

Cell membrane (fence): The cell membrane protects the cellular contents. It contains channels, transporters, receptors, enzymes, cell-identity markers, and linker proteins. It consists of a lipid bilayer with embedded proteins. The cell membrane controls the movement of substances in and out of cells and organelles.

Transmembrane proteins (guard shack): They regulate what enters and exits the cell. They frequently undergo conformational changes to move a substance through the cell membrane.

Nucleus (head office): Everything that happens in the cell is controlled by the nucleus. It contains most of the cell's genetic material.

Nuclear membrane (office security): Protects the nucleus and regulates what enters and exits the nucleus. It consists of two lipid bilayers, the inner nuclear membrane, and the outer nuclear membrane.

Nucleolus (CEO's office): The nucleolus produces ribosomes. It also participates in the formation of signal recognition particles and plays a role in the cell's response to stress.

DNA (blueprints): DNA contains the instructions needed for an organism to develop, survive, and reproduce. Within a cell DNA is organized into two long structures called chromosomes. During cell division these chromosomes are duplicated in the process of DNA replication, giving each cell its own set of chromosomes.

mRNA (delivery orders): mRNA carries codes from the DNA in the nucleus to the sites of protein synthesis in the cytoplasm.

tRNA (jigs): tRNA serves as the physical link between the mRNA and the amino acid sequence of proteins. tRNA accomplishes this by carrying an amino acid to the ribosome, directed by a codon in a mRNA.

Cytoplasm (factory floor): Cytoplasm is the gel-like substance inside a cell. It contains and supports all of the cell's organelles.

Mitochondria (power plant): The mitochondrion is a double membrane-bound organelle. They supply the cell with energy, as well as tasks like signaling, cellular differentiation, and cell death.

Rough and Smooth ER (assembly area): The endoplasmic reticulum folds the protein molecules, and also transports the synthesized proteins to the Golgi apparatus.

Ribosome (work stations): Ribosomes link amino acids together in the order specified by the mRNA. Ribosomes are made up of two major components: the smaller ribosomal subunit, and the larger ribosomal subunit, which joins amino acids.

Golgi apparatus (packing and shipping dept.): The Golgi apparatus packages proteins into membrane-bound vesicles before the the vesicles are sent to their destination in the cell.

Lysosomes (janitorial dept.): The lysosome is a spherical vessel that contains hydrolytic enzymes that can break down many kind s of biomolecules. They also act as the waste disposal system in the cell by digesting unwanted materials in the cytoplasm.

Vesicle (shipping container): Vesicle's are a basic tool used by the cell for organizing cellular substances. Vesicle's are also involved in metabolism, transport, buoyancy control, and temporary storage of food and enzymes.

Centrosome (road building dept.): The centrosome is the main microtubule organizing center as well as a regulator of cell- cycle progression. The centrosome also plays a key role in mitosis.

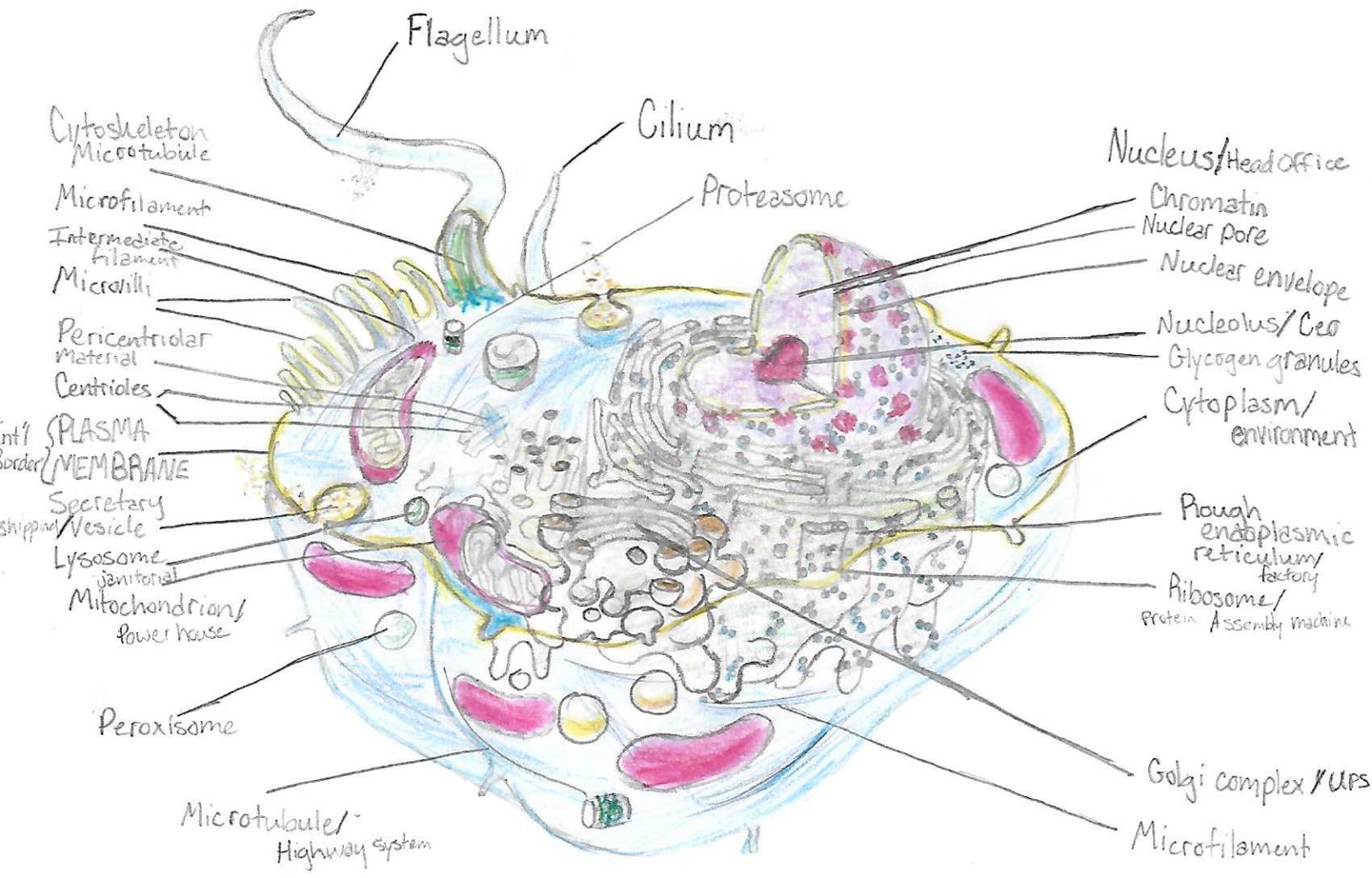
Microtubules (highways): Microtubules are involved in maintaining the cell structure, as well as making up the cytoskeleton. They also make up the internal structure of the flagellum. They also provide platforms for intracellular transport.

Motor proteins (delivery trucks): Motor proteins are the driving force behind most active transport of proteins and vesicles in the cytoplasm.



