



Biology Discussion Topics

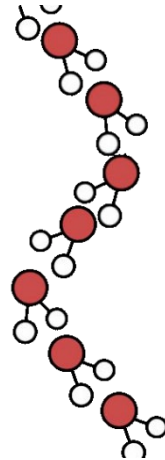
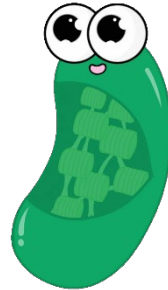
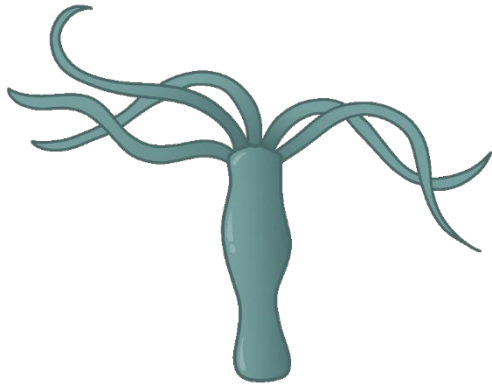
with GIFs!



By The Amoeba Sisters

Printable from Slides- this document is not animated.

(2017)



What

This activity is designed to start conversation on biology concepts for review. Each slide displays our GIFs (animations) to visualize concepts along with questions for review.

These can make **GREAT warm-ups and exit tickets.**

Please note that these do *not* cover a whole year worth of material as it only includes *some* of our GIFs. If you'd like to see these and MORE of our GIFs to download individually, [visit our GIFs page here.](#)

How

If the question on the slide is *not* hyperlinked, it is designed to be answered by looking at the GIF alone. If the question *is* hyperlinked, it is related to the GIF but the answer can be found in the supplemental resource that it directly links to.

When ready, click "PRESENT" at top right corner! This is 'view only' so *you won't be able to edit these slides.*

***Wanting to use these GIFs outside of this slideshow? [Visit here](#)** to access our GIFs which includes these and more! Need a **printout** of the question slides? [Visit here.](#)

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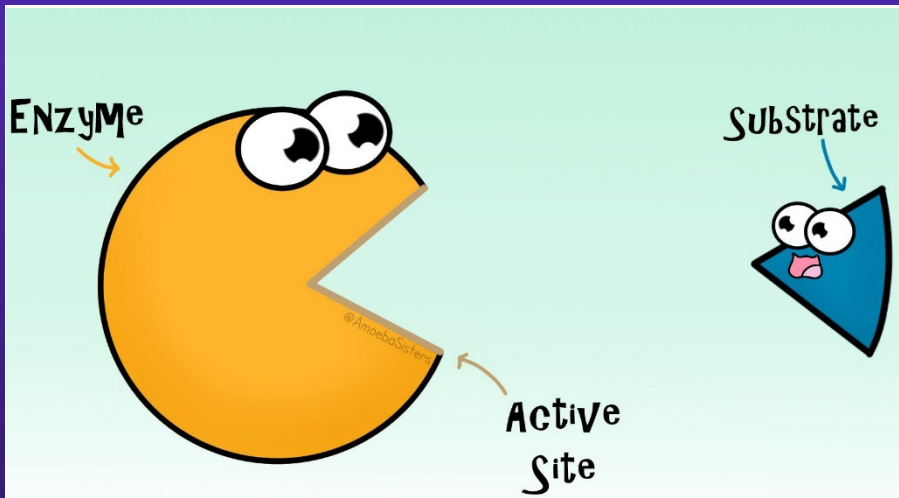
Biomolecule Building Blocks @AmoebaSisters

Nucleic Acid <small>@AmoebaSisters</small>	Carbohydrate	Lipid	Protein

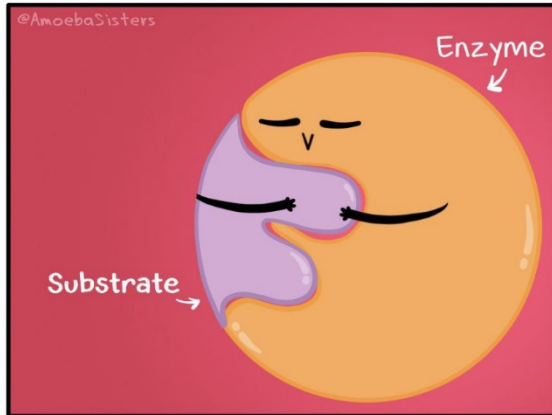
#1: What are the four biomolecules and what are their monomers?

#2: What do the structures of these four biomolecules look like? What is a mnemonic you can remember for the elements within them?

#3: What are some functions of these four biomolecules?



Induced Fit



It's the ultimate enzyme-substrate hug.

#1: What is the role of the active site for the enzyme's substrate?

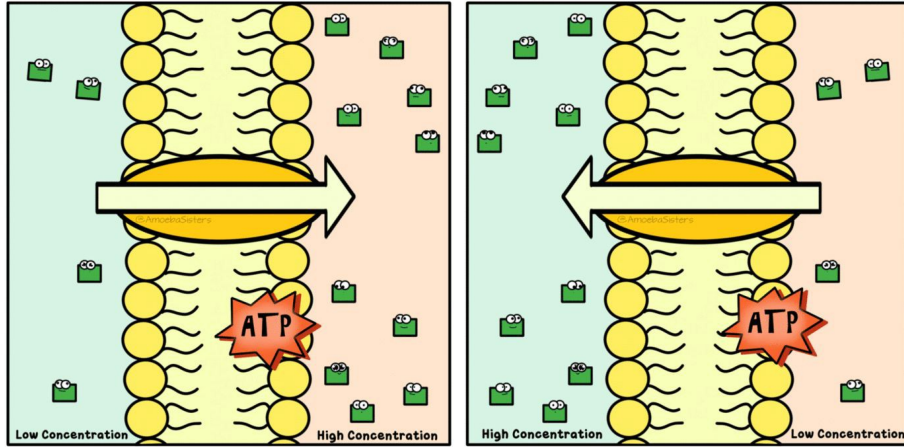
#2: Describe the fit for substrates to enzymes---is it specific? Non-specific?

#3: What kind of biomolecule are enzymes typically composed of? What effect do enzymes have on their substrates and the overall reaction? Give some real life examples!

#4: What does it mean for an enzyme to be denatured?

Active Transport

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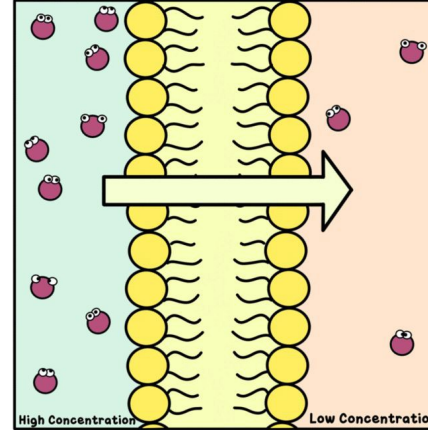
#1: Which transport movement would require energy: movement from high to low concentration or from low to high concentration?

#2: What is the energy molecule needed in this active transport example?

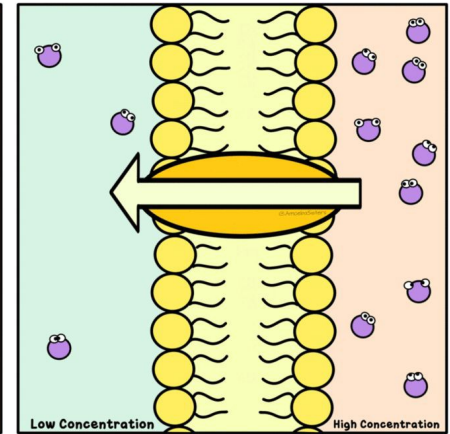
Passive Transport

©AmoebaSisters

Diffusion



Facilitated Diffusion



#3: How is facilitated diffusion different from diffusion? Do either of them require energy?

#4: What is the function of the structure that molecules are moving through in facilitated diffusion?

