

CHAPTER 31

So far, you have looked at four organelles that you can find in both plant and animal cells: the nucleus, ribosomes, "ER", and mitochondria. Every eukaryotic cell uses these small structures to stay alive. But there are many more for you to study...

In this chapter, you are going to look at three more organelles that can be found in both plant and animal cells:

Lysosome ("lie-so-so-m")

Golgi body ("goal-gee")

Vacuole ("vack-u-ol")

In addition, you are going to explore one more organelle that you would never find in an animal cell:

Chloroplast ("klor-o-plasts")

In the last chapter you were asked to think of the cell as a business... you have a boss, messages being sent, and ways to deliver these messages.



Most businesses work with other businesses, don't they? So how does a cell work with other cells?

The ribosomes have a hard time sending out their protein messages to other cells on their own. So, the ribosomes use another organelle...

...the **Golgi body**.

The Golgi body acts like a “**packing station**” by wrapping up proteins into a bundle. This “packing station” collects a large group of messages into a bundle and sends them outside of the cell. When the bundle reaches another cell, the bundle releases its protein into the new cell.



I THINK WE
COULD CARRY A
FEW MORE...

Please do not
confuse the
Golgi body
With the “**ER**”!

The Golgi body
sends bundles of
protein messengers
outside of the cell.

AFTER PACKING EVERYTHING UP, THE GOLGI BODY
SENDS OUT ITS MESSAGES TO OTHER CELLS.

The “ER” can only send messages within the same cell!

But every business has some kind of waste?

So how does a cell get rid of its waste?

Getting rid of waste is the job of the **lysosome**. Think of this organelle as the “**garbage disposal**” of the cell. Whenever you put garbage in the garbage disposal, it breaks it apart into smaller pieces. When the pieces are small enough, it gets flushed down the drain! A lysosome does the same thing with the waste inside a cell.



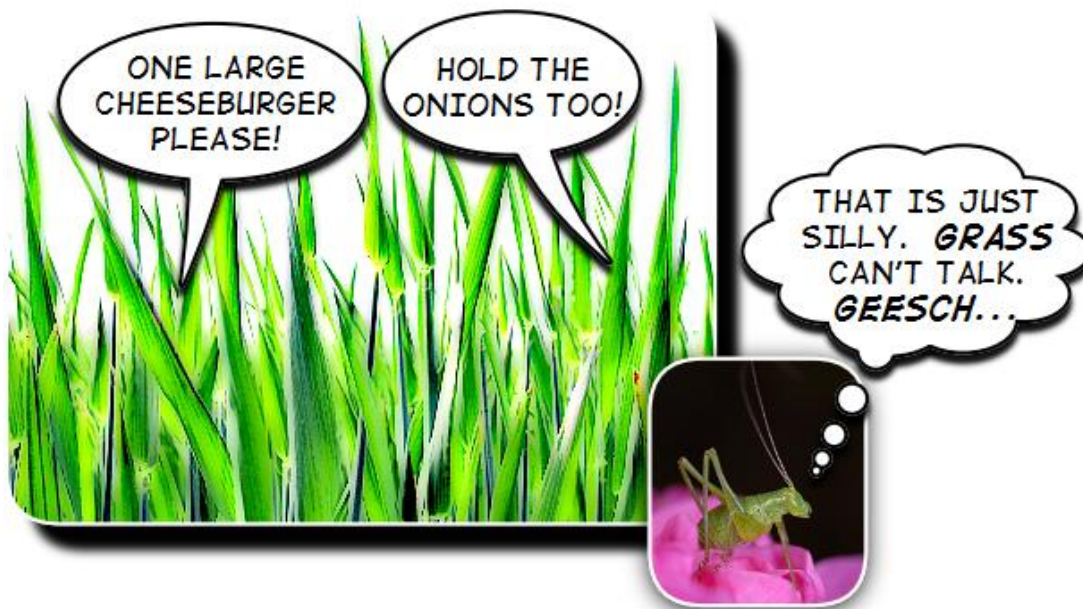
Inside this organelle you will find **enzymes** that break down the waste that is trapped in the cell.

