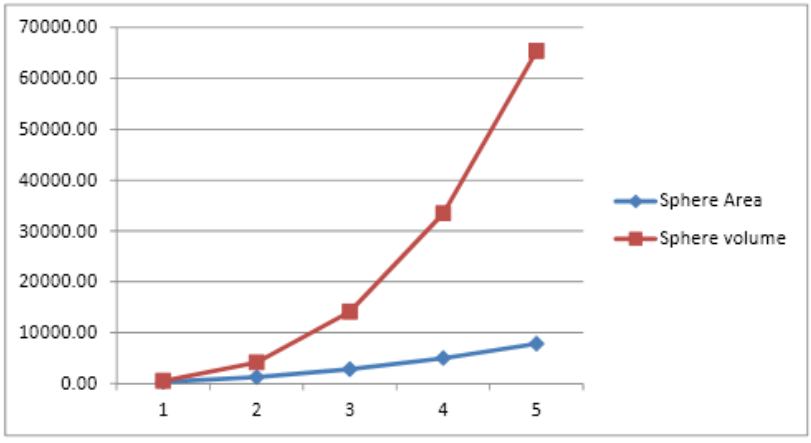
SNC2D0 The Importance of Cell Division

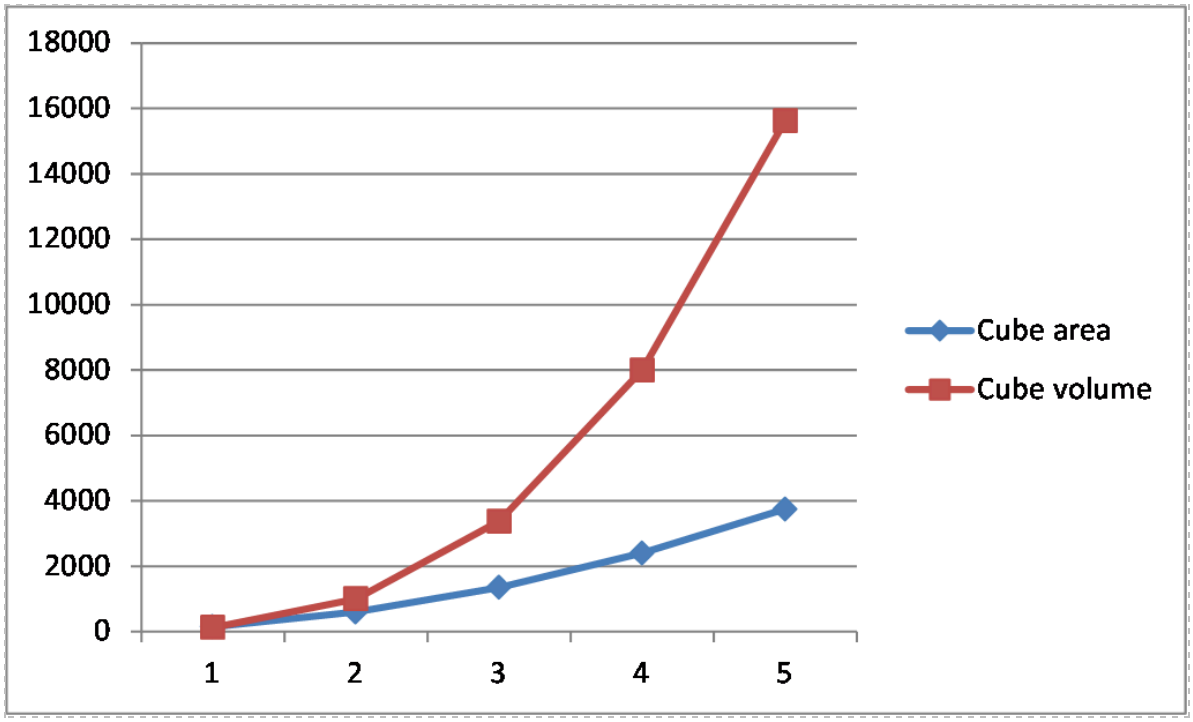
Sphere:

	Radius	Sphere Area	Sphere volume	Sphere volume/area
5	5cm	314.16	523.60	1.67
10	10cm	1256.64	4188.79	3.33
15	15cm	2827.43	14137.17	5.00
20	20cm	5026.55	33510.32	6.67
25	25cm	7853.98	65449.85	8.33

Square:

	Side Length	Cube area	Cube volume	Cube volume/area
5	5cm	150	125	0.833333333
10	10cm	600	1000	1.666666667
15	15cm	1350	3375	2.5
20	20cm	2400	8000	3.333333333
25	25cm	3750	15625	4.166666667





For both the sphere and the cube, as the size increased, what was the trend in the;

a. Surface area?

b. Volume?

c. Ratio of volume/area?