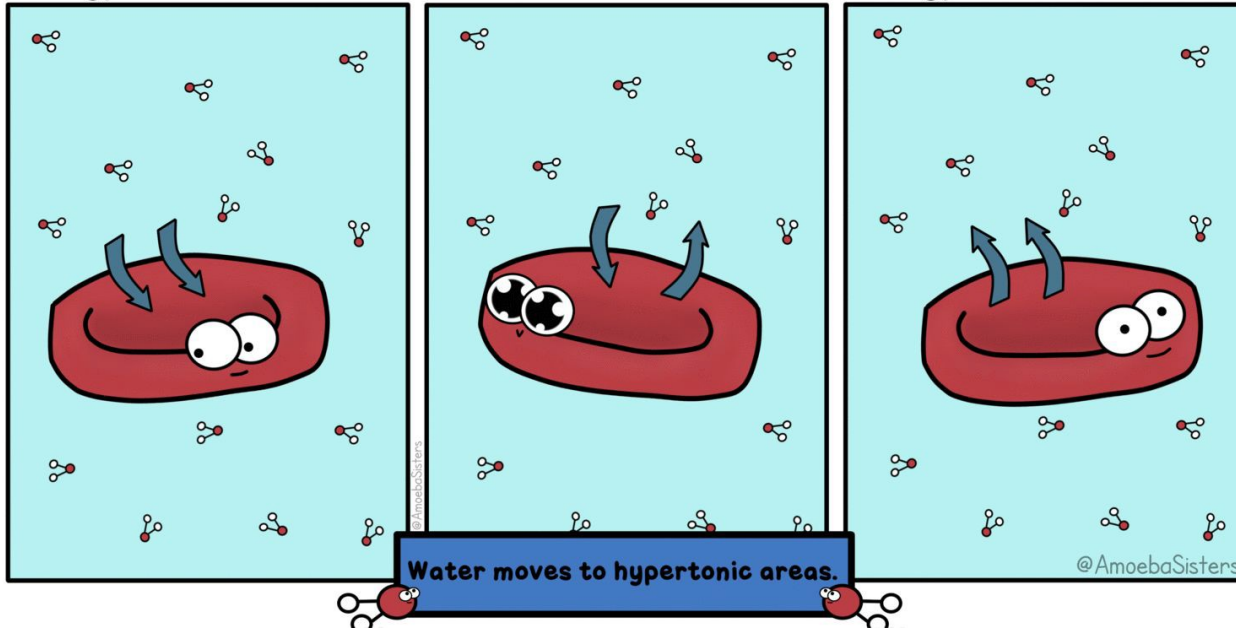
#1: The GIF mentions water moves to hypertonic areas. Explain what that means and how it is shown in the GIF.

Passive Transport: Osmosis

Hypotonic Solution

Isotonic Solution

Hypertonic Solution



#2: If stranded on an island, you would experience faster dehydration by drinking saltwater. Explain in terms of this GIF.

#3: An IV given of distilled (pure) water could be dangerous (even deadly) to a person. Explain in terms of this GIF.

[#4: Learn more about osmosis here!](#)

#1: Which types of transport do not require energy?

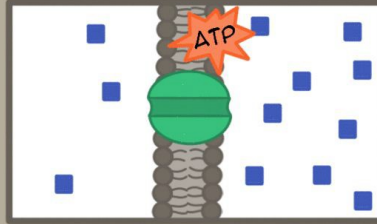
#2: What is another example of bulk transport?

#3: All of these shown involve a cell membrane (plasma membrane).
Do all cells have a membrane?

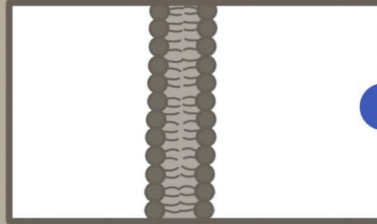
CELL TRANSPORT @AmoebaSisters

Requires Energy

Active Transport

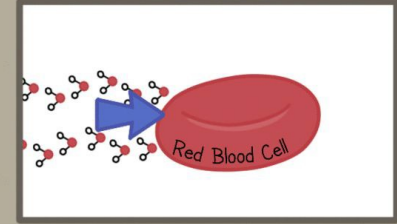


Bulk Transport (ex: Endocytosis)

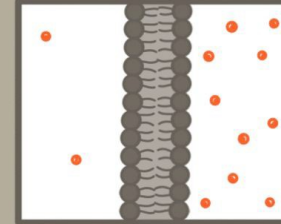


Does Not Require Energy
(Passive Transport)

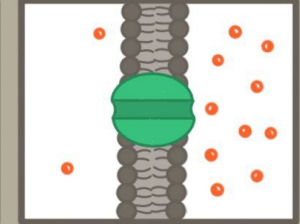
Osmosis



Diffusion



Facilitated Diffusion

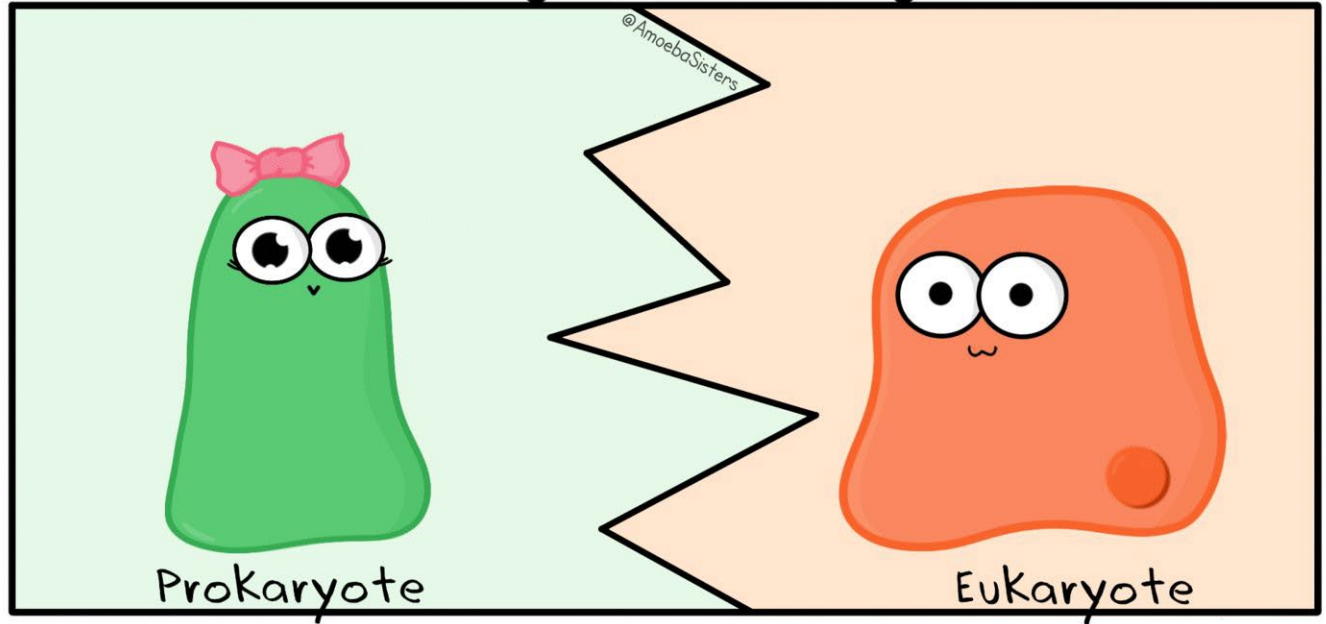


#4: Learn more about the cell membrane and transport here!

Prokaryote vs. Eukaryote

#1: What do the prokaryotes and eukaryotes have in common?

#2: What is different about the prokaryote and eukaryote cells?

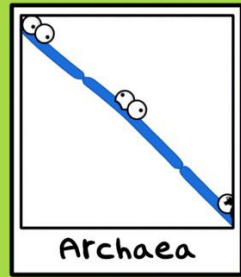


#3: What is an example of a membrane-bound organelle?

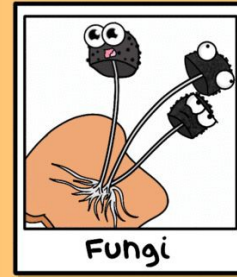
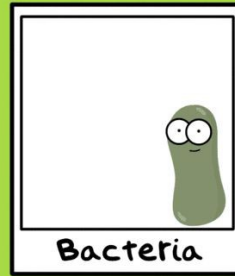
#4: What is a mnemonic you can use to remember prokaryotes vs. eukaryotes?

#1: Would bread mold and toenail fungus be made of eukaryote or prokaryote cells?

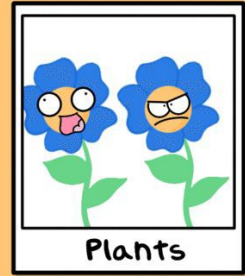
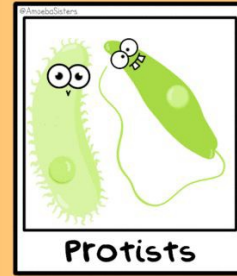
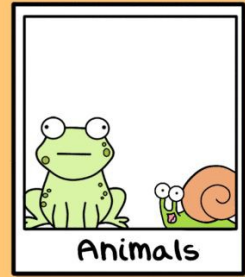
#2: Some of these groups are unicellular and some are multicellular. What do those words mean?



PROKARYOTES
Pro- = "Before" Karyo- = "Nucleus"



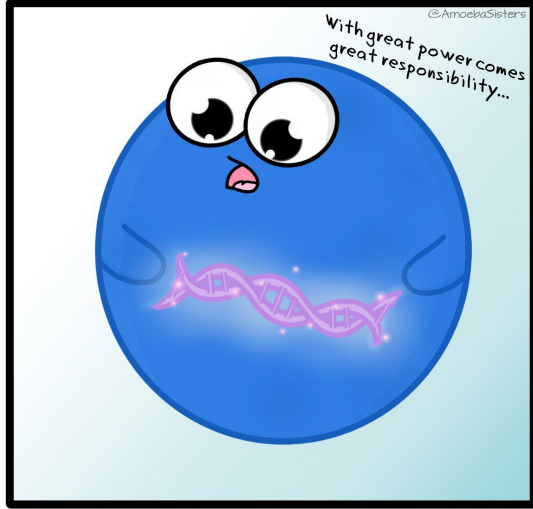
Eu- = "True" Karyo- = "Nucleus"
EUKARYOTES



#3: Are the cells in your body eukaryote or prokaryote cells?