Remember that enzymes are chemicals that your body uses to do all kinds of things...including breaking down your waste into smaller, more usable pieces.

**Most businesses store their materials somewhere.
How does a cell store its materials?**

Plant and animal cells store extra water and nutrients in an organelle called a **vacuole**. The vacuole is known as the “the warehouse” of the cell.

The vacuoles inside animal cells are not very large. There is no need for an animal cell to have a large vacuole because an animal can always eat more food!



In plant cells, the vacuole is much larger! A plant cannot pick up a cheeseburger and fries whenever it gets hungry. So the plant must store as many nutrients as it can.

A little review...

The DNA **(the boss)** wants to send out messages but it cannot leave its office **(the nucleus)**. So it makes RNA **(the message)** and sends it out into the cytoplasm for the ribosomes **(the decoders)** to read. The ribosomes read the message **(RNA)** and make new messages **(proteins)** that can be read by the other organelles. These new messages will tell the organelles what to do and when to do it.

Sometimes, these messages **(proteins)** are delivered faster by traveling on the "ER" **(the highway)**.

Other times, these proteins are sent outside of the cell after they are bundled up in the Golgi body **(packing station)**.



If any extra protein, nutrients or water is needed to be stored, it goes into the vacuole (**the warehouse**).

When there is any waste that the cell makes, it goes to the lysosome (**garbage disposal**) to be broken down into smaller pieces.

Now, let's take a look at an organelle that you will never find in an animal cell!

Chloroplasts

("klor-o-plasts")

Chloroplasts are special organelles that can be found in plants and many organisms in the Protista and Eubacteria kingdoms.

What makes chloroplasts so special?

Chloroplasts contain a chemical called **chlorophyll** ("klor-o-fill"). Chlorophyll soaks up as much sunlight as possible.

What does it do with all of the sunlight?

It takes a lot of energy to keep a plant growing. The sun provides a **huge** amount of energy to the plant to make its food!

Chlorophyll uses sunlight, nutrients and water to make their own food. This is called **photosynthesis**.

And since a plant cannot pick up a cheeseburger when it gets hungry, it has to make its own food to stay alive!

If you do not believe me, try putting a plant into a dark closet. Without any light reaching its leaves, you are certain to find a dead plant wilting by your coats in a couple of days!




By the way, if you ever wondered why plants almost always look green, it is because green is the color of chlorophyll. The next time you look at a leaf on a tree, all of the green that you see is coming from chlorophyll!

Also...

Plant cells have a special way to protect themselves by using...

Cell walls

A photograph of a large, ancient stone castle with multiple towers and battlements. A white speech bubble with a black outline points from the left towards the castle's walls. The text inside the speech bubble reads: "SO YOU THINK YOU ARE GOING TO GET THROUGH **THESE** WALLS, DO YOU?".

