

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due September 26th, 2024

Plasma Membrane and Cell Transport



Note from your Mentors: After a few weeks in, I hope you are enjoying class and getting into a routine with your homework. Besides becoming *enamored* with cellular biology and later physiology and anatomy, one of our goals in class is to help you become an exceptional student. The homework and chapter readings we've assigned have been carefully thought out

to give you the most bang for your buck; We are aiming for quality instruction and assignments without wasting your time with mindless busywork. (If it starts to FEEL like busywork, try to remember the reason behind the reading, drawing, and teaching pattern we've given you.)

Additionally, the lectures and activities in class are to support and supplement what you are learning at home. We are aiming to provide you with all the resources you need to get a foundational understanding BEFORE you come to class. While the workload we've given will most likely take less time overall than some other classes (I was aiming for just 2 hours a week, give or take a little) this class does require you to *mentally* work harder than maybe you have ever before. It's supposed to be a hard class on purpose - but definitely a very achievable class with high success rates where I think you can all succeed and gain invaluable habits for your future academic pursuits.

Read carefully, even twice if you need to. Take notes and highlight and underline your books. Study all the diagrams, not just the ones you copy in your notebook. And although not required, the optional videos are there to help you when the concepts are difficult. We don't do tests at ASA, so we don't require you to memorize or internalize what we are hoping you are learning. But we do HOPE that you are putting in the effort to memorize the general concepts and maybe even the details as we go along. We are ALWAYS happy to further explain and answer any questions you have. As mentors, we are here to support YOU, not just dictate to you what we want you to do.

So I hope you feel encouraged and inspired and supported in your learning efforts this year. I think you are all doing a FABULOUS job and I am very confident we are going to feel exceptionally proud of ourselves come the end of second semester, if we don't feel that way already!

Biology Song of the Week:  [3. Cellular Vibes.mp3](#) Here's a song to help you kick back and just chill for a while.

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: Read chapter 5 "The Plasma Membrane and Cell Transport," pages 102-125

Diagrams F5.7, F5.17, F5.18

Iguana Book: Read PART OF chapter 6 "A Tour of A Cell" pages 115-123

Diagrams F6.8, F6.12, F6.16, F6.17

Optional videos: Here are five videos you can watch to solidify your understanding of cell membranes and transport. If you only have time to watch a couple, watch the first two. If you have a little more time - maybe watch those two more than once - or watch the other videos as well. I think the first two and the last are the best, but there is value in the 3rd and 4th videos as well.

 [Cell Membrane Structure and Function](#) basic info about the membrane

 [In Da Club - Membranes & Transport: Crash Course Biology #5](#) I think his club analogy is less interesting, but oh well. This video is great to watch because even

though it is FULL of information, it covers things that the Penguin book doesn't cover AND things that the Iguana book doesn't cover as well.

▶ [Transport in Cells: Diffusion and Osmosis | Cells | Biology | FuseSchool](#) specifically diffusion and osmosis ▶ [Transport In Cells: Active Transport | Cells | Biology | FuseS...](#) and here is part 2 which covers active transport.

▶ [Cell Membrane Transport - Transport Across A Membrane - How Do Things Move ...](#) This one covers a variety of transport methods

ACTION ITEMS:

- **Do your homework (read, draw, teach)**
- **Finish up your lab papers and glue them in your notebook if you haven't already.**

SEMESTER PROJECT INFORMATION:

Each student is expected to complete a semester project, one for both fall and winter semesters. They may choose from the following options:

- **Collect current event news articles relating to biology/health/etc. in a binder. Complete a one paragraph typed summary/reaction write up explaining the article and what you thought of it. Collect at least one article each week.**
- **Choose ONE book from the mentor provided list to read. Write a two page summary of the book, including your thoughts and questions and how it relates to things we have learned in class - or that you hope to learn if we haven't covered that topic yet.**
- **If there is a particular biological topic that interests you (anything relating to cellular/molecular biology or human anatomy/physiology), go deeper and study up on it on your own. Become an expert on that topic. Then, write and submit a three page paper (minimum) that explains and teaches that concept - as if you were writing a section in a text book or other book for students. You can include your own diagrams if you want, but make sure the text is at least 3 pages long.**
- **Conduct a biology related science fair project and submit it to the WHEN science fair. The fair is in February or March, so if you choose this option, you could either do it Fall semester and hold on to it until February (and**