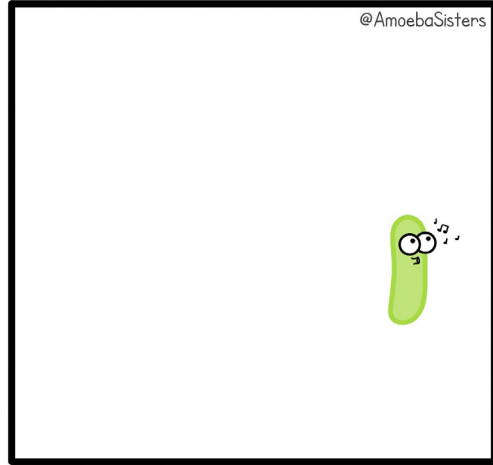
#4: Learn more about prokaryotes and eukaryotes here!

Nucleus



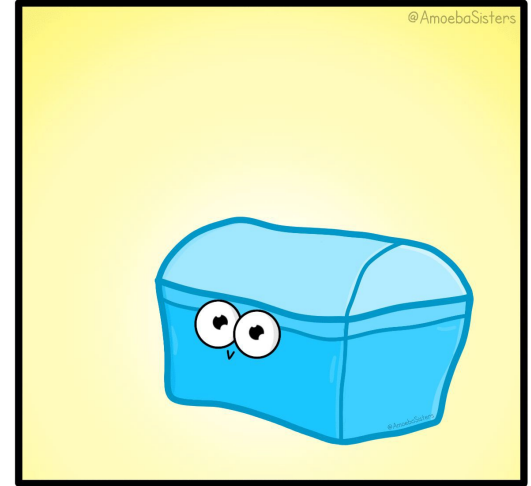
Genetic information bearer of the cell

Lysosome



Enzyme-packed wrecking balls of the cell

Vacuole

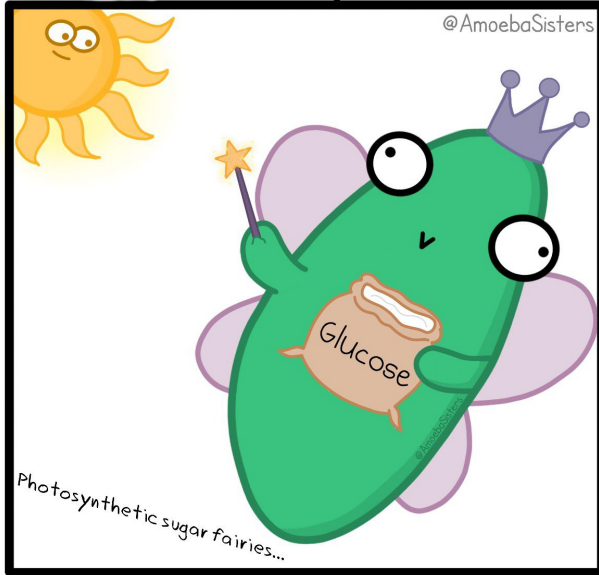


Storage containers of the cell

#1: Would each above organelle be found in eukaryotes or prokaryotes? (Switch back to the prokaryote/eukaryote GIF if needed)!

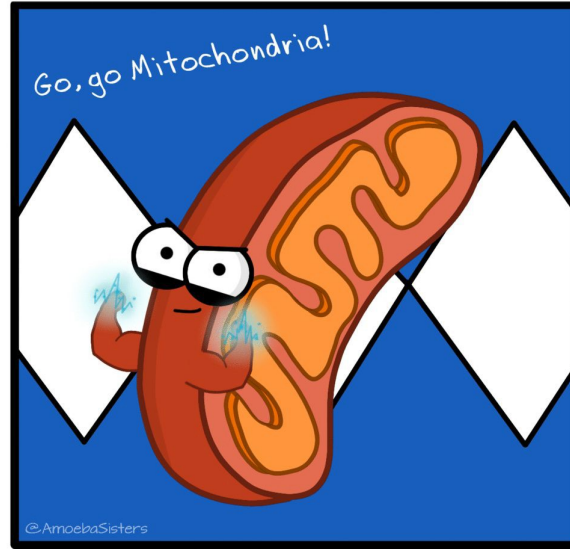
#2: Describe the function of each organelle.

Chloroplast



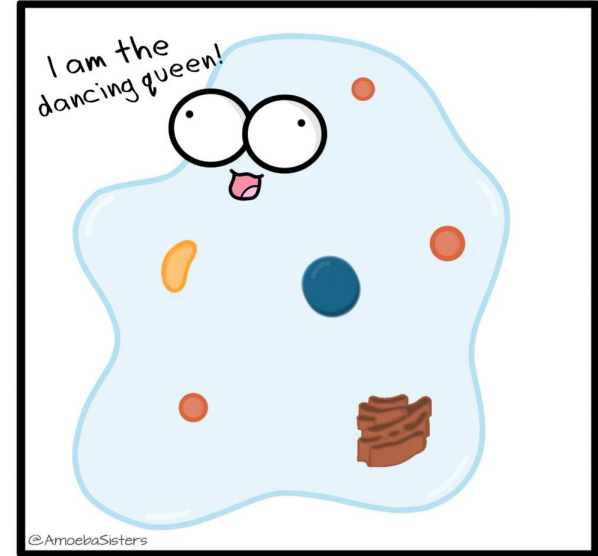
Glucose synthesizers of the cell

Mitochondrion



Mighty ATP producer of the cell

Cytoplasm

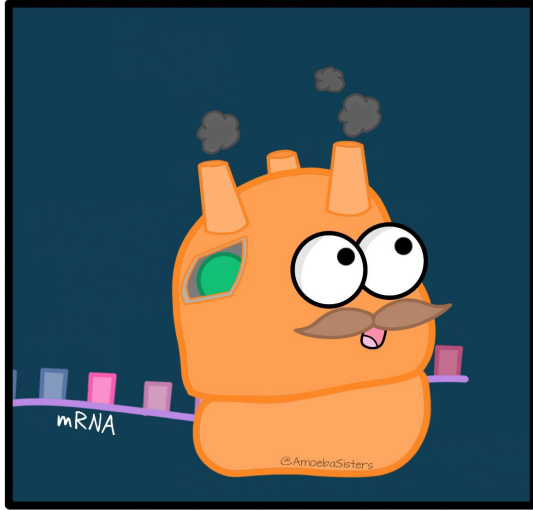


Thick jelly-like substance of the cell

#1: Which of these is a jelly-like substance found in both prokaryotes and eukaryotes? What is its likely function?

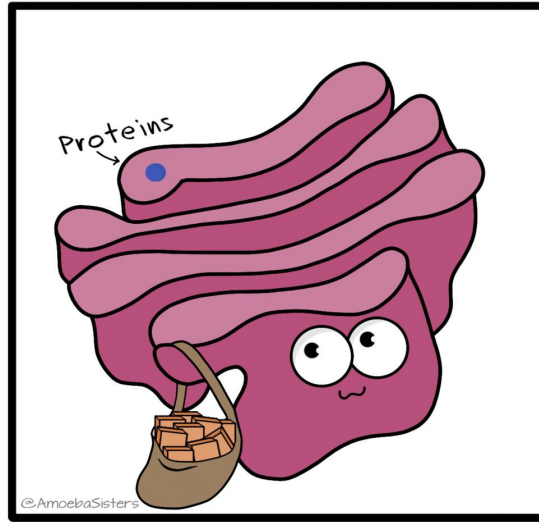
#2: Compare and contrast the chloroplast with the mitochondrion.

Ribosomes



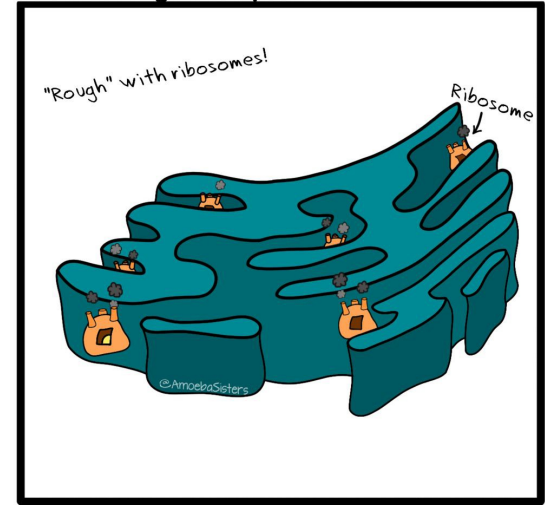
Protein synthesizers of the cell

Golgi Apparatus



Post office of the cell

Rough Endoplasmic Reticulum



Protein assembly line of the cell


#1: Which of these organelles is found in both prokaryotes and eukaryotes?

#2: Describe the functions of each of the above organelles.

#1: How are formulas for photosynthesis and cellular respiration related?

#2: One of these formulas could be thought of as “making” glucose and another formula could be thought of as “breaking” glucose. Explain.