Cell/Restaurant

- Nucleus - The nucleus stores genetic material, and coordinates the cell's activity. The nucleus contains the nucleolus also. This is like the manager's office space in a restaurant.
- DNA - DNA contains the genetic material. DNA is similar to the menus in a restaurant. Both menus and DNA contain information.
- Ribosomes - Ribosomes in the cell synthesize proteins making them bioavailable to our bodies. They are like chefs that make food.
- Mitochondria - These are the power plants of the cell. Mitochondria are like the electrical wiring, providing necessary energy.
- Lysosomes - Lysosomes make up the cleaning crew, using enzymes to dissolve and remove waste from the restaurant/cell. You could think of them as janitors.
- Cell Membrane - The cell membrane is a semipermeable barrier that surrounds the cell and protects the inner organisms. This is like a wall with doors letting things in and out.
- Cytoplasm - It fills out space and gives shape to the cell. The cytoplasm could be thought of as the atmosphere in the restaurant.
- Transmembrane proteins - They play a part in what is allowed inside the cell. This is like a maitre d', permitting only those with reservations to enter.
- Nucleolus - Controls what goes on inside the cell. It contains most of the cell's genes. The nucleolus is like the owner/manager of a restaurant. He is the brains of the operation.
- Microtubules - In the cell, microtubules provide path ways to follow. These act like the spacing between tables that create walking patterns, showing people/organelles where to go.
- Nuclear Membrane - This is a double-layered containment system providing structure to the nucleus. It is like the walls that separates the manager's office from the rest of the building, allowing only certain people in.
- Golgi Apparatus - They take simple molecules and combine them to make them more complex, then send them on their way. Golgi bodies are like to-go meals. They are transport in and out.
- Cytoskeleton - It is the support system of the cell (like our own skeletons). The cytoskeleton is similar to the frame work (planks, studs, beams etc.) of a building.
- Vacuoles - Vacuoles could be seen as different things, but with nearly same purposes. Refrigerator, freezer, or pantry, however you choose to see them they do the same job; contain/preserve food.
- Endoplasmic Reticulum- They gather and transport information. ER could be viewed as a waiter.
- Centrosome - These form walkways inside the cell showing the way. In context, they are like floor patterns showing the way to get around tables, booths, etc. in a restaurant.
- Motor Proteins - Delivery services for the restaurant/cell.
- mRNA - They are messengers of new genetic material. These drop off mail, carrying blueprints (new specials or recipes) to the menu/DNA.
- tRNA - They receive what the mRNA give them. These are the people/organelles that receive the new recipes and follow them.
- Chloroplasts - (Plant cells only) Chloroplasts act as solar panels absorbing the sun's output, converting it to usable energy.



TITENY

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The Cell Factory Assignment

A **cell membrane** is an almost invisible structure that surrounds the cell and controls the movement of substances in and out of cells and organelles. It can also be called the “international border” for a cell factory, and its main function is basically to be the proverbial “fence”.

The **nucleus** is a membrane bound structure that contains the cells’ hereditary information and controls the cells’ growth and reproductions. It is also the most prominent organelle in the cell. The nucleus can also be known as the “head office” of the cell as it contains proteins and genetic material, but most importantly the DNA. Within its capabilities it serves as the “guard shack” of the cell.

The **nucleolus** is contained inside of the nucleus and assembles the small and large ribosomal subunits composed of protein, DNA, and RNA. It acts as the “CEO’s office” within a business as it “serves as the head” of the business.

The **nuclear envelope or membrane** is used to store and protect the genetic material in the nucleus. It can be referred to as the “head security office” in the cells as it is sometimes used like the “police” to keep out certain harmful materials.

The **cytoplasm** is a jelly-like fluid that fills the cell and is made up of mostly water and salt. The cytoplasm can be regarded as the “environment” of the cell as it works like the “factory floor”.

The **lysosome** is an organelle in the cytoplasm of the cell. It is enclosed by a single membrane and it contains powerful digestive enzymes. The lysosome might be categorized as the “janitorial dept.” as it uses its powerful enzymes to act like a “recycling plant.”

The **vacuoles and vesicles** are small bladder or sacs containing liquid. Their job is like a “railroad car” which act as “shipping containers” for the cell.

The **mitochondrion** helps with cellular respiration, taking the nutrients and breaking them down to turn into energy. It is the “powerhouse” of the cell as it “supplies the energy” for the cells.

The **centrosome** is a dense network of small protein fibers near the nucleus of the cell. The centrosome contains a pair of centrioles and pericentriolar material. Its job is like a “road building dept.” in that it helps to “builds roads” for the cell.

The **Rough ER** of the cell is the network of tubular membranes within the cytoplasm of the cell. It is the “protein factory” of the cell and works to “put together” the proteins for the **DNA, which** acts like a “blueprint” or a type of “parts list” along with many other jobs.

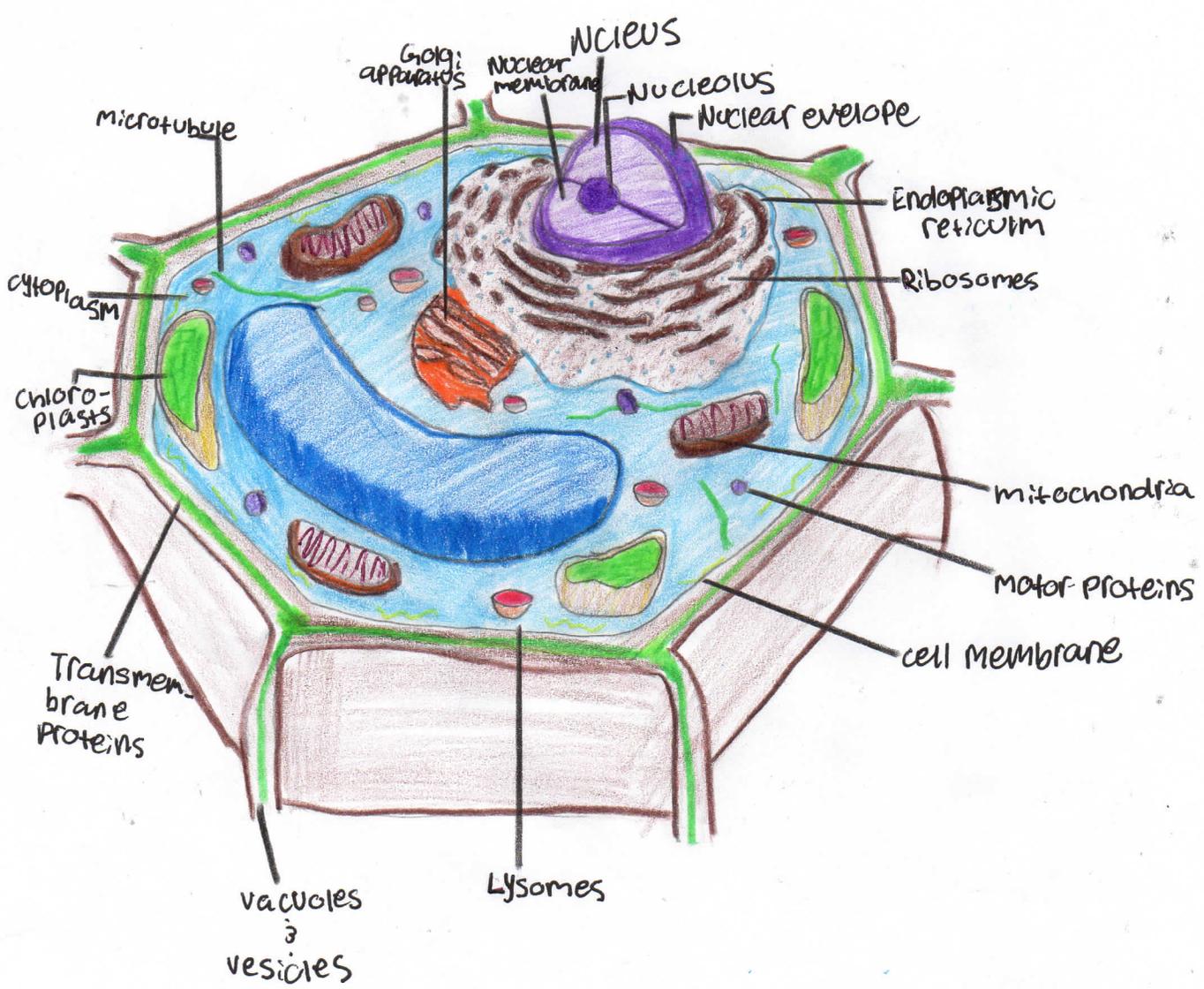
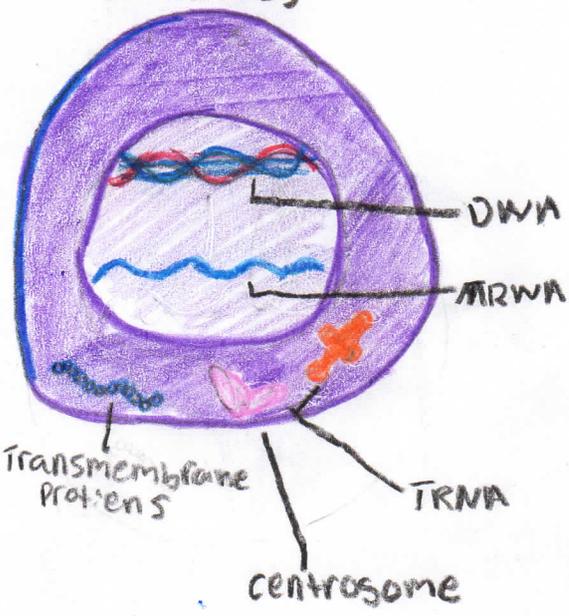
The **Smooth ER** is a sub-unit within a cell and its main function is to create cellular products like hormones. It also makes the lipids and steroids needed to detoxify the poisons and drugs when they enter the body. The Smooth ER is also referred to as the “lipid factory” for its many “uses of lipids”.