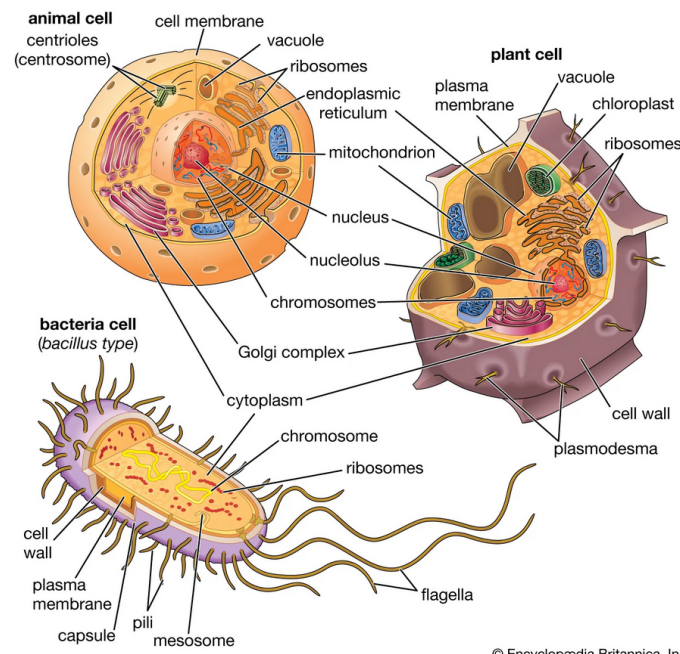
then do a different semester project for winter semester) OR you can do your project over the winterim and have it ready to go for the science fair in Feb/March and count that as your second semester project.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due September 19th, 2024

Cells and Cell Structure

Some typical cells



Notes from your Mentors: There was a little mixup when we recorded your homework in class this last week. In order to take care of that quickly and not take up valuable class time, I will be slack messaging you and having you send me a photo of the check marks for BOTH your **chemistry week homework** (the diagrams we started in class about the structure of at atom and covalent and ionic bonding) AND the **Molecules of Life homework** (the diagrams of a carbohydrate, a lipid, and an amino acid.) In class on the 19th we'll be all caught up and ready to record the homework that is being assigned THIS week in this section of the Class Doc.

Also, if you fall behind on your homework, just catch up as best you can. Utilize fall break and Christmas break if you have to (although I don't suggest waiting that long to catch up.) The homework is due every week and is important for understanding what we are talking about in

class, however you are ok to “turn in” your homework late in order to earn the plush human organ at the end of the year.

Biology Song of the Week:  2. The Cellular Swing.mp3 Brush up on your swing dancing!!!!’m not joking.

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: Read chapter 4 “Cell Structure,” pages 68-101

Diagrams F4.7, T4.1, T4.2

Iguana Book: Read PART OF chapter 6 “A Tour of A Cell” pages 108-114 AND 124-131

Diagrams F6.4, F6.5

Optional videos: There are MANY videos that review cell structure and organelles. I picked the first four that popped up on YouTube. Feel free to find other videos that are more interesting and entertaining if you want/need more review on this topic. These videos might be SUPER BORING, but if they get the job done...

-  Biology: Cell Structure I Nucleus Medical Media
-  Organelles: Structure and Function (AP BIOLOGY)
-  Introduction to Cells: The Grand Cell Tour (amoeba sisters)
-  A Tour of the Cell: Crash Course Biology #23 (crash course biology)

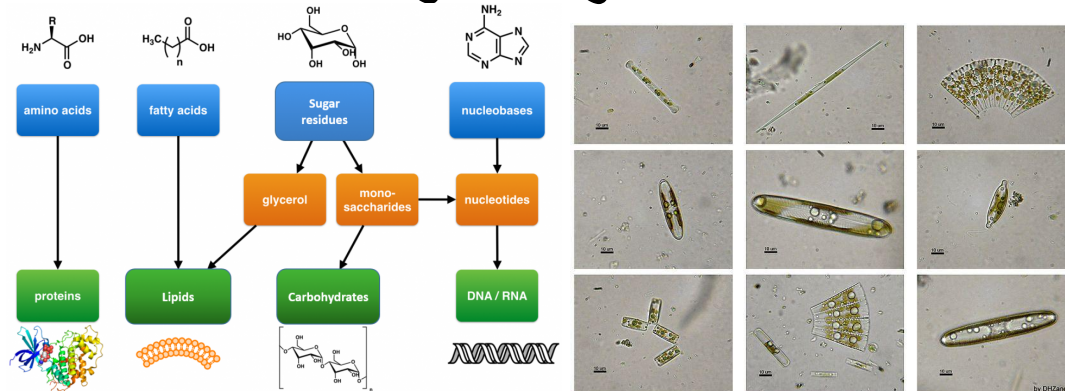
ACTION ITEMS:

- Do your homework (read, draw, teach)
- If we used your microscope last week, please bring it to class again this week. We’ll be looking at animal and plant cells with them.
- Take a photo of your check marks in your notebook from the last two weeks and send them to me privately via slack - or get the photos ready and wait for me to contact you via slack.

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due September 12th, 2024

Molecules of Life and Slightly Bigger but still Itty Bitty Life



Notes from your Mentors: You guys are amazing and last class was so much fun! Please don't hate us after this week's homework! It might feel very overwhelming IF you try and do it all in one day. Try doing the reading one day and drawing the diagrams on different days. Remember, you DO NOT need to make your diagrams perfect, but you should try and make them look nice and legible. *PRO TIP: Draw the diagrams first with pencil and then go over it with that fancy pen we gave you.* You will need to use the notebooks and diagrams to teach one of the concepts to someone in your family so if you can't read it or show them what it's supposed to look like, that will be hard.

Read your chapter. Draw and label your diagrams. Teach ONE (or more if you want) of the concepts to someone in your family or neighborhood or whatever. Make two checkboxes in your journal - one that says "I read my assigned reading" and another that says "I taught one of the concepts to someone." A quick visual of your diagrams and those two check boxes is all we need to see to check off your homework as done.

And don't forget! If you do all your homework this year, you could get your very own stuffed pancreas! (Or other human organ - some exceptions)

Biology Song of the Week:  [1. Biology Groove.mp3](#)

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: Read chapter 3 "Molecules of Life" pages 44-67

Diagrams F3.1, F3.10, F3.11

Iguana Book: Read chapter 5 "Molecules of Life" pages 90-107

Diagrams F5.6, F5.7, F5.9, F5.12

Optional videos:

▶ **Biological Molecules - You Are What You Eat: Crash Course Biology #3**

This one is longer (14 minutes), but also funnier.

▶ **Macromolecules Explained | 2MC GIGAVID**

This one is shorter (8 minutes) and a little more technical. We'll cover many of the things he is talking about later this year, so don't get caught up if you watch this and some of it goes over your head.

▶ **Introduction to microscopy** **MICROSCOPY COURSE**

Just what it sounds like - about 3 minutes. If you are interested in microscopy, check out the rest of his videos. Also, check out the video just to see the different microorganisms.

<https://www.youtube.com/watch?v=SGPfIE5eHrU>

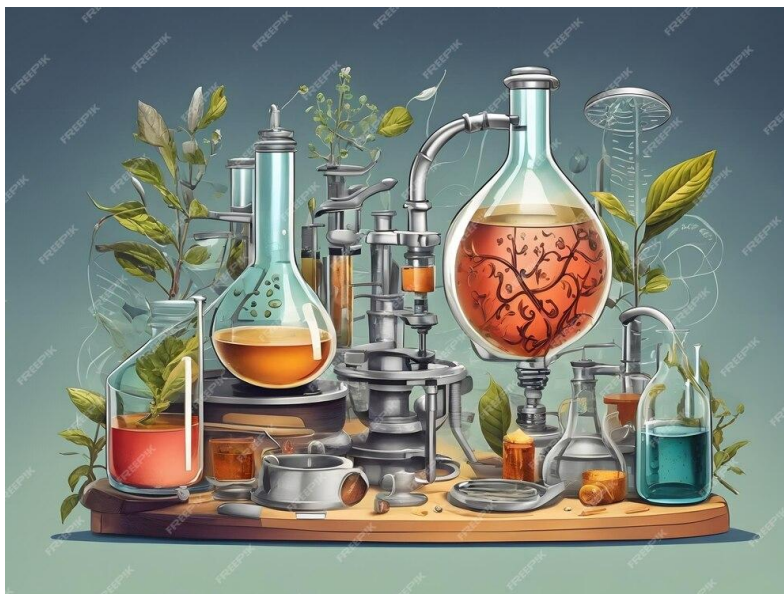
I don't know why that last link is showing up just as the link and not the button, but oh well. This last video is 4 minutes and shows some common microscopic pond water life.