Cellular Respiration Formula

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{ATP ENERGY}$$


Glucose

Photosynthesis Formula

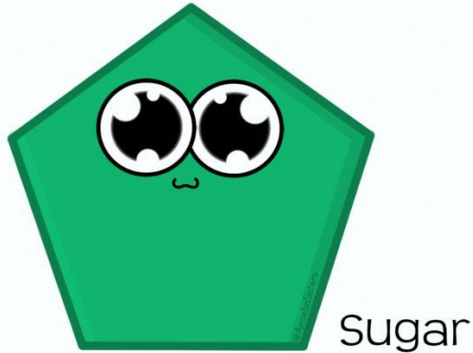
$$6CO_2 + 6H_2O \xrightarrow{\text{LIGHT}} C_6H_{12}O_6 + 6O_2$$

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#3: Learn more [about photosynthesis and cellular respiration here!](#)

Nucleotide Structure

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#1: Nucleotides make up nucleic acids (such as DNA and RNA). What are the three parts of a nucleotide?

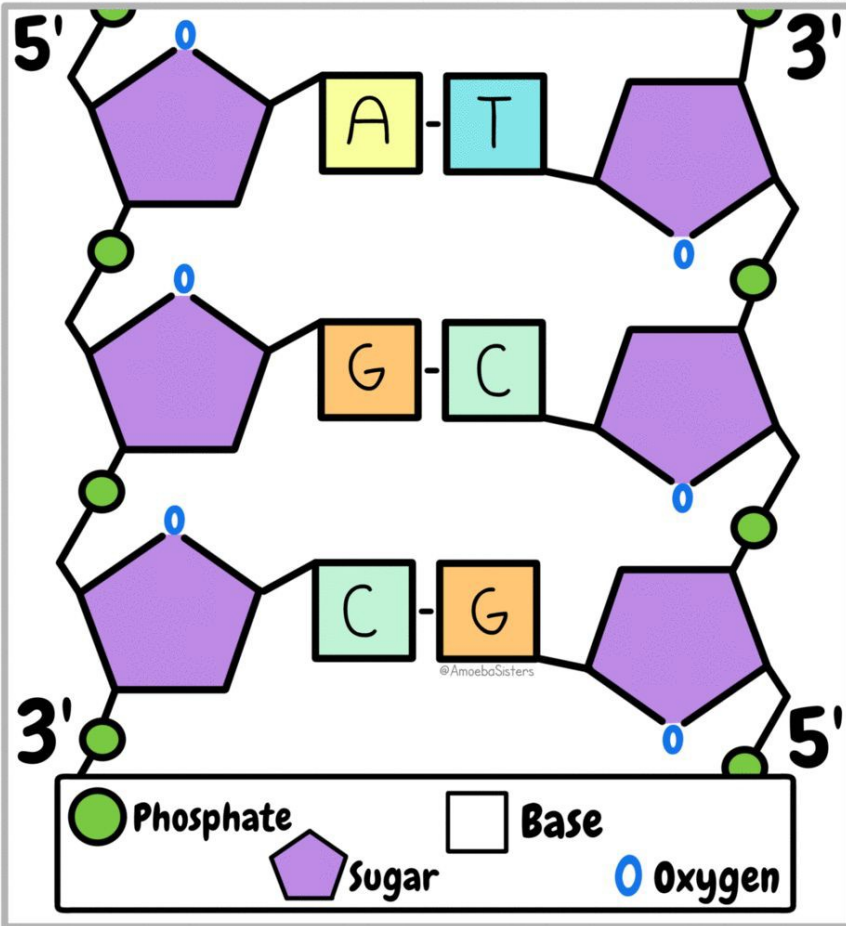
#2: How can you use this GIF to distinguish between the sugar and the base?

#3: Which of these parts actually codes for your traits?

#4: How would this nucleotide be different in DNA vs. RNA?

5' to 3' and 3' to 5' in DNA

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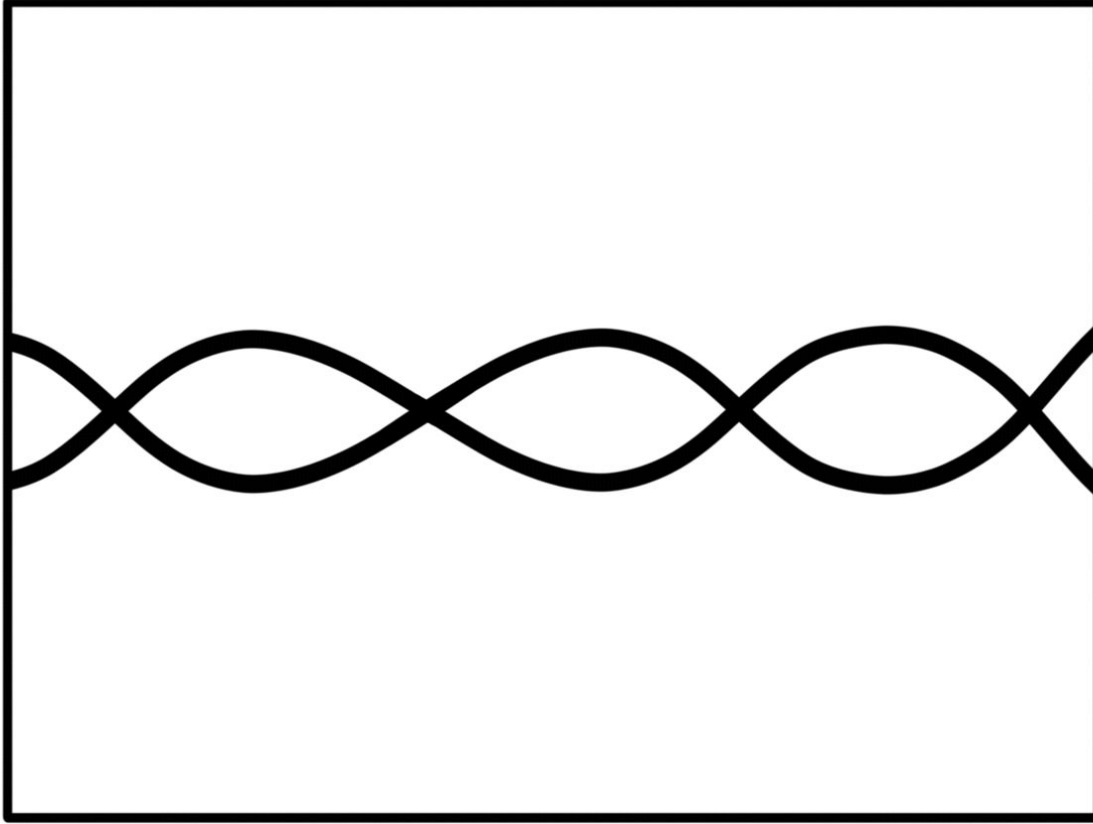
#1: How many nucleotides are in this picture? How do you know? (May need to see nucleotide GIF again)

#2: What are the three parts of a nucleotide?

#3: What is a mnemonic you can remember to know how the DNA bases pair?

#4: Explain what is meant by the 5' to 3' (left) and 3' to 5' (right).

Leading and Lagging Strand in DNA Replication @AmoebaSisters



#1: What is the role of helicase and DNA polymerase in DNA replication? Note: These are just some enzymes in the process!

#2: How is the leading strand different from the lagging strand in DNA replication?

#3: Why does DNA replication need to occur and when does it happen in the cell cycle?

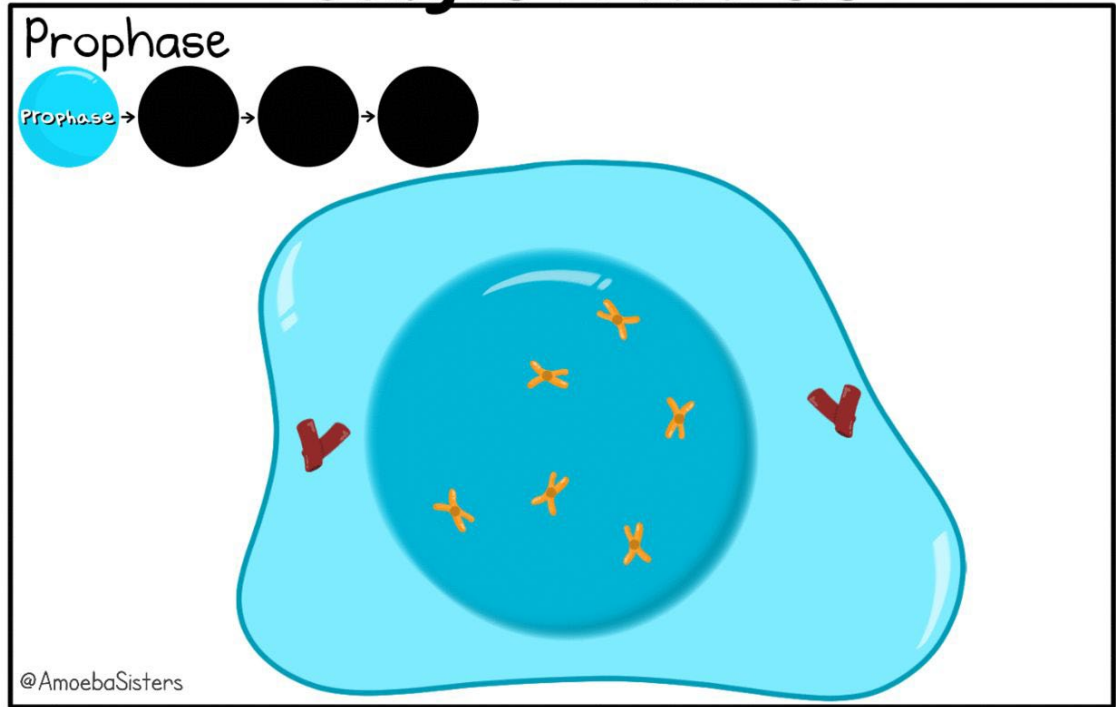
#1: What is the end result of mitosis?