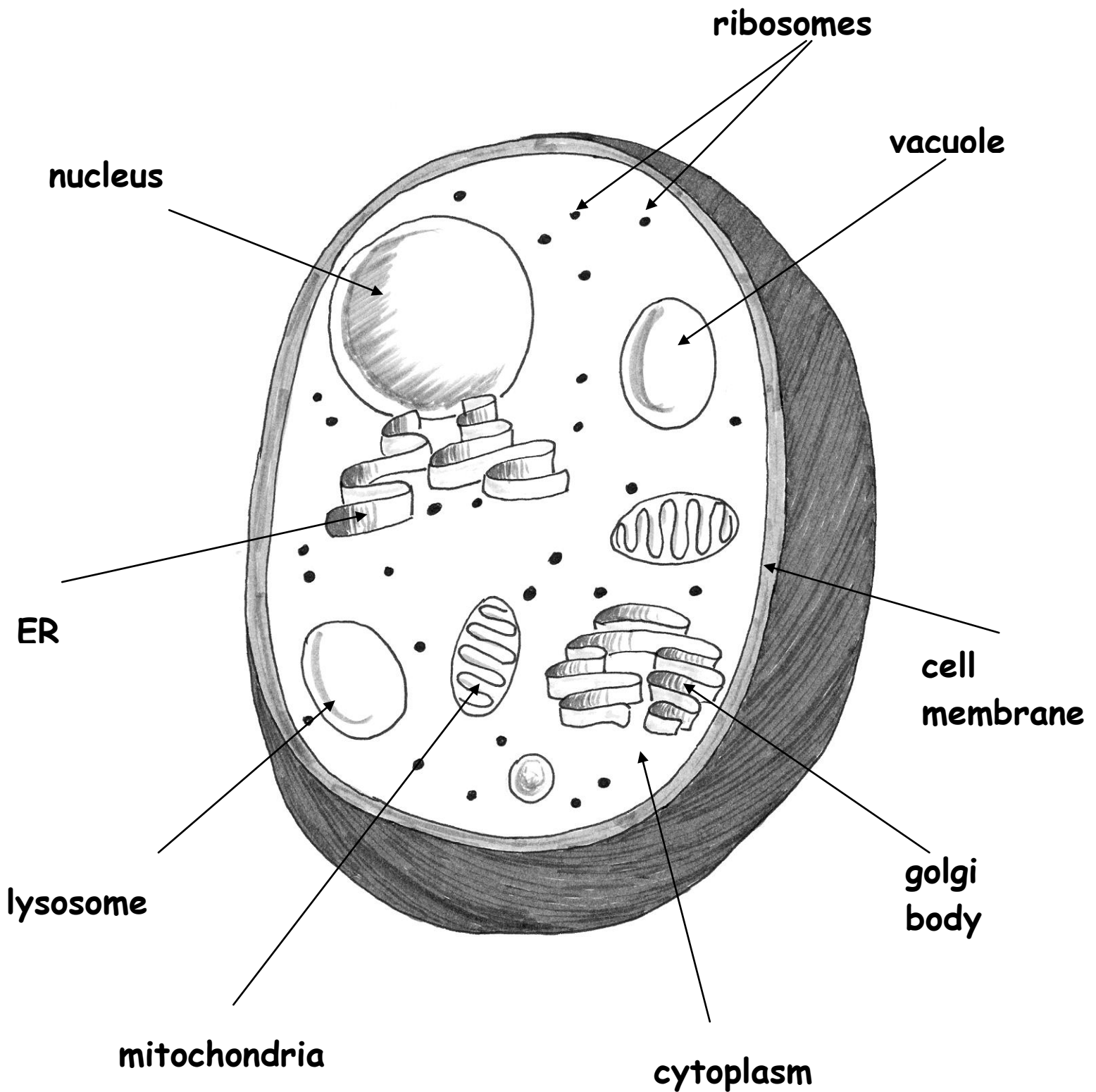
SO YOU THINK YOU
ARE GOING TO GET
THROUGH **THESE**
WALLS, DO YOU?

Plant cells have **cell walls**. So do most organisms from the kingdom fungi and a few organisms from the kingdom Eubacteria. The cell wall is a stiff structure that surrounds the cell and protects it from harm.