ACTION ITEMS: **Do your homework (read, draw, teach) (yes, you can!)**
 Bring a microscope to class (if you can)
 Bring a cup of scummy pond water (if you can)

Please contact either one of us (Sister Mock and Sister Hopkins) via slack or whatever if you have any questions or need any further explanations! See you next Thursday!

Homework Due September 5th, 2024

WELCOME TO BIOLOGY!



Note from your Mentors: Before we get to the bio part of biology, we need to review some very basic chemistry. Even if you have taken a chemistry class before (and even if it was very recently) please complete the following reading assignments BEFORE class on Thursday the 5th. We will also add some optional YouTube videos for you to watch AFTER you've done the book reading if the concepts still seem confusing.

On the first day of class YOU DO NOT NEED TO BRING ANYTHING. DO NOT BRING YOUR BIG FAT TEXTBOOKS. We will give you your notebooks (which you WILL need to bring to class each week) and whatever other supplies we decide to give you.

If you do NOT have a textbook yet, please get one ASAP or contact Sister Mock (801-380-3950) ASAP. You must have a copy of ONE of the approved textbooks. I have a couple extra I can sell to you if there are no more available online.

Biology Song of the Week: I probably shouldn't have started with a bluegrass song - it's kind of an acquired music taste - but even if you aren't a bluegrass fan, hopefully you'll like the song.

📁 0. Basic Chemistry Revival.mp3

Homework: (these are not links. They are just pretty purple to get your attention)

Penguin Book: Read chapter 2 "Chemistry of Small Molecules" pages 21-43

Iguana Book: Read chapter 4 "The Chemical Basis of Life" pages 72-89.

Optional Homework:

▶ Atomic Structure And Electrons - Structure Of An Atom - What Are Atoms - Neutrons Proto...

- **Chemical Bonds: Ionic and Covalent**
- **What is a base in Chemistry? Acids and Bases**

CLASS SYLLABUS

(You don't need to print this out - we will give you a copy for your notebook on the first day of class.)
 (Also, this is subject to change, so don't memorize it. Always look at the most recent posting of homework for the most up-to-date information.)

we ek		micro and cellular biology	<u>Penguin book</u>	Diagrams Due
0	summer		assign Chemistry reading!!!	
1	9/5/24	chemistry	ch 2 Chemistry of Small Molecules pg 21-43	F. 2.7 and 2.9 (in class)
2	9/12/24	carbs, lipids, proteins (amino acids)	ch 3 Molecules of Life pg 44-67	F. 3.1, 3.10, 3.14
3	9/19/24	cells	ch 4 Cell Structure pg 67-101	F. 4.7, T. 4.1, T. 4.2
4	9/26/24	plasma membrane	ch 5 The Plasma Membrane and Cell Transport pg 102-125	F. 5.7, F 5.17, F. 5.18
5	10/3/24	energy	ch 6 Energy and Chemical Activity in the Cell pg 126-147	F-6.13, F-6.16, F-6.17, F-22
6	10/10/24	cell respiration	ch 8 Cell Respiration pg 172-197	F-8.3, F-8.4, F-8.8, F-8.12
	10/17/24	Fall Break - NO CLASS	Fall Break - NO CLASS	
7	10/24	cell reproduction/ meiosis/mitosis	ch 9 Eukaryotic Cell Reproduction pg 200-219	F-9.4, F-9.8 (F-9.10)
8	10/31	mendelian genetics	ch 10 and 11 Mendelian Genetics/Going Beyond Mendel pg 220-257	F-10.7, F-11.13
9	11/7/24	dna	ch 12 DNA and the Genetic Material pg 258-275	F-12.9, F-12.11
10	11/14	Field Trip	Field Trip - visit an oncologist - still in the works, date may change	
11	11/21	more dna	ch 13 Genes in Action pg 276-291	F-13.6, F-13.16
			winterm extra - chapter 14-17 (pg 292 - 345)	
			<u>Iguana Book</u>	Diagrams Due