#2: What is the purpose of mitosis?

#3: Does mitosis make identical or different cells?

#4: Describe what occurs in the steps of mitosis.

Stages of Mitosis



#5: What must cells do before they perform mitosis (and also before meiosis)?

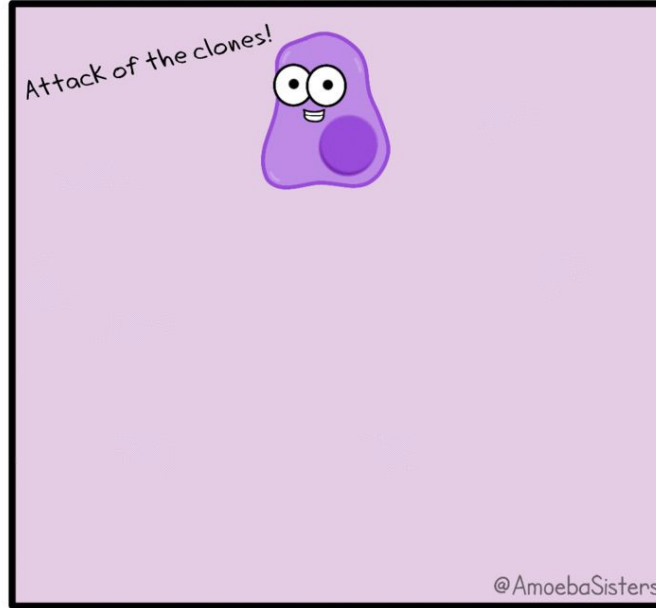
MITOSIS

VS

MEIOSIS

#1: Human body cells start with ____ chromosomes and end with ____ chromosomes after *mitosis*.

#2: In *meiosis*, the human gametes produced (sperm and egg) have ____ chromosomes.

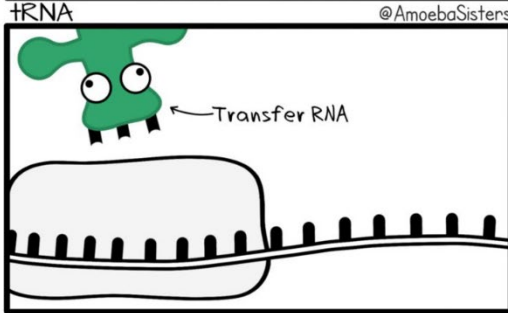
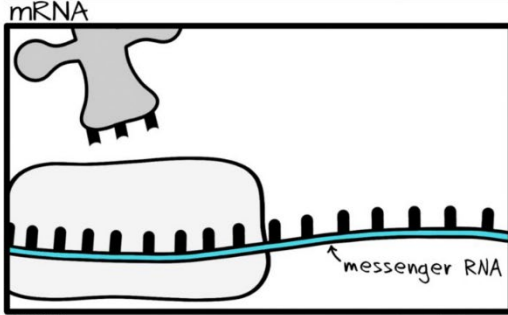
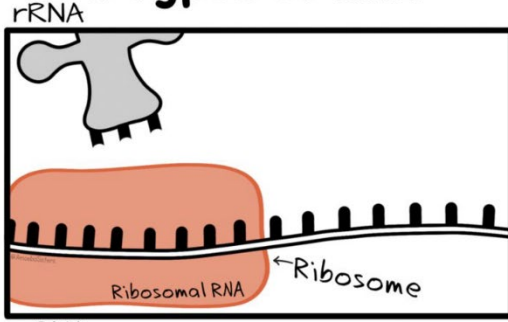


#3: Which of these is a reduction division?

#4: Which of these makes identical cells?

#5: Which of these make different cells?

3 Types of RNA



#1: Which of these RNA types brings amino acids to matching mRNA codons?

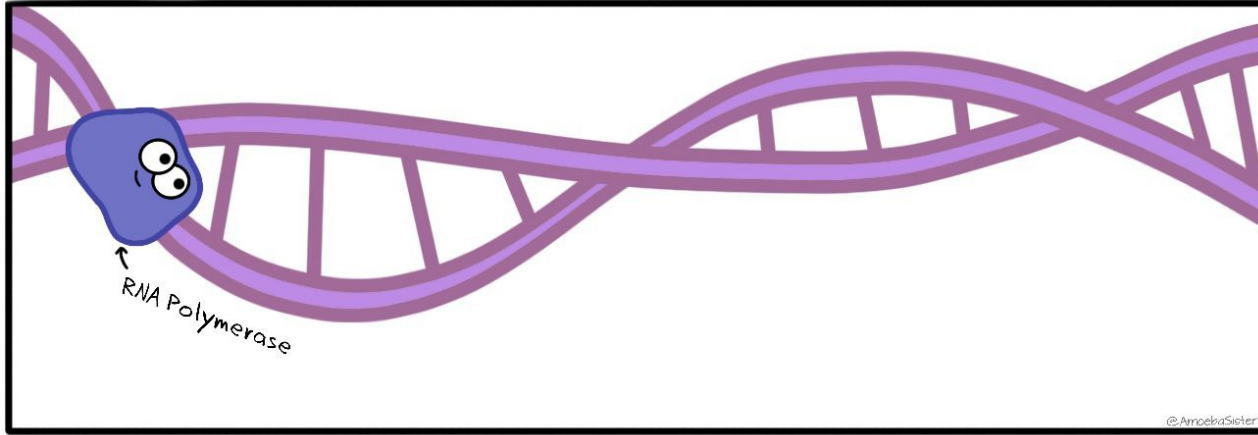
#2: Which of these RNA types makes up the ribosome?

#3: Which of these RNA types carries the message and was produced in transcription?

#4: Review the [differences of DNA and RNA here!](#)

Protein Synthesis

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Step 1: Transcription

#1: Summarize the events of protein synthesis.

#2: What is produced in transcription by the RNA polymerase?

#3: What is produced in translation?

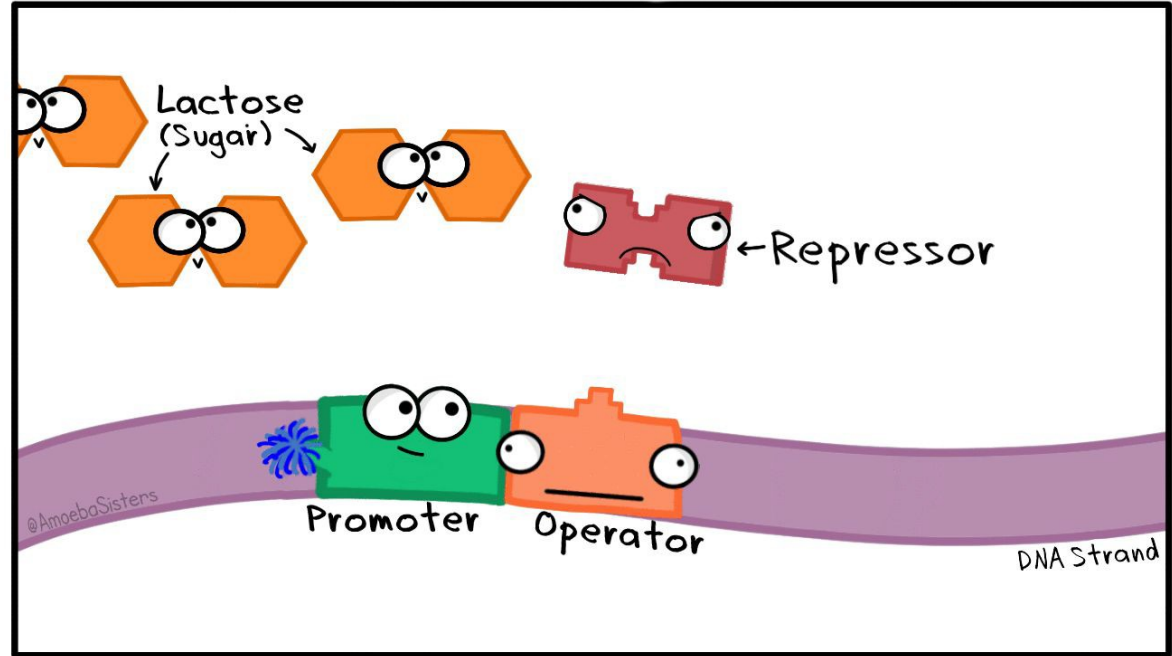
#4: Which of these steps directly uses DNA?