The **ribosomes** are the cell structure that creates protein, which is needed for repairing damage or directing chemical processes. Ribosomes are found in the cytoplasm and are sometimes looked on as the “protein assembly machine” for their “production in protein”.

The **Golgi apparatus** stores and transports the proteins for specific functions within the cell. It also modifies the proteins and transports them where they are needed. The Golgi apparatus can be considered the “post office or UPS” or even the “packing and shipping department” of the cell due to their many “uses of protein”.

The **cytoskeleton** is mainly made up of filaments and **microtubules** that play a significant role in the shape, growth, and division of the cell. The microtubules can also be described as the “highway system” as they “run and function throughout” the whole cell.

NUCLEUS



Cell Membrane

- a. The basic function of the cell membrane is to protect the cell from its surroundings.
- b. The fence.
- c. Fences protect and that is the same purpose of the cell membrane.

Transmembrane proteins

- a. A transmembrane protein is a type of protein that goes throughout the whole membrane. Transmembrane proteins function as gateways to permit and overlook the transport of specific substances across membrane.
- b. Guard shack or Security detail
- c. This name is best suited because sometimes “guards” or “security” overlook transportation

Nucleus

- a. The nucleus contains the majority of the cell's genetic material. This material is organized as DNA molecules, along with a variety of proteins, to form chromosomes.
- b. Head office
- c. The Nucleus is the “head office” to making chromosomes.

Nuclear membrane

- a. Nuclear membrane proteins are proteins that are embedded in and associated with the inner membrane of the nuclear envelope.
- b. Office security
- c. The nuclear membrane protects. This is primarily the main job of security.

Nucleolus

- a. The nucleolus makes ribosomal from proteins and ribosomal RNA. It also sends the subunits out to the rest of the cell where they combine into complete ribosomes.
- b. CEO's office
- c. The Nucleolus sends subunits out to the rest of the cell. A CEO will tell a person where to go or what to do, as well as the Nucleolus

DNA

- a. DNA contains the instructions needed for an organism to develop, survive and reproduce.
- b. Blueprints
- c. DNA is what creates the details to a person. To create something, you need blueprints to do it.

mRNA (messenger RNA)

- a. mRNA molecule in cells carries codes from the DNA in the nucleus to the sites of protein synthesis in the cytoplasm (the ribosomes).
- b. Delivery orders
- c. mRNA carries out cells like a delivery.

tRNA (transfer RNA)

- a. tRNA is a type of RNA molecule that helps decode a messenger RNA(mRNA) sequence into a protein. tRNAs function at specific sites in the ribosome during translation, which is a process that synthesizes a protein from an mRNA molecule.
- b. Construction workers
- c. It helps build a message RNA, like construction workers building.

Cytoplasm

- a. Cytoplasm is present within the cell membrane of all cell types and contains all organelles and cell parts. Cytosol is the part of the cytoplasm that does not contain organelles.
- b. Environment
- c. Just how the environment is always present, Cytoplasm is always present.

Mitochondria

- a. Mitochondria are organelles that act like a digestive system which takes in nutrients, breaks them down, and creates energy rich molecules for the cell.
- b. Power plant
- c. You get your power (energy) from mitochondria breaking down nutrients.

Chloroplasts

- a. chloroplasts absorb sunlight and use it in conjunction with water and carbon dioxide gas to produce food for the plant.
- b. Solar panels
- c. Solar panels function from sunlight.

Endoplasmic reticulum

- a. Endoplasmic reticulum functions as a manufacturing and packaging system. It works closely with the Golgi apparatus, ribosomes, mRNA, and tRNA.
- b. Assembly area
- c. It assembles the packaging system

Ribosomes

- a. Ribosomes make RNA into proteins. This process is very important to cells, large numbers of ribosomes are found in cells.
- b. Work stations
- c. Ribosomes work to make RNA into proteins.

Golgi Apparatus

- a. The Golgi apparatus gathers simple molecules and combines them to make molecules that are more complex.
- b. Shipping dept
- c. The golgi apparatus ships simple molecules to make them complex.

Lysosomes

- a. Lysosomes are organelles that contain digestive enzymes. They digest excess or worn out organelles, food particles, and engulfed viruses or bacteria. Lysosomes are like the stomach of the cell.
- b. Recycling plant
- c. Lysosomes “recycle” organelles, food particles, and engulfed viruses or bacteria

Vacuoles & vesicles

- a. Vesicles and vacuoles are used for storage inside eukaryotic cells. Plant cells have a single vacuole which is generally the largest organelle inside the cell.
- b. Shipping containers
- c. Vesicles and vacuoles ship out their storage.

Centrosome

- a. Centrosomes are structures found inside of cells. The main purpose of a centrosome is to organize microtubules and provide structure for the cell.
- b. Road building dept.
- c. Centrosomes “organize” structures to build a road, like a department.