0	summer		assign Chemistry reading!!!	
1	9/5/24	chemistry	Ch 4 The Chemical Basis of Life pg 72-89	see Penguin (in class)
2	9/12/24	carbs, lipids, proteins (amino acids)	ch 5 The molecules of life pg 90-107	F 5.6, 5.7, 5.9, 5.12
3	9/19/24	cells	ch 6 A tour of a cell week 1 pg 108-114	F 6.4, F6.5,
4	9/26/24	plasma membrane	ch 6 A tour of a cell week 2 pg 115-133	F-6.8, F-6.12, F-6.16., F-6.17
5	10/3/24	energy	ch 7 The Working Cell: Energy from Food week 1 pg 134-144	F-7.5, F-7.6, F-7.9
6	10/10/24	cell respiration	ch 7 The Working Cell: Energy from Food week 2 pg 145-157	F-7.17, F-7.18, F-7.19
	10/17/24	Fall Break - NO CLASS	Fall Break - NO CLASS	
7	10/24	cell reproduction/meiosis/mitosis	ch 9 The Cellular Basis of Inheritance pg 178-203	F-9.8, F-9.17, (F-9.20)
8	10/31	mendelian genetics	ch 10 Patterns of Inheritance pg 204-223	F-10.5, F-10.14
9	11/7/24	dna	ch 11 DNA and the Language of Life pg pg 224-245	F-11.5, F-11.6, F-11.7
10	11/14	Field Trip	Field Trip - visit an oncologist - still in the works, date may change	
11	11/21	more dna	ch 12 and 13 Human Genetics AND Frontiers of Genetics pg 246-287	F-11.17, F-11.19

SEMESTER PROJECT INFORMATION:

Each student is expected to complete a semester project, one for both fall and winter semesters. They may choose from the following options:

- Collect current event news articles relating to biology/health/etc. in a binder. Complete a one paragraph typed summary/reaction write up explaining the article and what you thought of it. Collect at least one article each week.
- Choose ONE book from the mentor provided list to read. Write a two page summary of the book, including your thoughts and questions and how it

relates to things we have learned in class - or that you hope to learn if we haven't covered that topic yet.

- If there is a particular biological topic that interests you (anything relating to cellular/molecular biology or human anatomy/physiology), go deeper and study up on it on your own. Become an expert on that topic. Then, write and submit a three page paper (minimum) that explains and teaches that concept - as if you were writing a section in a text book or other book for students. You can include your own diagrams if you want, but make sure the text is at least 3 pages long.
- Conduct a biology related science fair project and submit it to the WHEN science fair. The fair is in February or March, so if you choose this option, you could either do it Fall semester and hold on to it until February (and then do a different semester project for winter semester) OR you can do your project over the winterim and have it ready to go for the science fair in Feb/March and count that as your second semester project.

ASA Biology Book List 2024-25

1. *Brain Rules* by John Medina (neurology)
2. *Good Germs, Bad Germs* by Jessica Snyder Sachs (bacteria)
3. *The Immortal Life of Henrietta Lacks* by Rebecca Skloot (CC - check with me first) (cancer research)
4. *Gulp* by Mary Roach (CC - check with me first) (the digestive system)
5. *Fever* by Laurie Halse Anderson (easier reading level) (history - fever of 1773)
6. *Inheritance* by Sharon Moalem (genetics)
7. *The Song of the Cell* by Siddhartha Mukherjee (difficult reading level) (cells, cancer)
8. *The Cartoon Guide to Genetics* by Larry Gonick and Mark Wheelis (easier reading level) (DNA, genetics)
9. *Guinea Pig Scientists* by Mel Boring (easier reading level) (scientific experiments)

10. *Cells: An Introduction to the Anatomy and Physiology of Animal Cells* by Ellen Johnston McHenry (short “textbook” on cells)
11. *The Way We Work* by David Macauley (easier reading level - CC, check with me first) (human anatomy - lots of pictures)

CC = content considerations. Not all of these books are entirely appropriate for every audience. Some books should have a chapter skipped, but the rest of the book is fine. Other books deal with serious issues and themes that some may not be comfortable with. Please talk to me AND your parents if you are considering one of the CC rated books.