#5: Which step would involve rRNA, which makes up the ribosome?

#1: An operon, common in prokaryotes, is just one way that genes can be regulated. Explain the role of the promoter, operator, DNA polymerase, and repressor.

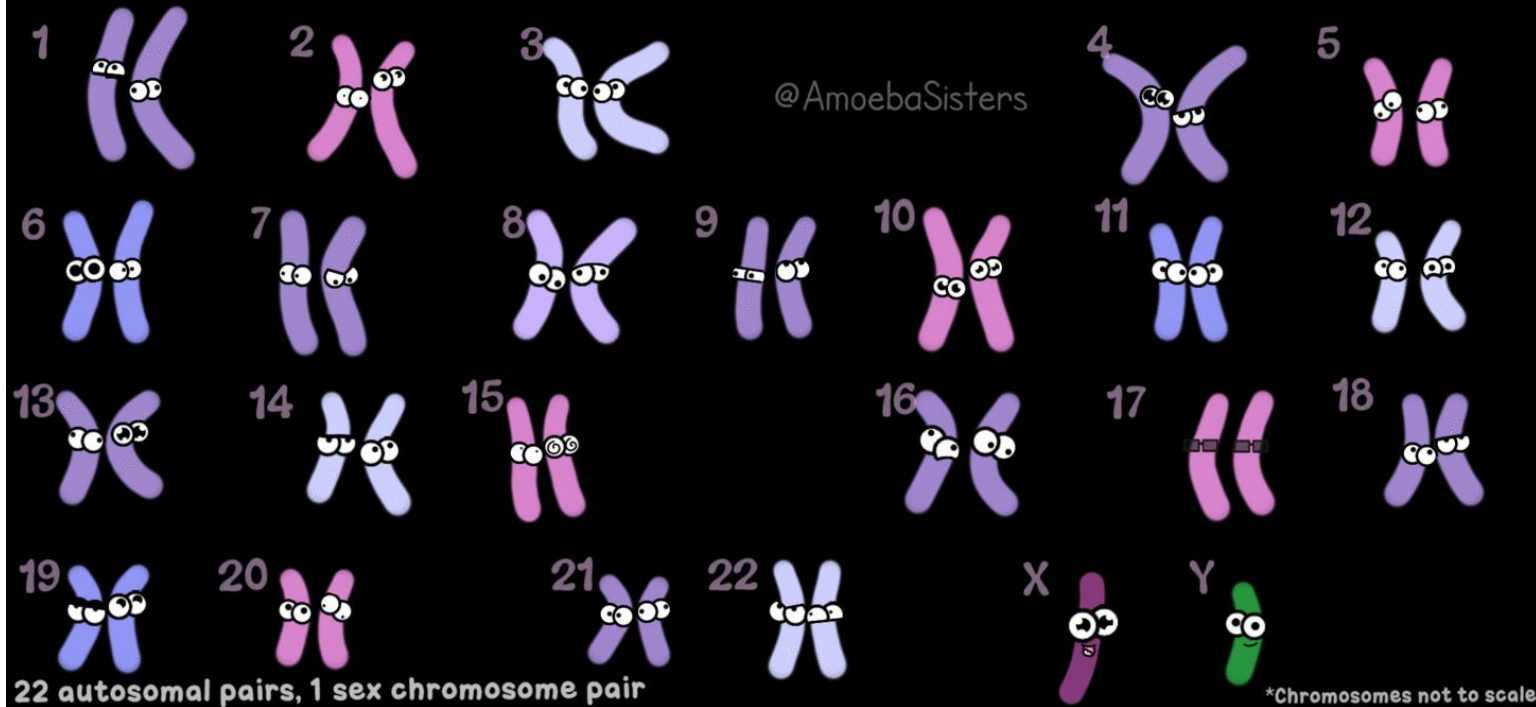
#2: While humans do not have operons, gene regulation is still very important. What is gene regulation and why is gene regulation important for cells?

THE LAC OPERON



#3: TRUE or FALSE: All of your body cells (few exceptions) contain your entire DNA code but only use portions of the DNA code depending on gene regulation.

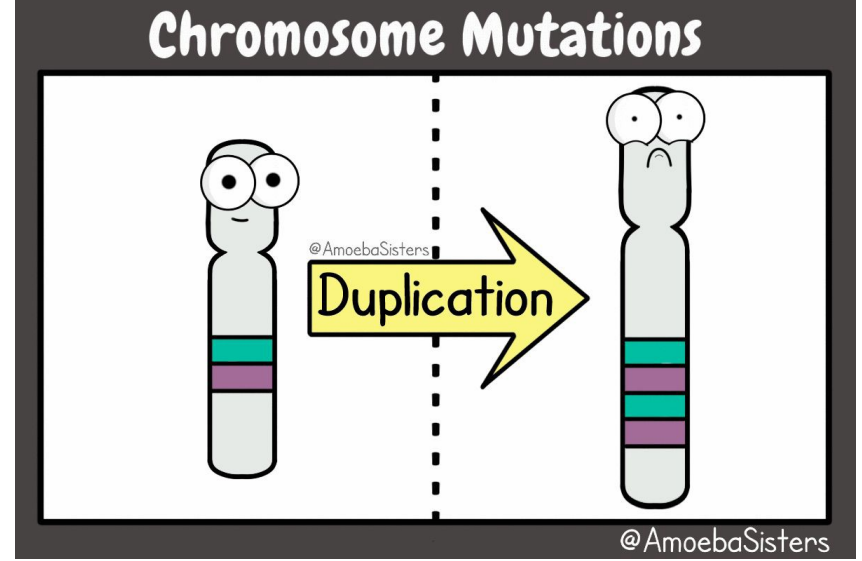
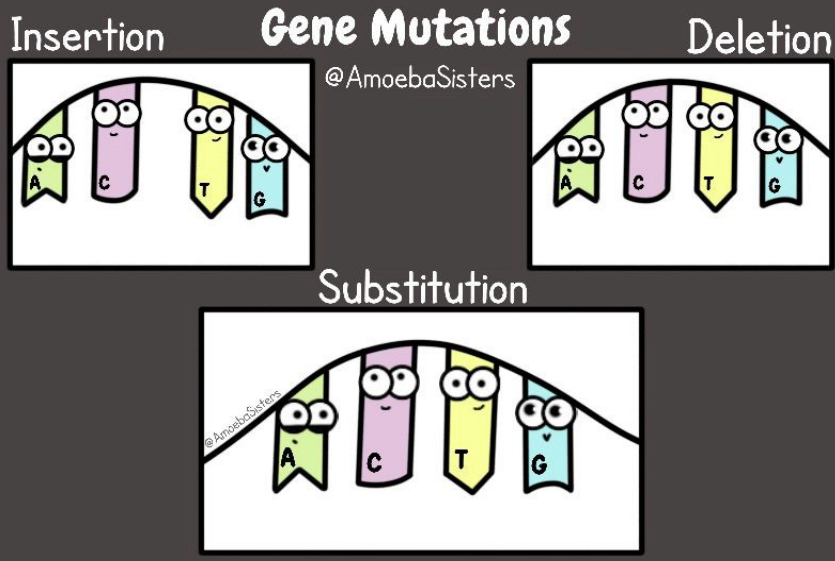
HUMAN KARYOTYPE: 46 CHROMOSOMES*



#1: What does a karyotype show?

#2: Is the biological sex of this individual male or female? How do you know?

#3: How can a karyotype reveal a genetic disorder?



#1: Explain the three gene mutations shown.

#2: Which gene mutations can result in a frameshift mutation, meaning, a gene has been added or deleted so that the reading frame is now altered?

#3: Explain the four chromosome mutations shown.

#4: How are chromosome mutations different from gene mutations?

#1: Explain the crosses shown in the above monohybrid GIF using vocabulary such as *homozygous* and *heterozygous*.

#2: Explain how the FOIL method can be used to set up a dihybrid cross.

#3: How do you set up a Punnett square with sex-linked traits?

#4: How do you set up a Punnett square with blood type genotypes?

#5: Explore more of our genetic series.