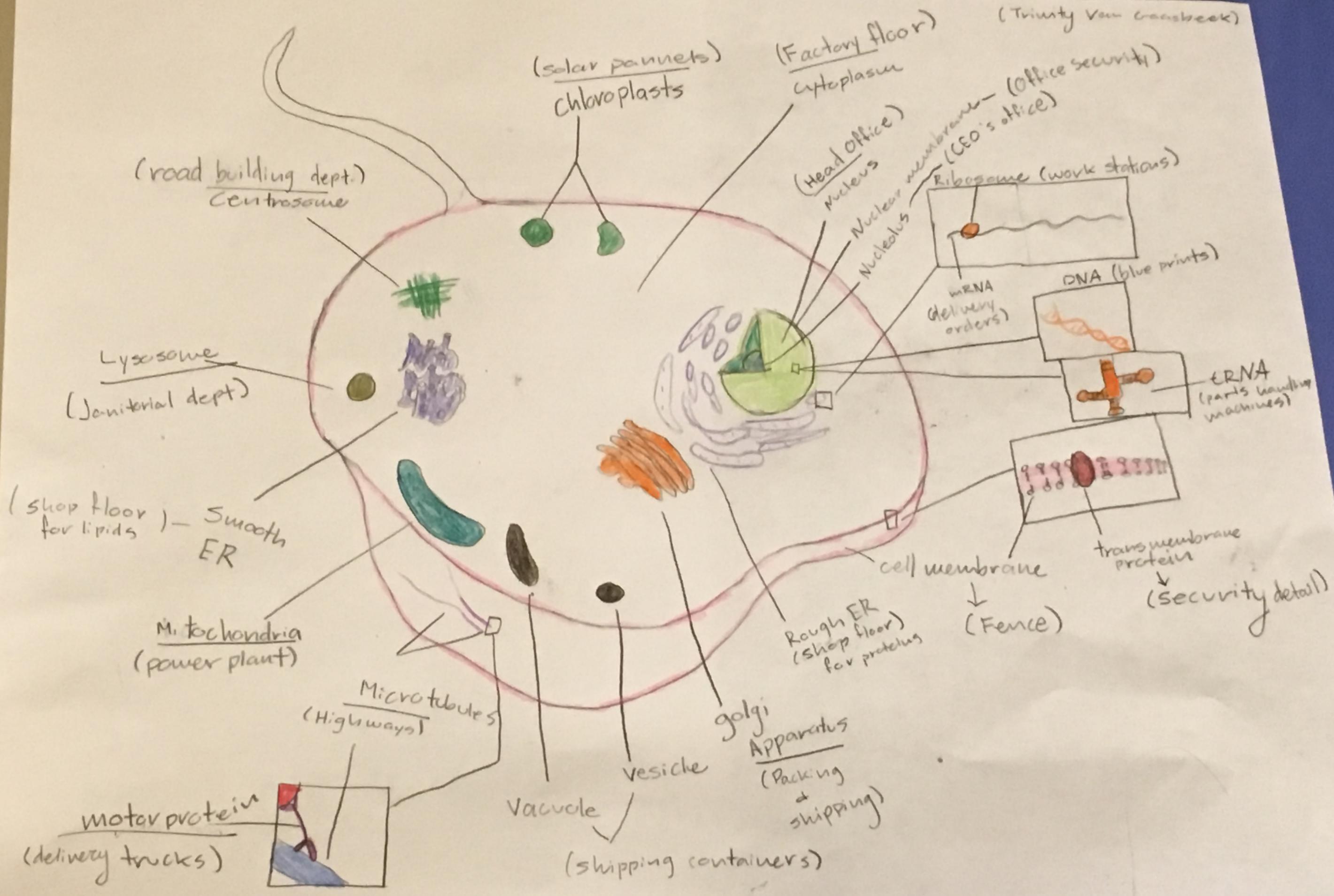
Microtubules

- a. Microtubules are conveyer belts inside the cells. They move vesicles, granules, organelles like mitochondria, and chromosomes via special attachment proteins.
- b. Highways
- c. They allow things to go somewhere faster, like a highway.

Motor proteins

- a. Motor proteins use the cytoskeleton for movement into two categories based on their substrates: Actin motors and Microtubule motors.
- b. Delivery truck
- c. Motor proteins delivery movement from the cytoskeleton.

(Trinity Van Craasbeek)



Cell Factory

Cell Membrane: The cell membrane is the cell's outer surface. This separates the cell's interior from its surroundings. This acts as a barrier from the outside, allowing only specific materials to enter or exit the cell. This also plays a large role in communication between cells. The factory title of the cell membrane is the fence; it acts as a border between the factory (or cell) and the rest of the land (or the environment surrounding the cell).

Transmembrane Proteins: In the cell, transmembrane proteins are proteins which span both layers of the cell membrane, extending into the cytosol and extracellular fluid. These make up a majority of integral proteins. They act as gateways, allowing specific materials through the cell membrane which cannot spread through by diffusion. The factory name for these is security detail because they only allow the materials which are allowed to enter the cell through.

Nucleus: The nucleus is home to most of the cell's DNA. This large organelle also contains a nuclear membrane and nucleolus. The factory name for the nucleus is the Head Office. The reason for this name is that the nucleus contains the most important part of the cell—DNA.

Nuclear Membrane: The nuclear membrane acts as another border for the cell. This border, however, separates the nucleus from the surrounding cytoplasm. The layers of this membrane are similar to the layers in the cell membrane, and the nuclear membrane contains several nuclear pores which act similarly to channel proteins in the cell membrane. The factory name for this part of the cell is the office security. This name is because, similarly to the cell membrane, it acts as a border between the head office (nucleus) and the rest of the factory (or cell).

Nucleolus: The nucleolus (or plural, nucleoli) creates ribosomes. The nucleoli are made up of groups of DNA, RNA, and proteins. The nucleolus is also where synthesis of rRNA takes place. The factory name for this is the CEO's office, because this is where the main pieces of the cell such as DNA are clustered, and where the ribosomes are formed, which assemble all proteins within the cell.

DNA: The DNA contains the cell's genes, which are hereditary units which control almost every aspect of cellular function and structure. DNA is within chromosomes, which are found within the nucleus. The place DNA holds within the factory is the blueprints. This is because DNA holds all the information in regards to the structure and function of the cell, much like blueprints do in a factory setting.

mRNA: In the cell, mRNA (messenger RNA) directs synthesis of proteins. These contain nucleotide sequences, which are used to determine the amino acid sequence of a protein. The factory name for mRNA is the delivery orders. This is because it provides the information and instructions on what protein to create.

tRNA: In the cell, tRNA (transfer RNA) binds to and holds an amino acid in place until it is incorporated into a protein during translation. The factory name for this is the parts handling machine, because it keeps the amino acids where it should be during transcription.

Cytoplasm: Cytoplasm consists of two parts. The first of these is cytosol, which is a fluid containing water, dissolved solutes, and particles. The second of the two parts are organelles. Each type of organelle has a specific shape and function (such as a nucleus). The factory name

for cytoplasm is the factory floor, because it acts as a place where the rest of the factory (or cell) stands.

Mitochondria: Mitochondria in the cell produce a majority of the ATP through aerobic respiration within the cell. Many cells have a few thousand mitochondria within them. Their factory name is the power plant, because it provides energy to the cell.

Chloroplasts: Similar to mitochondria, chloroplasts generate energy for plant cells through absorbing sunlight and converting that to energy. Their factory name within a plant cell are solar panels, because they take up sunlight to use as an energy source.

Endoplasmic reticulum: In the cell, endoplasmic reticulum (ER) comes in two different types. The first of these is rough ER. In rough ER, secretory, membrane, and organellar proteins are created. The second ER is smooth ER. This works similarly to rough ER, but rather than creating proteins, it creates fatty acids and steroids. The factory name for ER is the shop floor, because of the creation of proteins and lipids in these extensive parts of the cell.

Golgi apparatus: The golgi apparatus is the first step in transport within the cell. When enzymes enter the golgi apparatus, they are sorted and packaged for transport. The factory name for this is packing and shipping, because this is where the enzymes are packed and made ready to ship, and are eventually sent out.

Lysosomes: Lysosomes are a type of vesicle which form around the golgi apparatus. These contains dozens of different types of enzymes. These recycle worn structures within the cell by digesting them and returning them to the cytosol for reuse. The factory name for lysosomes is the janitorial department, because it breaks down the “broken” structures.