What implications does this have for cells?

How might this geometric fact be connected to reasons for cell division?

How often does your body replace each red blood cell?

Describe the difference between osmosis and diffusion.

If you break a bone in your body, what does your body do, to prevent the bone from breaking again (answer is not in the textbook)?

Cell division is very important for plants and animals, for three reasons;

1. Reproduction
2. Growth
3. Repair

Cell Division: 1 - For Reproduction

Asexual reproduction	**Sexual reproduction**
One parent divides in two	Two parents divide in two … two new cells merge.
Genetic information from **one parent**	Genetic information from **two parents**
Mitosis involved	Meiosis produces gametes (half cells: with half the DNA of a normal cell)

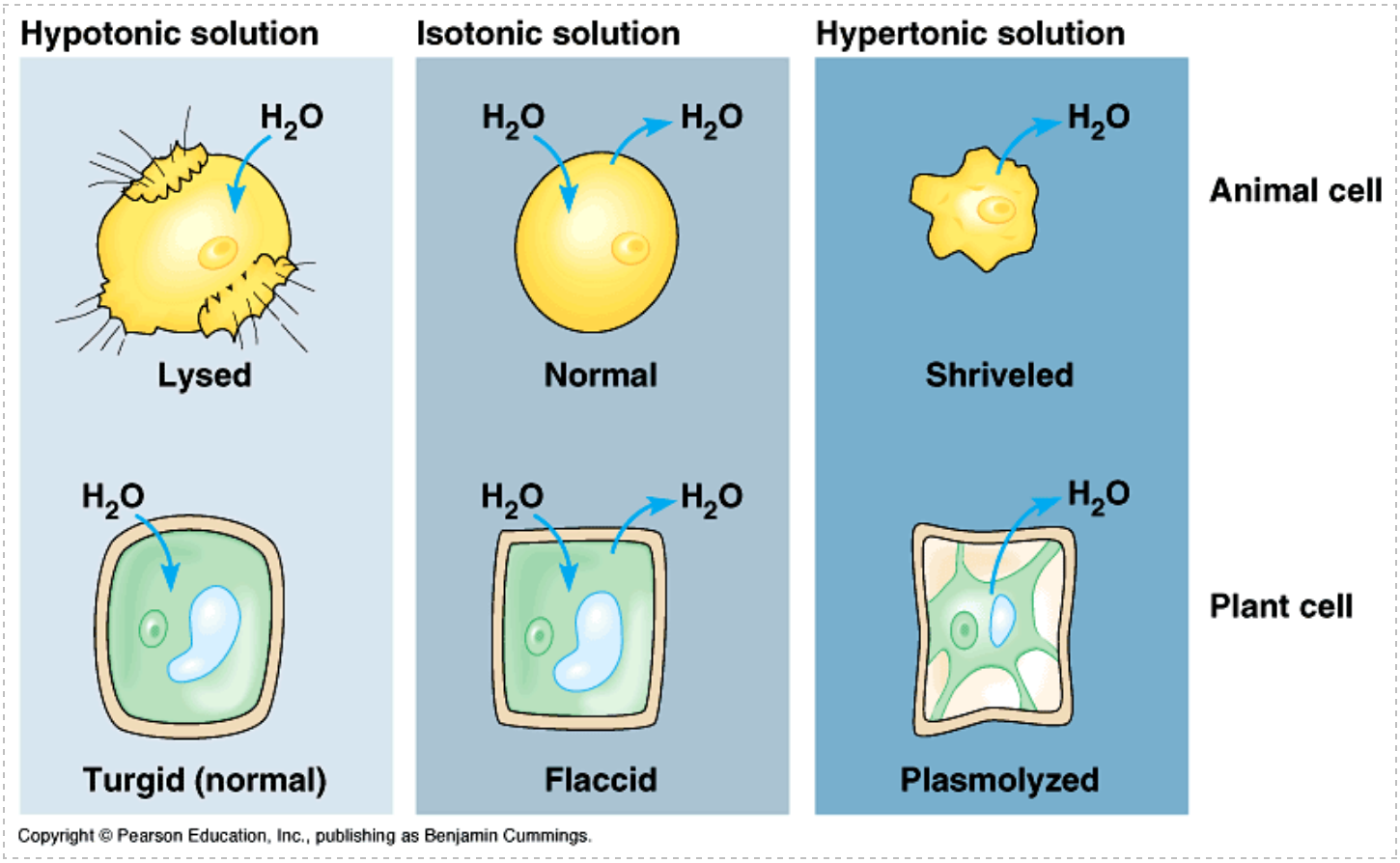
Cell division for growth;