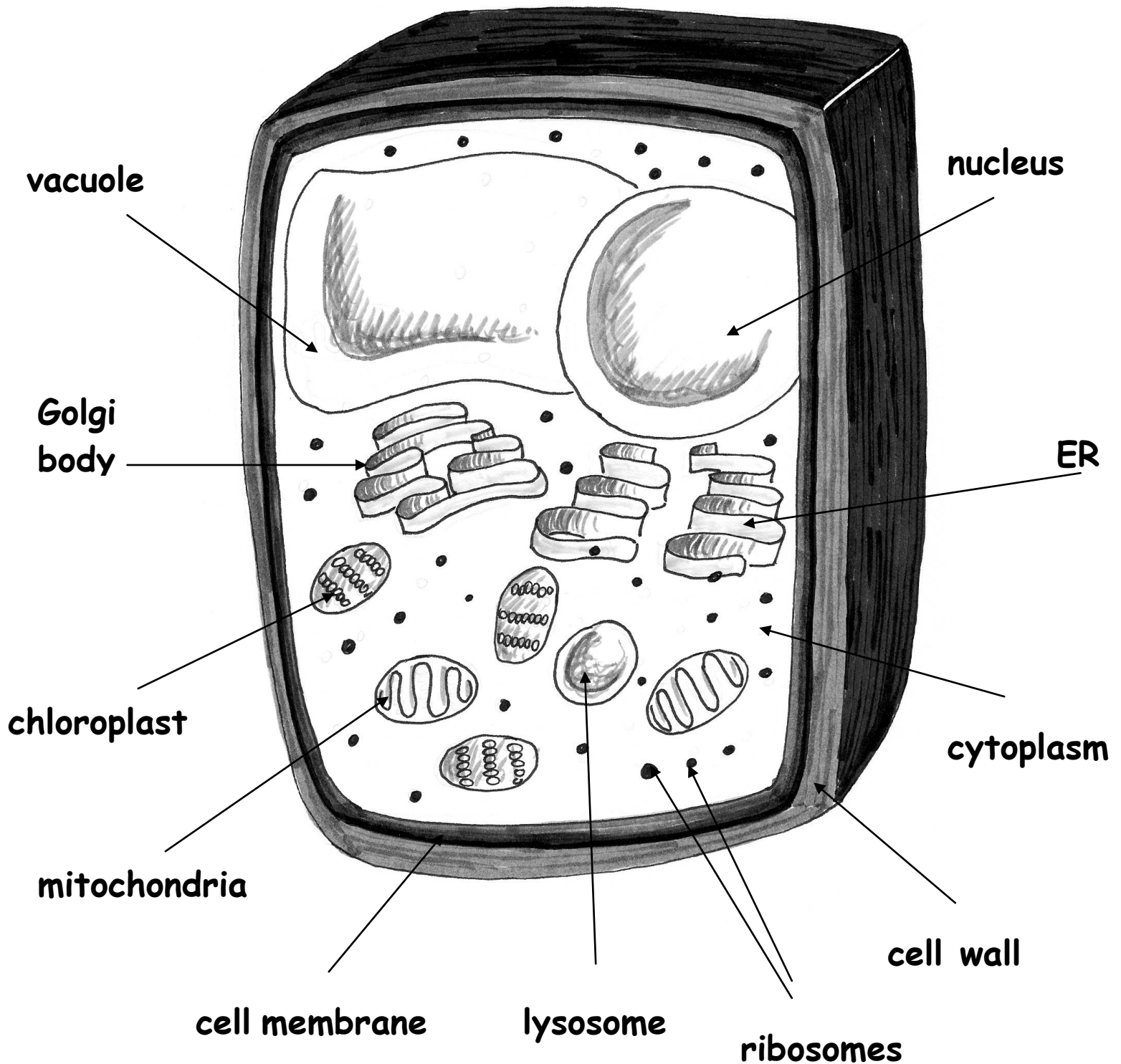
In addition to protecting the cell, the cell wall also gives an organism the ability to remain stiff, like the trunk of a tree! Cell walls connect to each other just like a brick wall! This gives plants and fungi a strong body that does not break in half during a windstorm and can straighten up when it gets knocked down!

In the next chapter, you are going to explore what makes a plant cell, animal cell and bacterial cell the same...and what makes them different!

Animal cell



Plant cell



Unscramble the words below:

1. odgoyilgb

2. cotahllpros

3. ouecalv

4. yhrplhlcolo

5. llcaewll

6. yoosesml

Write the definitions for each word:

1.

2.

3.

4.