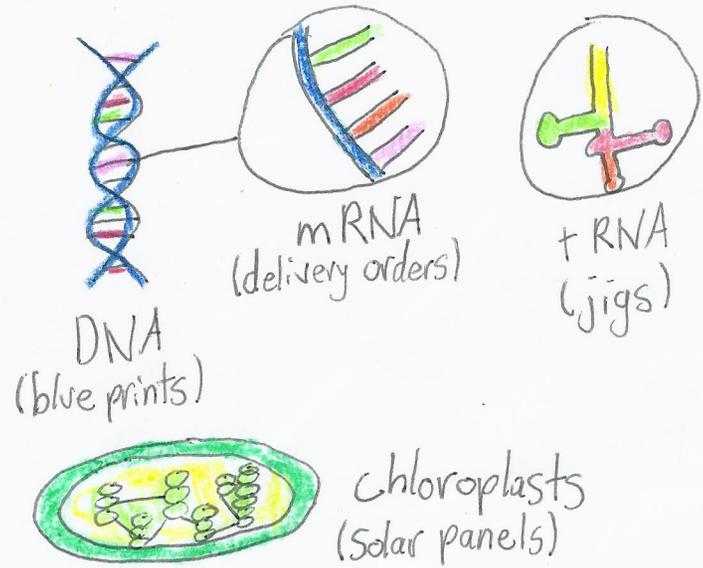
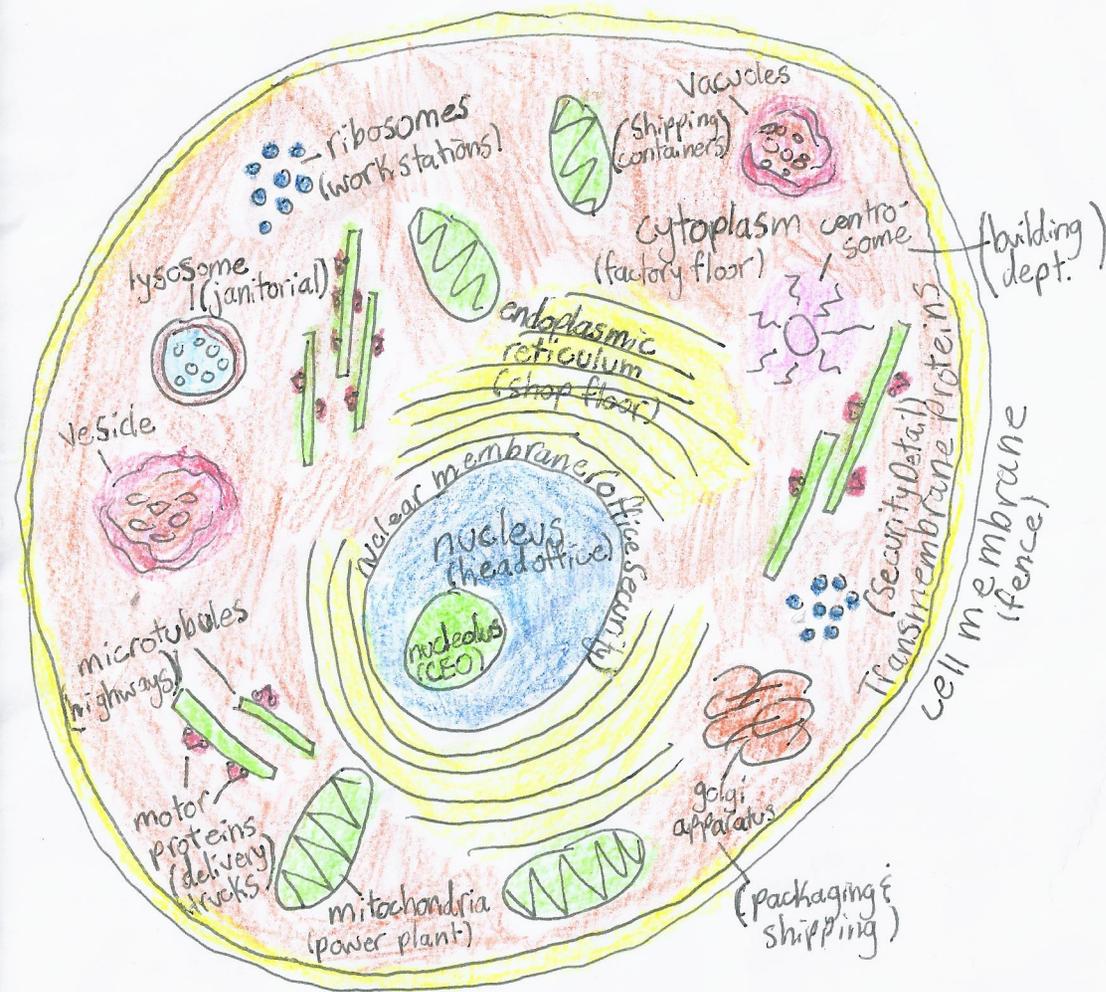
Vacuoles and vesicles: Vacuoles and vesicles act as transport containers for the enzymes where are packed in the golgi apparatus. The enzymes are packed within these and are taken by proteins throughout the cell. The factory name for these are shipping containers, because they act as packages which hold enzymes for transport.

Centrosomes: Centrosomes organize the growth of the mitotic spindle, playing a large role in cell division. These replicate themselves so that the following generations of cells have the ability to divide. In nondividing cells, centrosomes also have a role in the microtubular formation. The factory name for this is the road building department, because it creates the microtubules for highway systems across the cell.

Microtubules: Microtubules are part of the cytoskeleton. These contribute to determining cell shape. These also help with the movement of organelles and chromosomes. The factory name for microtubules are the highways, because they act as roads for travel across the cell.

Motor proteins: Motor proteins act as carriers upon the microtubules of the cell. These carry large sacs of proteins and other needed items within the cell across the cell. The factory name for these are delivery trucks, because they carry the cargo of the cell to different locations.

Animal Cell



Cell Membrane- The cell membrane, or fence, has the job of protecting the cell from its surroundings. It controls what comes in and out from the cell. It surrounds the cytoplasm and is made of proteins. A “fence” is a good way to describe it because it protects its contents.

Transmembrane proteins- the transmembrane protein, or security detail, spans the inside of the cell membrane. It is the shield that allows the cell membrane to let substances into the cell. It is made of similar proteins as the cell membrane. “Security detail” fits its description because it is the one that opens the “fence”.

Nucleus- the nucleus, or head office, holds all of the genes of the cell, meaning, the DNA strands and proteins. It controls all the functions of the cell through gene expression. “Head office” is a good description of it because it oversees all functions.

Nuclear Membrane- the nuclear membrane, or office security, is a double-layered membrane made of lipids. Its job is to separate the nucleus from the cytoplasm and allow only certain ions, molecules and proteins in through its pores. “Office security” fits it well because it protects the “head office”.

Nucleolus- The nucleolus, or CEO office, is in charge of making ribosomes. It is located inside the nucleus and creates ribosomes by using proteins and ribosomal RNA. It then sends these out of the nucleus where they fully form. It is the “CEO’s office” because it plays an essential role in the production of essential components inside the cell.

DNA- The DNA, or blueprints, holds the genetic code of the cell. It has the instructions the cell needs to survive and reproduce. Most of the time, when a cell separates, the DNA is exactly the same in every cell. A blueprint is the perfect name for it because it has the essential instructions for cells to function properly and each body’s DNA is different, just like unique buildings.

mRNA- The mRNA, or delivery orders, are sent out from the nucleus with temporary DNA codes to be delivered to the tRNA. “Delivery order” is the perfect name because it holds the DNA orders that need to be delivered.

tRNA- The tRNA, or handling machines, transfer the DNA codes that were given to them by the mRNA to the ribosomes. It also translates the DNA codes. “Handling machine” is the best name for the tRNA because it handles the codes.

Cytoplasm- The cytoplasm, or shop floor, is a jelly-like substance that surrounds the nucleus and contains all the organelles of the cell. It is made mostly of water and salt and is contained by the cell membrane. The “shop floor” is the perfect made for cytoplasm because every part of the cell, or factory, is placed in it.

Mitochondria- The mitochondria or, power house, is like a stomach for the animal cell. It breaks down all the nutrients absorbed by the cell, producing energy for its functions. The “power house” fits this organelle great because it produces the power for the cell to thrive.

Chloroplasts- The chloroplasts, or solar panels, absorb sunlight to produce energy for plant cells. Its function is very similar to that of the mitochondria in animal cells. It uses the process of photosynthesis to make food for the plant to thrive. “Solar panels” perfectly describe the chloroplasts because just like solar panels, they use the sun as a source of energy.

Endoplasmic reticulum- The endoplasmic reticulum (ER) can also be called the assembly area. There are two types of ER; the rough and smooth ER. The rough ER is given chains of amino acids when the ribosomes are processing them. It is considered rough because ribosomes attach to it, giving it a rough look. The smooth ER helps store lipids and steroids. They should be considered the assembly areas because they help assemble essential substances in the cell.

Ribosomes- The ribosomes, or work stations, are bound to the endoplasmic reticulum and is where the proteins are translated from the tRNA. To do this, the ribosomes assemble together to attract the tRNA. A chain of amino acids is taken and translated by the ribosomes. “Work station” is a good name for the ribosomes because it’s where one of the most important functions in the cell happens and it requires a long process and a lot of work.

Golgi Apparatus- The golgi apparatus, or packaging and shipping department, has the job of combining molecules and either sends them out to the cell to feed it, or stores it for later when it’ll need it more. It mainly packages proteins and lipids. It truly does have the packaging and shipping job because it packs molecules then distributes them.