SOLVING PUNNETT SQUARES
with Hairy (H) and Hairless (h) Guinea Pigs

©AmoebaSisters

FOIL method for Dihybrid or Two-Trait Cross

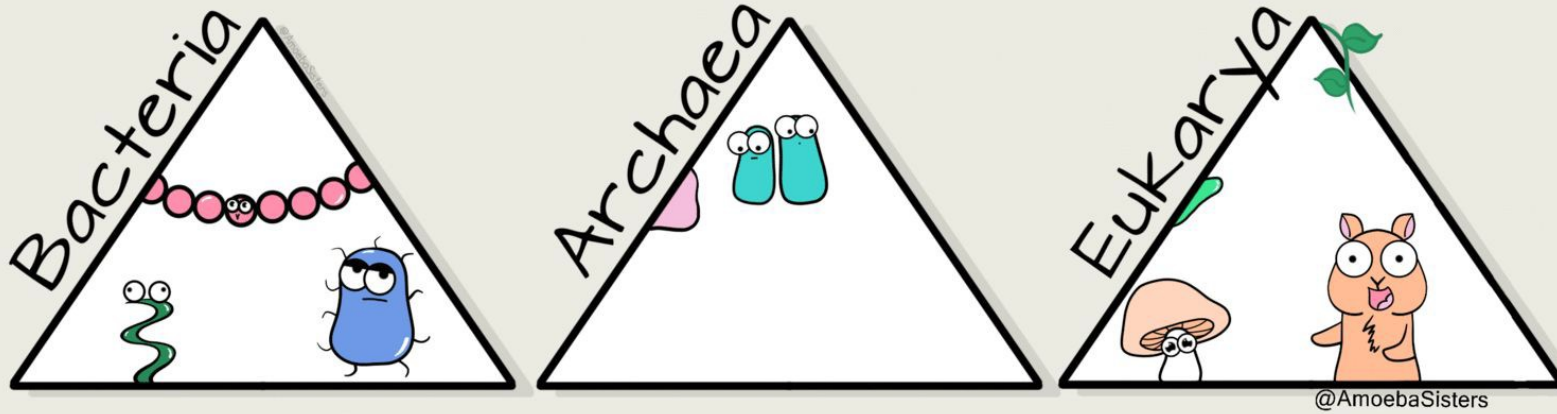
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F
O
I
L

HhSs x hhss

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THE 3 DOMAINS

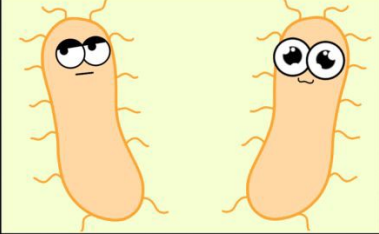
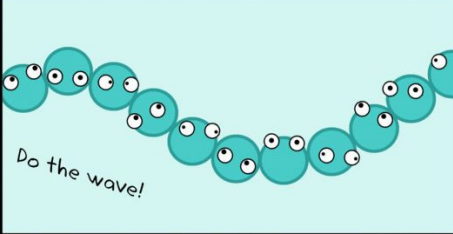






#1: How many domains are there in this system and which domain would humans belong in?

#2: “Domains” are a part of a taxonomy hierarchy. After domains, which level follows? Would domains be the most or least specific in the hierarchy?

#1: Remember that kingdom organization is debatable and changing due to new evidence! Is this a 5 kingdom or 6 kingdom system shown?

#2: In the particular system shown, how many of these kingdoms are eukaryotes?

Archaea Prokaryote	Eubacteria Prokaryote	Protista Eukaryote
		
Fungi Eukaryote	Plantae Eukaryote	Animalia Eukaryote
		

#3: Describe characteristics of these groups and determine whether they are (1) unicellular and/or multicellular and (2) autotrophs and/or heterotrophs.

SCIENTIFIC NAME

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Puma concolor

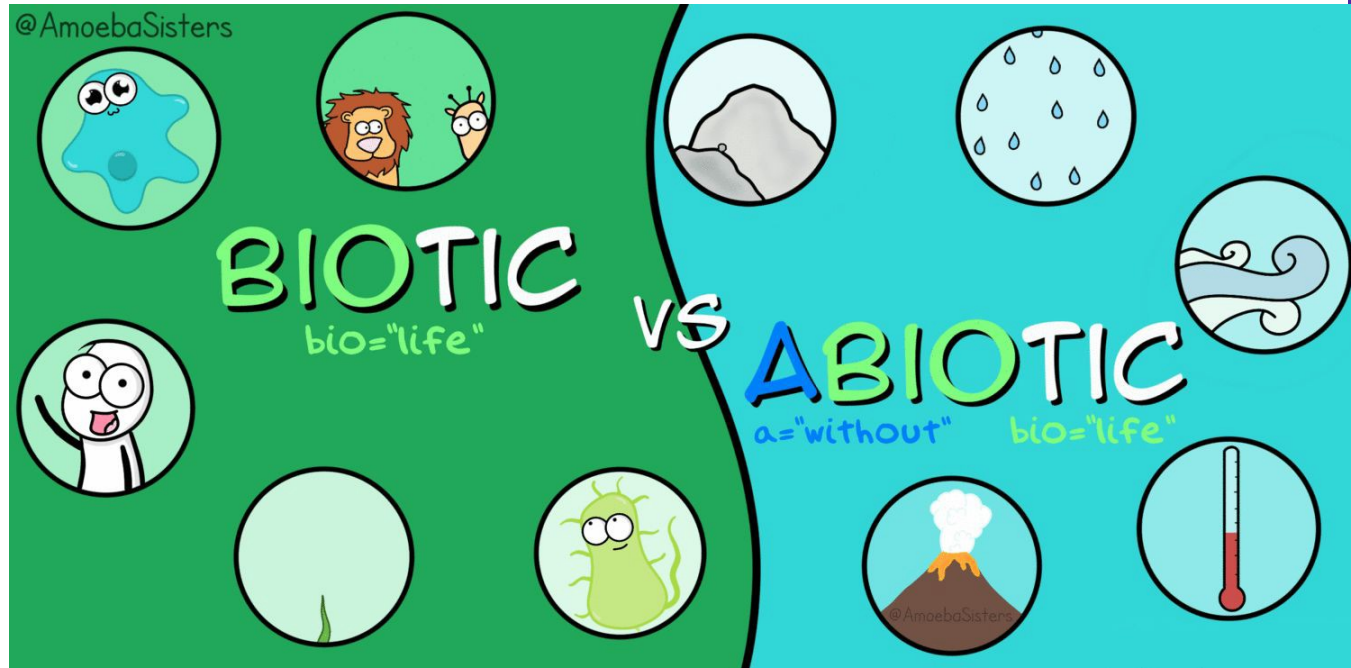


COMMON NAMES

#1: Describe how a scientific name is written based on the GIF.

#2: What advantage do scientific names have over common names, as shown in this example?

#1: What are the differences between biotic and abiotic factors?
(Give examples that are not in the GIF.)



#2: Explain how biotic and abiotic factors could impact an ecosystem?

Misunderstood Bacteria



Break down food in
the digestive system!

©AmoebaSisters

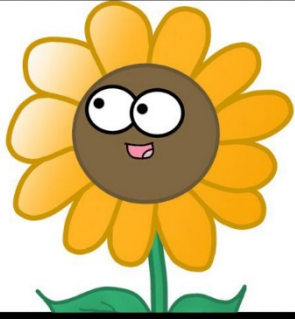
#1: Bacteria can be helpful to organisms and ecosystems!

Describe how each of these examples are helpful for organisms and/or ecosystems.

Bacteria that are helpful to organisms and ecosystems!

Symbiosis

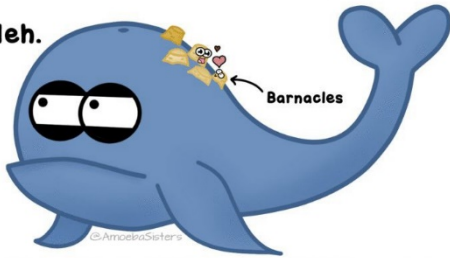
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MutUALiSM

#1: Explain a symbiotic relationship that demonstrates mutualism.

Meh.



COMMENSALiSM

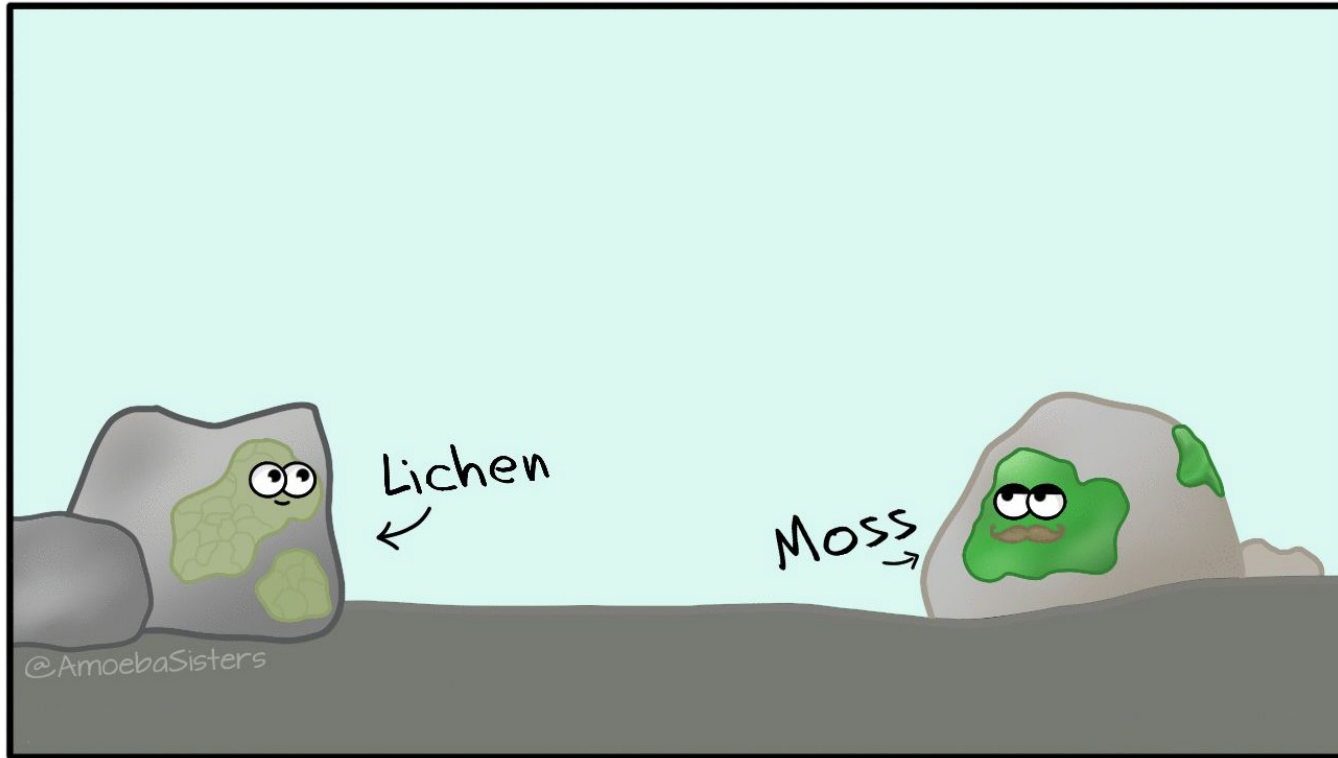
#2: Explain a symbiotic relationship that demonstrates commensalism.

