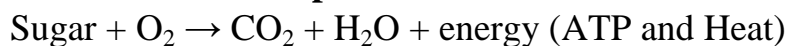Characteristics of Living Cells

What is life?
1 **Ingestion**   to absorb through Cell boundaries or release of chemicals
in the regions

2 **Assimilation**   a series of conversions of ingested food to chemical
substances that are needed. These enter and become
biochemical pathways. Conversion of energy from one
form to another is common, but living systems must
convert released energy to ATP

Ex: aerobic cellular respiration
Sugar + $O_2 \rightarrow CO_2 + H_2O$ + energy (ATP and Heat)

anaerobic cellular respiration
Sugar $\rightarrow$ Organic Molecule + energy

3 **Growth** increase in size as a result of assimilation (repair parts,
store nutrients)

4 **Reproduction** Production of more individuals like self

5 **Elimination**   releasing waste products (unused materials or toxic by-
products) Cells are constantly converting molecules and
thereby loose energy so must restore nutrients through
eating   Ex: yeast eliminate alcohol

6 **Responsiveness**   Respond to the environment which is a range of
reactions
A. immediate (irritability) Ex: an individual response to
a stimulus + or −
B. slow (adaptability) Ex: slower responsive change to
the environment through genetic regulation of the

individual to the group

C. very slow (evolution) Ex: a change to cope with the altered surroundings which could occur through spontaneous mutation and natural selection or differential reproduction

7 Coordination the total of all different complex chemical reactions
Metabolic processes
These must take place in an organized series of events to benefit the cell

A.   Single Series
Ex: Enzyme + Substrate → <u>Enzyme-Substrate Complex</u> → <u>Enzyme</u> + End Product

B.   Several Series
Ex: A (Substrate) + <u>a (Enzyme)</u> → B (Product) then
B (Substrate) + <u>b (enzyme)</u> → C + <u>c (enzyme)</u> →
D + <u>d (enzyme)</u> → E (Product)

8 Regulation   the rates of reactions
This can occur through the use of inhibitors or enhancers as well as genetic feedback mechanisms