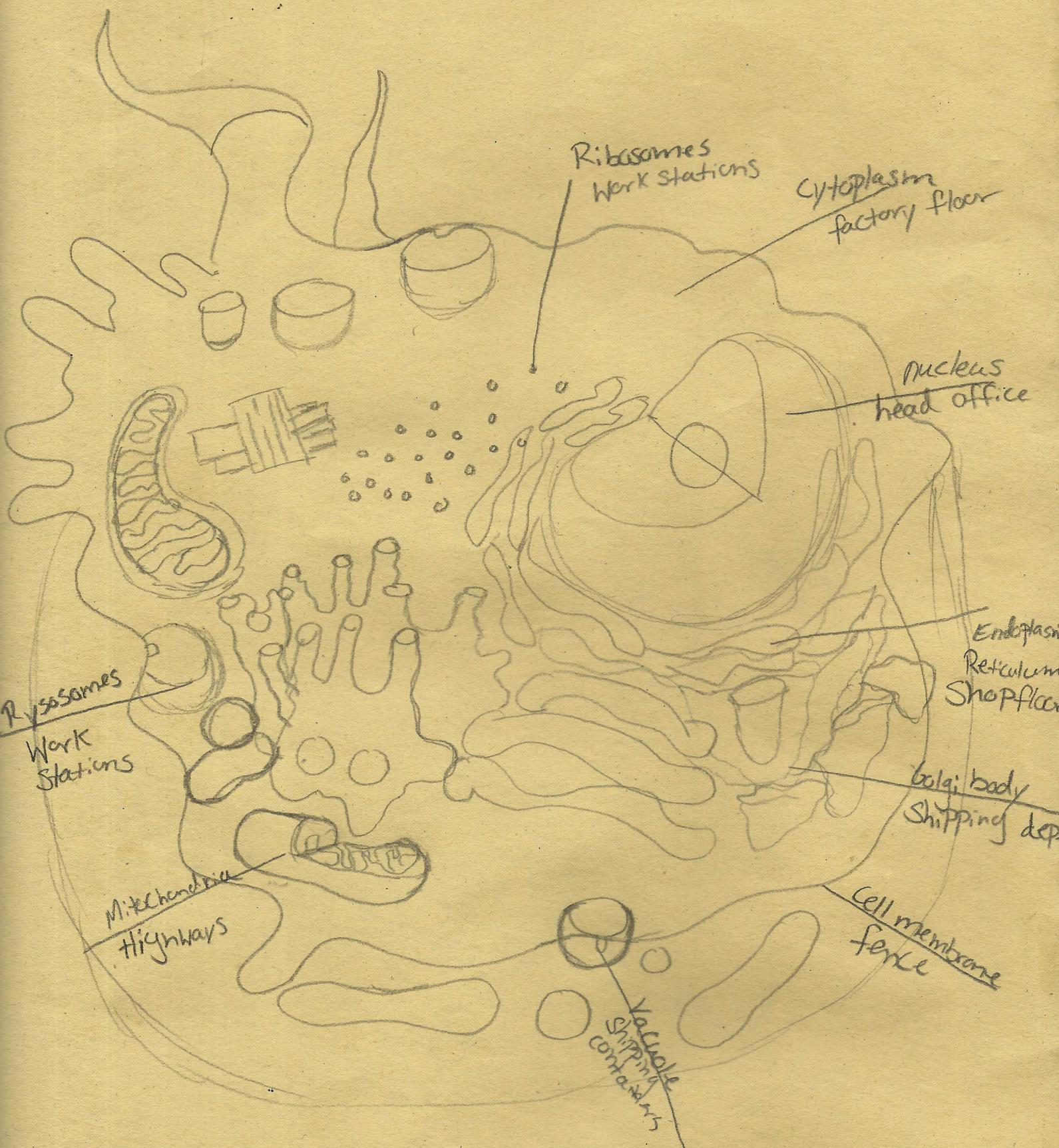
Lysosomes- The lysosomes, or janitorial department, clean up the debris in the cell. They digest extra organelles, food particles, and dangerous viruses and bacteria. It does have the job of a janitor because it cleans up the gross stuff 😊

Vacuoles and vesicles- Vacuoles and vesicles or, shipping containers, store minerals in the cell. Vacuoles are larger than vesicles. They take water from the cytoplasm and release it from the cell to prevent bursting from pressure. The vesicles are made in the golgi apparatus and the endoplasmic reticulum. They can fuse to the cell membrane to release its contents for the same reason the vacuoles do. They can be called shipping containers because of how they transport and release contents.

Centrosome- The centrosomes can be called the road building department. They are made from two microtubule rings called centrioles. The centrosome’s job is to direct these centrioles during cell division. The centrosome is truly the road building department because of how it creates the road for the centrioles.

Microtubules- Microtubules or, highways, are key in mitosis. They transport all the organelles of a cell during cell division. They help in connecting chromosomes in this split and guide them to their place in the new daughter cell. They can be referred to as highways because almost all organelles travel along them to be placed where is necessary.

Motor proteins- Motor proteins or, delivery trucks, have two functions. The first is to guide the organelles on the microtubule highways during mitosis. The second is to control muscle movements in the cell like moving myosin down the microfilaments with actin. Motor proteins also convert chemical energy through ATP. They are the delivery trucks because they bring cells and minerals where they need to go down the highways.



Ribosomes
Work Stations

Cytoplasm
factory floor

nucleus
head office

Endoplasmic
Reticulum
Shop floor

Golgi body
Shipping dept

Cell membrane
fence

Vacuole
Shipping
containers

Mitochondria
Highways

Ribosomes
Work
Stations

Elizabeth Wolfe

Chemistry

10/30/17

Cell factory assignment

Cell membrane: the semipermeable membrane surrounding the cytoplasm of a cell. The real work of the cell occurs in the cytoplasm, the cell's "factory floor." The term "cytoplasm" refers to everything between the cell membrane and the nuclear membrane. It consists mostly of water, salts, some proteins, and many small structures called organelles. Fence/ it holds everything in

Transmembrane: A transmembrane protein is a type of integral membrane protein that spans the entirety of the biological membrane to which it is permanently attached. Guard shack/ it doesn't pass everything through.

Nucleus: the central and most important part of an object, movement, or group, forming the basis for its activity and growth. The nucleus is the cell's "control center"; it also holds the cell's DNA. We compared the nucleus to a mayor's office in a town. We made this comparison because we know that a mayor's office "controls" the town and sometimes houses records.

Nuclear membrane: Definition of nuclear membrane. a double membrane enclosing a cell nucleus and having its outer part continuous with the endoplasmic reticulum called also nuclear envelope. Most organelles, including ribosomes after they are built in the nucleus, are found in the cytoplasm, which is the substance found between the nucleus and the cell membrane number eight in the cell factory diagram. The cytoplasm is analogous to the factory floor, where all the work takes place.

Nucleolus: a small dense spherical structure in the nucleus of a cell during interphase. CEO's office/ it needs to be consulted before everything can pass through

DNA: Your DNA is what makes you uniquely you. It's that double helix that your genes are made of. Your DNA accounts for why you resemble your parents and it distinguishes you from your pet frog and from everybody else. DNA stands for deoxyribonucleic acid, sometimes called "the molecule of life," as almost all organisms have their genetic material codified as DNA.

mRNA: Messenger RNA (mRNA) is a subtype of RNA. An mRNA molecule carries a portion of the DNA code to other parts of the cell for processing. mRNA is created during transcription. During the transcription process, a single strand of DNA is decoded by RNA polymerase, and mRNA is synthesized.

tRNA: Transfer RNA. Small RNA molecules that carry amino acids to the ribosome for polymerization into a polypeptide. During translation the amino acid is inserted into the growing polypeptide chain when the anticodon of the tRNA pairs with a codon on the mRNA being translated.

Cytoplasm: the material or protoplasm within a living cell, excluding the nucleus. Nucleus

Function: distinct central organelle that contains the cells genetic material in the form of DNA.

Analogy: The nucleus is like the king of the whole factory what's going on. Cytoplasm Function: environment inside a plasma membrane in the form of a semi-fluid material.

Mitochondria: an organelle found in large numbers in most cells, in which the biochemical processes of respiration and energy production occur. It has a double membrane, the inner layer being folded inward to form layers. an organelle found in large numbers in most cells, in which the biochemical processes of respiration and energy production occur. It has a double membrane, the inner layer being folded inward to form layers

Chloroplasts: a plastid that contains chlorophyll and in which photosynthesis takes place.

Transcript of Chloroplasts analogy. Chloroplasts are like solar panels because they both convert

energy. The chloroplasts function is to carry out photosynthesis in the plant to provide it with energy.

Endoplasmic: a system of interconnected vesicular and lamellar cytoplasmic membranes that functions especially in the transport of materials within the cell and that is studded with ribosomes in some places — see rough endoplasmic reticulum.

Ribosomes: a minute particle consisting of RNA and associated proteins, found in large numbers in the cytoplasm of living cells. They bind messenger RNA and transfer RNA to synthesize polypeptides and proteins.