… because it is most efficient for cells to have a large surface area to volume ratio to allow nutrients to pass in and out of the cell easily.

Passive transport

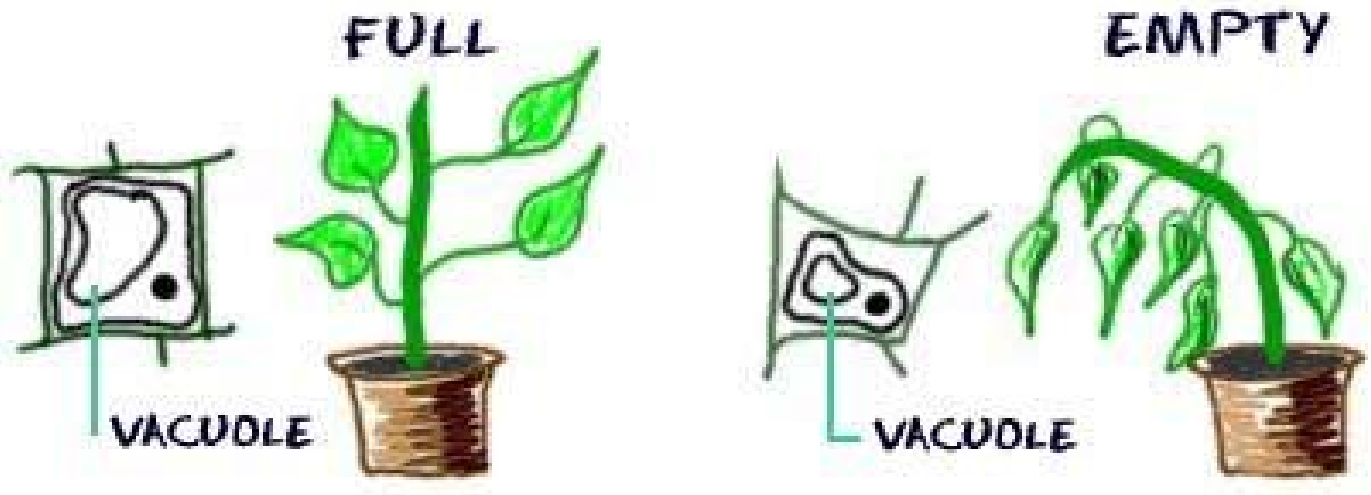
This is movement across the membrane without any energy input. There are 2 main forms that we will discuss:

diffusion, and osmosis



An *isotonic solution* has the same concentration as a cell, so no visible changes occur (this is called dynamic equilibrium)

A *hypotonic solution* is less concentrated than the cell, so in this case the cell swells and bursts (or in the case of a plant cell, the cell walls prevent bursting, so there is an increase in turgor pressure)
A *hypertonic solution* is more concentrated than the cell, so the cells shrivels up (in plants this also happens and the cell membrane pulls away from the cell wall, this is called plasmolysis).
Turgor Pressure:



HW: page 33

1. List three reasons for cell division. K/U
2. What is the role of cell division in helping the body stay healthy? K/U
3. Write a short description of osmosis and diffusion, using your own words. K/U C
4. What is the difference between asexual reproduction and sexual reproduction? K/U