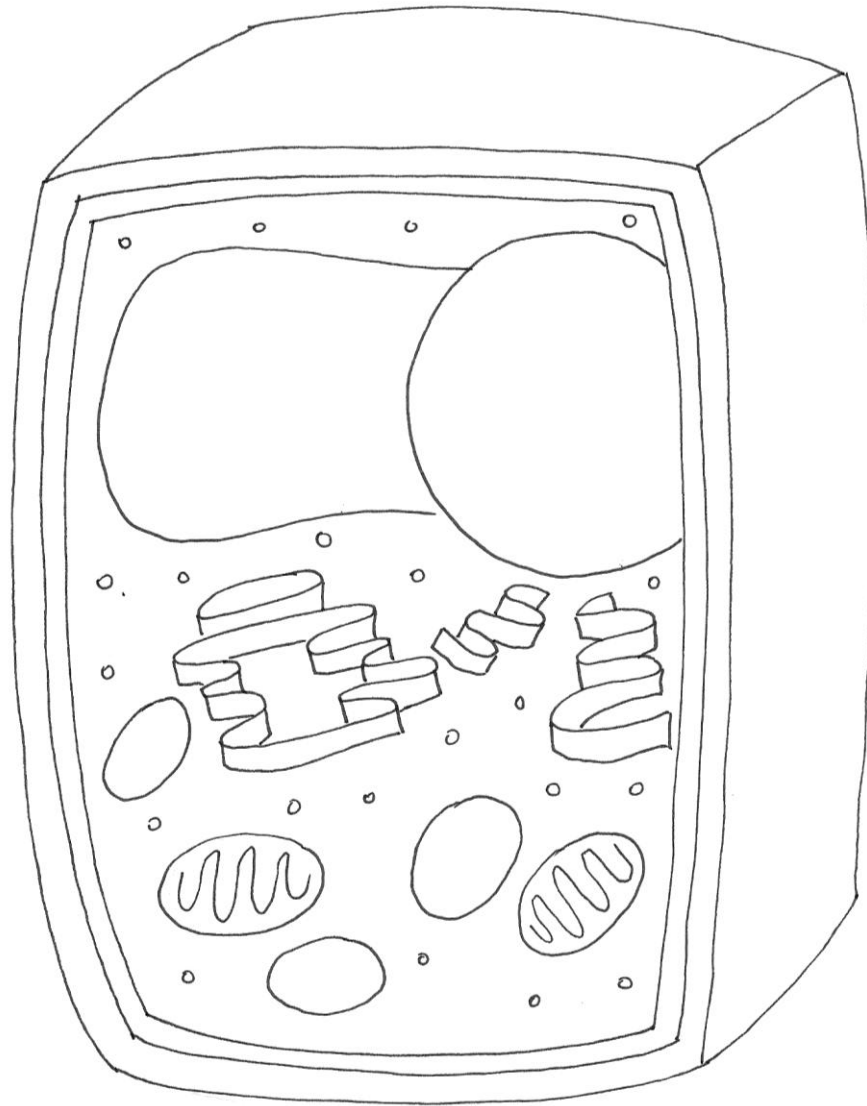
5.

6.

Match the words in the first column to the best available answer in the second column.

- | | |
|-------------------|--|
| _____ Lysosome | 1) an organelle that stores extra water and nutrients |
| _____ Golgi body | 2) an organelle that gets rid of the waste inside a cell |
| _____ Vacuole | 3) special organelles that contain chlorophyll |
| _____ Cell wall | 4) an organelle that wraps up proteins into a bundle inside a cell |
| _____ Chloroplast | 5) a chemical found inside chloroplasts that uses sunlight to make food for the cell |
| _____ Chlorophyll | 6) a stiff structure that surrounds a plant cell and protects it from harm |

Color the plant cell below



Color the organelles these colors:

- | | |
|-------------------|-----------------------|
| Nucleus - red | Lysosome - orange |
| Ribosomes - brown | Mitochondria - yellow |
| ER - blue | Golgi body - blue |
| Vacuole - purple | Chloroplast - green |