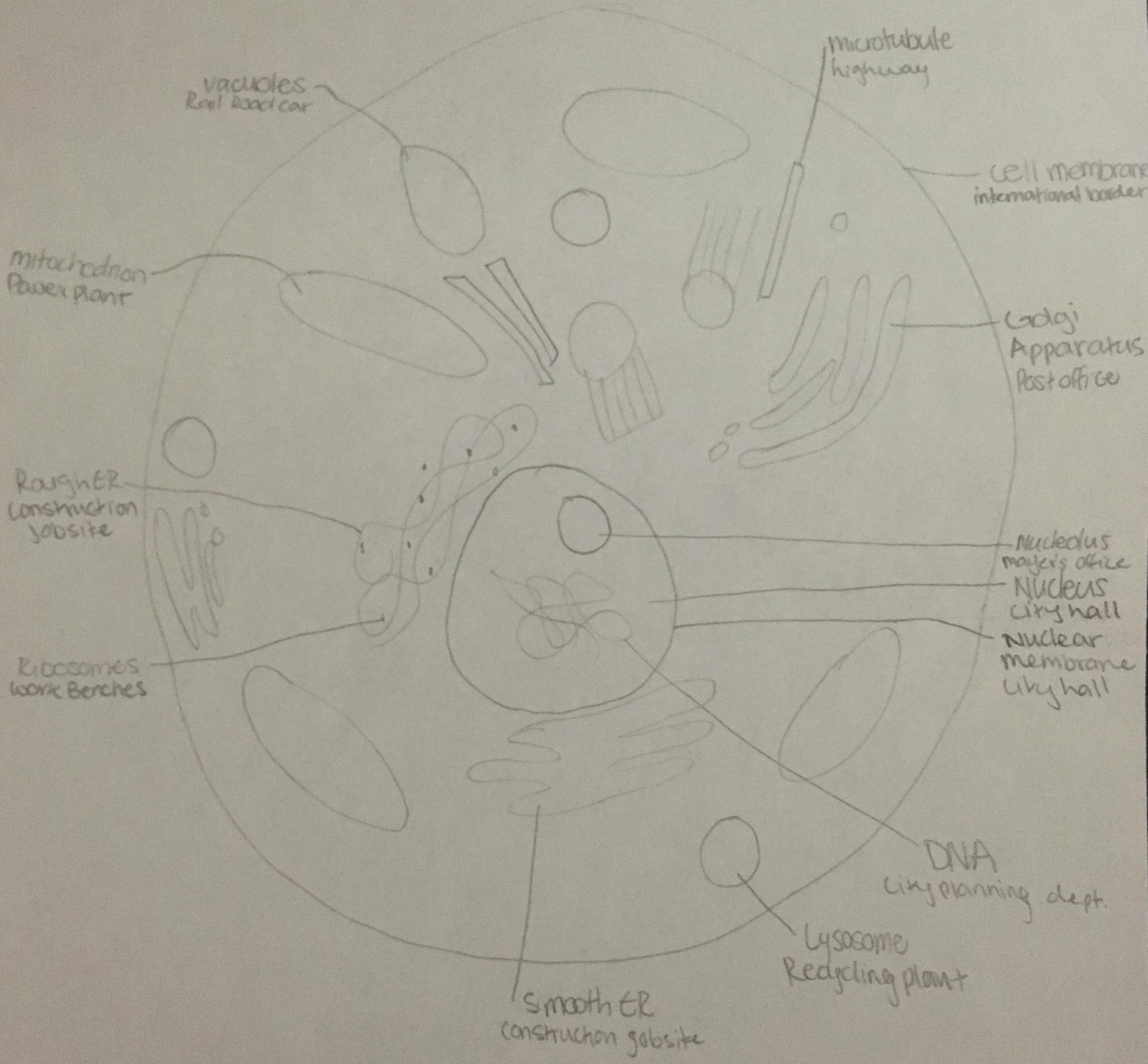
Golgi apparatus: a complex of vesicles and folded membranes within the cytoplasm of most eukaryotic cells, involved in secretion and intracellular transport. Golgi Body Function: flattened stack of membranes that modifies, sorts, and packages proteins into sacs called vesicles. ... The endoplasmic reticulum is to transport ribosomes to the Golgi apparatus. Analogy: Both rough and soft endoplasmic reticulum are like hallways that transport cellular materials.

Lysosomes: an organelle in the cytoplasm of eukaryotic cells containing degradative enzymes enclosed in a membrane. Lysosomes are like garbage men/garbage collectors. They are similar because like garbage men, lysosomes get rid of waste materials. ... The lysosome is a membrane-bound cell organelle found in animal cells. The lysosomes destroy worn-out or damaged organelles and get rid of waste materials.

Vacuoles: a space or vesicle within the cytoplasm of a cell, enclosed by a membrane and typically containing fluid. The vesicles deliver the containing the fluids. Almost like a shipping department.

Centrosome: an organelle near the nucleus of a cell that contains the centrioles (in animal cells) and from which the spindle fibers develop in cell division.

Motor Proteins: Motor proteins are class of molecular motors that are able to move along the surface of a suitable substrate. They convert chemical energy into mechanical work by the hydrolysis of ATP.



Elizabeth Adye
Cell Factory
10/30/17

Cell membrane

It is the outermost layer, it contains cholesterol, it has pores and is semi-permeable, which means it allows the movement of substances in and out. Its city name is International Border because it regulates what goes in and out.

Transmembrane proteins

They are receptors that transport molecules across the membrane. Its city name is Border Crossing because they transport molecules across the cell membrane.

Nucleus

It controls many of the functions of the cell, contains the DNA, and many organelles including the nucleolus. Its city name is City Hall because it directs many of cities operations.

Nuclear membrane

It's a double-layered membrane that surrounds the nucleus. Its city name is Police because it protects the nucleus where genetic material (DNA) is stored.

Nucleolus

It's a structure made up of proteins and ribonucleic acids (RNA). Its main function is to re-write ribosomal RNA (rRNA) and combine it with proteins. Its city name is Mayor's Office because it re-writes and puts new plans together.

DNA

Deoxyribonucleic acid contains genetic instructions so an animal cell can develop and function. Its main role is to provide long term storage of information. Its city name is the City Planning because such a department contains all the blue prints for all the structures and operations within the city.

mRNA

It's a molecule in a cell that carries codes from the DNA to the cytoplasm where protein is synthesized. Its city name is Blue Prints because it shows how something is built.

tRNA

tRNA reads the message of nucleic acids and translates it into amino acids. This process is called translation. Its city name is Construction Foreman because it reads the instructions and makes the work happen.

Cytoplasm

It's a jelly-like fluid that fills the cell. It's mostly water and salt and it contains all the organelles and cell parts. Its city name is Environment because it's ever present and contains everything.

Mitochondria

It's a membrane where chemical reactions happen. Its main job is cellular respiration. It takes in nutrients from the cell, breaks it down, and turns it into energy. Its city name is Power Plant because it generates energy.

Chloroplasts

They convert light energy from the sun into sugars that are used by plant cells. This whole process is called photosynthesis. Its city name is Solar Panel because it harnesses solar power for the cells use.

Endoplasmic reticulum

It's an organelle that is found in eukaryotic cells. It is a network that is interconnected of flat sacs or tubes that are enclosed in membranes. It folds proteins and transports synthesized proteins to the Golgi apparatus. Its city name is Construction Job Site because it is where a lot of work happens.

Ribosomes

They are a cell structure that makes protein. They are found floating in cytoplasm or attached to the endoplasmic reticulum. Their city name is Work Benches because they build protein.

Golgi Apparatus

It processes and bundles macro molecules like proteins and lipids as they are synthesized within a cell. It is constructed from membrane-bound sacs. It is sometimes called a Golgi body or complex. Its city name is Post Office because processes and packages.

Lysosomes

It is the main organelle involved in digestion and removal of waste within the cell. It contains digestive enzymes to digest organelles, food particles, and engulfed viruses and bacteria. It is the Recycling Plant of the city due to the fact that it breaks down the food and processes out the garbage.

