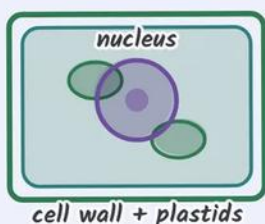


the cell as the unit of life, and the processes every living thing must carry out

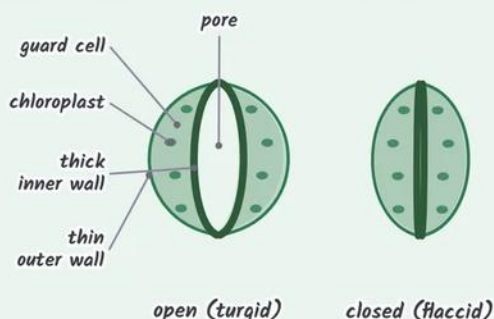
What every living thing must do

- **nutrition** : obtaining food, either by making it or by taking it in
- **respiration** : releasing the energy stored in that food, in every cell, all the time
- **transport** : moving materials to where they are needed and waste away from it
- **excretion** : removing the waste products of the body's own chemistry
- **growth, movement, response to stimuli and reproduction** complete the list
- all of them happen at **cell level**, which is why the cell is called the basic unit of life



a plant cell in section: the wall outside the membrane, chloroplasts where food is made, mitochondria where energy is released, and the nucleus directing all of it. Every life process in the list happens somewhere in a picture like this

Stomata, the leaf's gas pores *



two guard cells with chloroplasts round a pore: open when they are turgid, closed when they are flaccid

Nutrition, and the two ways of getting food

- autotrophs make their own food, using light in photosynthesis. Green plants and algae
- photosynthesis needs carbon dioxide, water, chlorophyll and sunlight, and it produces glucose and oxygen
- it happens in the chloroplasts, and the leaf is arranged to bring the four requirements together
- stomata are the pores that let gases in and out, and they are opened and closed by guard cells
- heterotrophs depend on others: herbivores, carnivores, omnivores, and parasites and saprophytes
- saprophytes feed on dead matter and parasites on a living host, which is the distinction most often asked

The two equations at the centre

photosynthesis, storing energy



aerobic respiration, releasing it



anaerobic respiration in muscle



and in yeast



the first two equations are mirror images of one another, which is the relationship between the two processes: one locks energy into glucose and the other releases it again