ParaSiTiSM



#3: Explain a symbiotic relationship that demonstrates parasitism.

Primary Succession



#1: Explain the events happening in primary succession and how this results in a diversity of organisms.

#2: How is this process different from secondary succession?

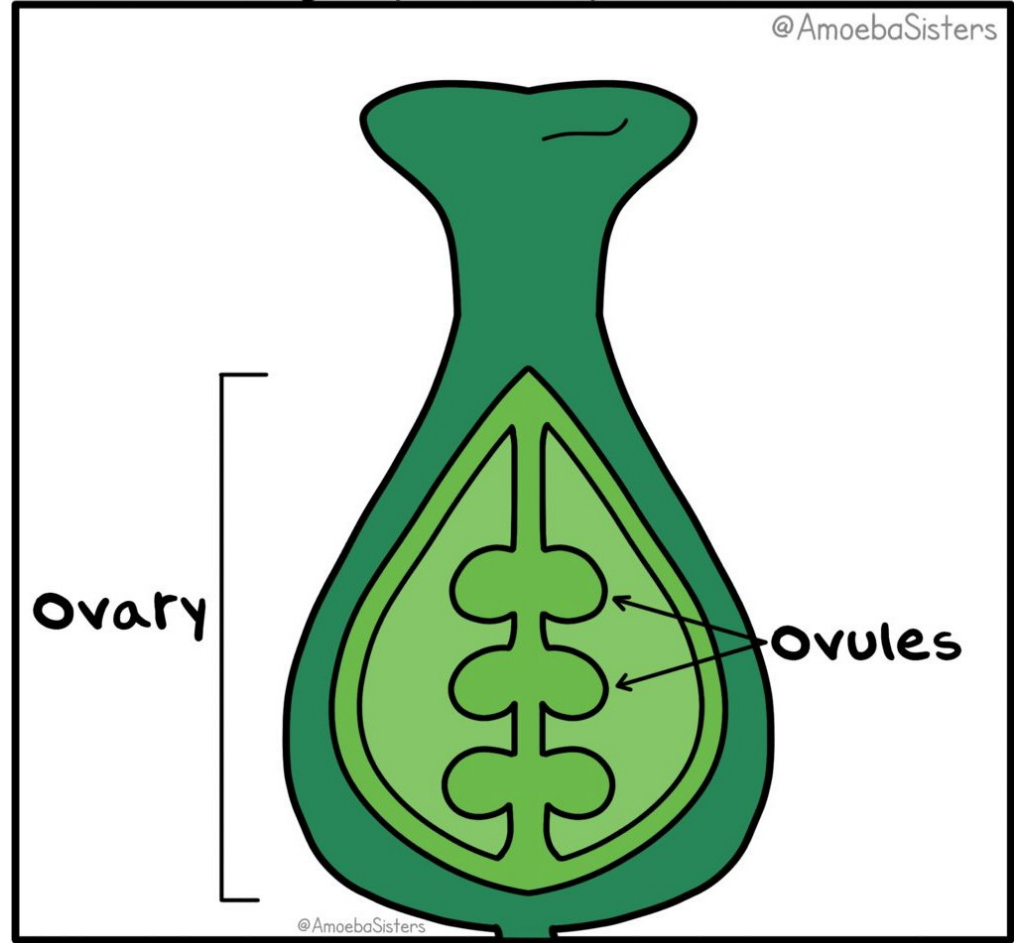
Angiosperm Reproduction

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#1: What are the events that occur in pollination?

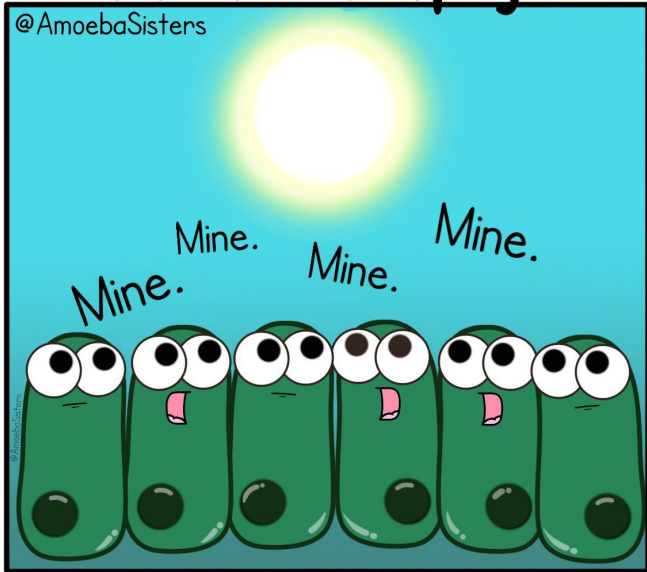
#2: What are the events that occur in fertilization?

#3: Why is seed dispersal so important?
What are some ways that seeds can be dispersed?



Palisade Mesophyll

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Chloroplast-packed fans of the sun

#1: These are specialized cells found in leaves. What organelle do they need to have a lot of in order to carry out their function?

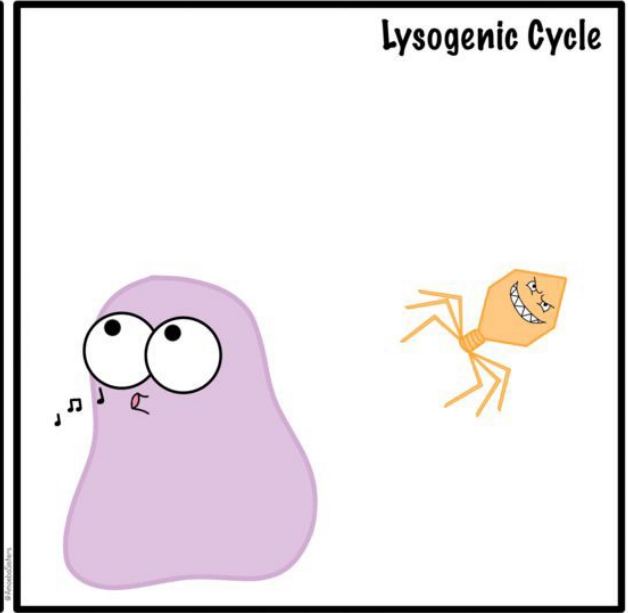
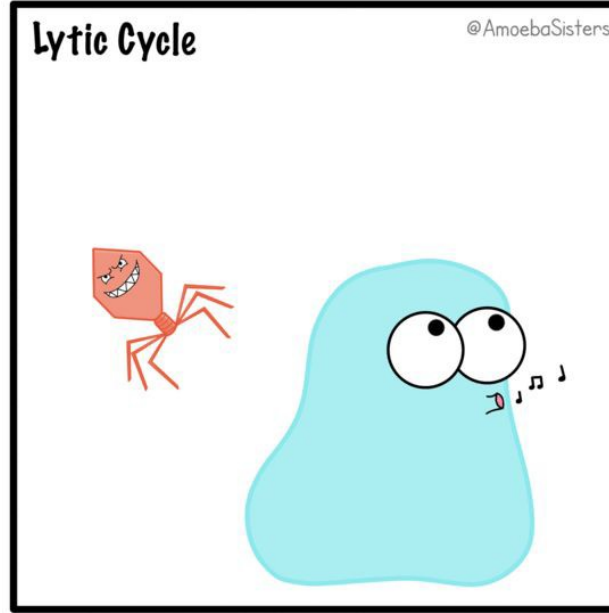
#2: What are some other specialized cells found in a cross section of a leaf and how does their structure support their function?

#3: What are some other examples of specialized plant and animal cells?

Lytic vs Lysogenic Cycles

#1: Both of these show viral replication. Describe the lytic cycle.

#2: Both of these show viral replication. Describe the lysogenic cycle.



#3: Do all virus structures have the structure shown in this GIF?

#4: Viruses are typically considered non-living. What are some reasons? (Check out the quote in this comic)