**2.3 – Plant and Animal Cellular Processes *(Notes)***

* Cells perform many functions in order to survive.
	+ Transfer – cells transfer small molecules (oxygen and carbon dioxide) and larger molecules (proteins) across their membranes.
	+ Reproduce and synthesize proteins
	+ Maintaining proper functionality – through carrying out thousands of chemical reactions
	+ Energy supply – Photosynthesis (plant), aerobic respiration (animals)
* Regardless of what you are doing (sitting, standing, awake, asleep, playing soccer, having dinner at a friend’s house etc.) your cells are busy places.
* Just like a busy factory materials are arriving in your cells, being used in production and the waste and final products are being transported out.
* The materials entering a cell through diffusion and osmosis and other transport mechanisms are raw materials to be used by the various organelles.
* These organelles are breaking materials down in order to:
	+ convert energy
	+ transport energy
	+ build proteins
	+ send chemical messages
* Cells also regularly expel tiny amounts of waste.
* Multicellular organisms expel waste proportional to their mass.
* Transforming energy
	+ All cellular activities (growth, repair and reproduction) need energy.
	+ Cellular respiration (animals)- Mitochondria provide energy for the cell by transforming oxygen and sugar (food) into carbon dioxide and water.
	+ Photosynthesis (plants) –
		- Chlorophyll in the chloroplast captures the Sun’s energy
		- Chloroplast uses this energy to convert the carbon dioxide and water into oxygen and sugar.
		- Energy is transformed from sunlight into sugar in plants
		- Chloroplasts produce the sugar needed by the mitochondria in this process.
	+ As an outcome of photosynthesis, sugar can now be consumed to release usable energy in both plant and animal cells (cellular respiration).
* Processing and transporting Materials
	+ Water, gases and nutrients enter cells through the cell membrane
	+ Materials move through the cytoplasm to the various organelles
	+ Endoplasmic reticulum – Makes proteins from raw materials that come into the cell and passes them to the golgi apparatus.
	+ Golgi apparatus – Processes protein molecules and secretes them outside the cell to be used elsewhere in the organism.
	+ Lysosomes – Breaks down food and digests waste.
	+ Nucleus – Controls all of the cells activity
* Reproducing
	+ Cells have a life span
		- Cells die because they have been damaged, not received enough food or water, or because they have reached the end of their life span.
	+ Given these losses multicellular organisms should be constantly shrinking.
	+ But this is not the case because before the cells die they create a replacement for themselves through cell division.
	+ Cell division for animal cells (p.52, Fig. 2.34) – Cell splits in half to create two smaller cells.
		- The nucleus splits first and then the membrane begins to pinch near the middle to divide the cytoplasm, including its organelles.
		- Then the rest of the cell divides completely.
	+ Cell division for plant cells (p.53, Fig. 2.35) –
		- The nucleus divides
		- Then instead of pinching in half a new cell plate develops across the cell to create a new cell wall between the two nuclei.