Vacuoles and Vesicles

Vacuoles contain mostly water. They regulate the water pressure and level in a cell. They control the environment within the cell. Vesicles move molecules within the cell. They are the city's Railroad Cars as they transport needed materials.

Centrosome

The main purpose of it is to organize microtubules and produce structure. They also work to pull chromatids apart when cells are dividing. It is the Road Building Department within the city for it provides an organized structure.

Microtubules

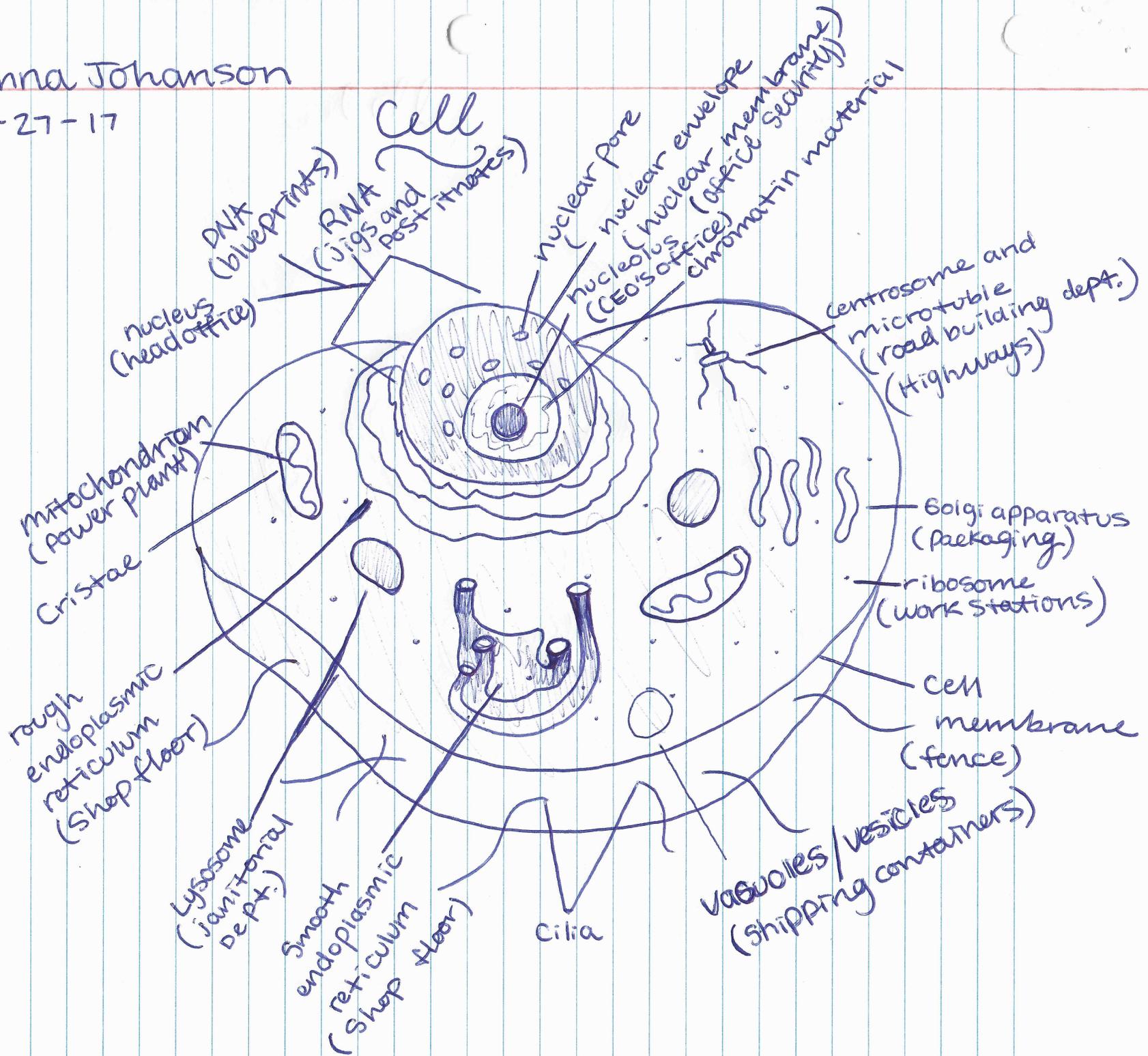
They support the movement of organelles. They also help to form large structures on the outside of cells. They combine in bundles for movement within the cell. They are the city's Highways due to the fact that they are all about transportation.

Motor Proteins

They are the main force behind the active transport of protein. They also transport vesicles in the cytoplasm. Their city name is Locomotive because they are a powerful vehicle within the cell.

Anna Johanson

10-27-17



Nucleolus (CEO'S office): like the nucleolus the CEO'S office manages the overall operations. The nucleolus makes ribosomal subunits from proteins and ribosomal RNA, also known as rRNA. It then sends the subunits out to the rest of the cell where they combine into complete ribosomes.

Nuclear membrane (office security): like the nuclear membrane the office security protects the office. The nuclear membrane is the double lipid bilayer membrane which surrounds the genetic material and nucleolus in eukaryotic cells.

DNA (blueprints): like the DNA the blueprints carry instructions on how to build something. The DNA contains the instructions needed for an organism to develop, survive and reproduce. To carry out these functions, DNA sequences must be converted into messages that can be used to produce proteins, which are the complex molecules that do most of the work in our bodies.

Messenger RNA (mRNA) (post it notes): like mRNA, post it notes can be used to write down information on. The messenger RNA (mRNA) are molecules in cells that carries codes from the DNA in the nucleus to the sites of protein synthesis in the cytoplasm (the ribosomes) (jigs)

RNA (tRNA) (jigs): like tRNA, jigs hold and guide a tool. The tRNA brings protein subunits, known as amino acids, to the ribosome where proteins are constructed.

Cytoplasm (factory floor): like a cytoplasm a factory floor contains all the machinery and parts. The cytoplasm is present within the cell membrane of all cell types and contains all organelles and cell parts

Mitochondria (power plant): like the mitochondria a power plant generates power for a city. The mitochondria takes in nutrients, breaks them down, and creates energy rich molecules for the cell.

Chloroplasts (solar panels): like a chloroplast a solar panel absorbs the sun's rays and uses it as a source of energy. The chloroplasts absorb sunlight and use it in conjunction with water and carbon dioxide gas to produce food for the plant.

Endoplasmic reticulum (shop floor): like an endoplasmic reticulum a shop floor is used for packaging and manufacturing. The endoplasmic reticulum functions as a manufacturing and packaging system.

Ribosomes (work stations): like ribosomes a work station is where things are built. The ribosomes are where RNAs translated into protein.

Golgi apparatus (packaging): the Golgi apparatus is like a packaging system, it packages things and sends them out. The Golgi apparatus gathers simple molecules and combines them to make molecules that are more complex. It then takes those big molecules, packages them in vesicles, and either stores them for later use or sends them out of the cell. It is also the organelle that builds lysosomes (cell digestion machines).

Lysosomes (janitorial dept.): the janitorial dept. is like a lysosome it cleans out unwanted things. The lysosomes are organelles that contain digestive enzymes that digest excess or worn out organelles, food particles, and engulfed viruses or bacteria.

Vesicles and vacuoles (shipping containers): like vesicles and vacuoles, shipping containers are used for storage. The vesicles and vacuoles are sacs used for storage inside eukaryotic cells. Plant cells have a single vacuole which is generally the largest organelle inside the cell. In the animal cells, there are several vesicles which are smaller and more numerous than vacuoles.

Centrosomes (road building dept.): like centrosomes, a road building dept. builds the roads. The centrosomes organize microtubules and provide structure for the cell, as well as work to pull chromatids apart during cell division.

Microtubules (highways): like microtubules, highways move cars. The microtubules are conveyer belts inside the cell. They move vesicles, granules, organelles like mitochondria, and chromosomes via special attachment proteins.

Motor proteins (delivery truck): like motor proteins, a delivery truck delivers things. The motor proteins utilize the cytoskeleton for movement fall into 2 categories based on their substrates: actin motors such as myosin move along microfilaments through interaction with actin. Microtubule motors such as dynein and kinesin move along microtubules through interaction with tubulin.