GROWTH

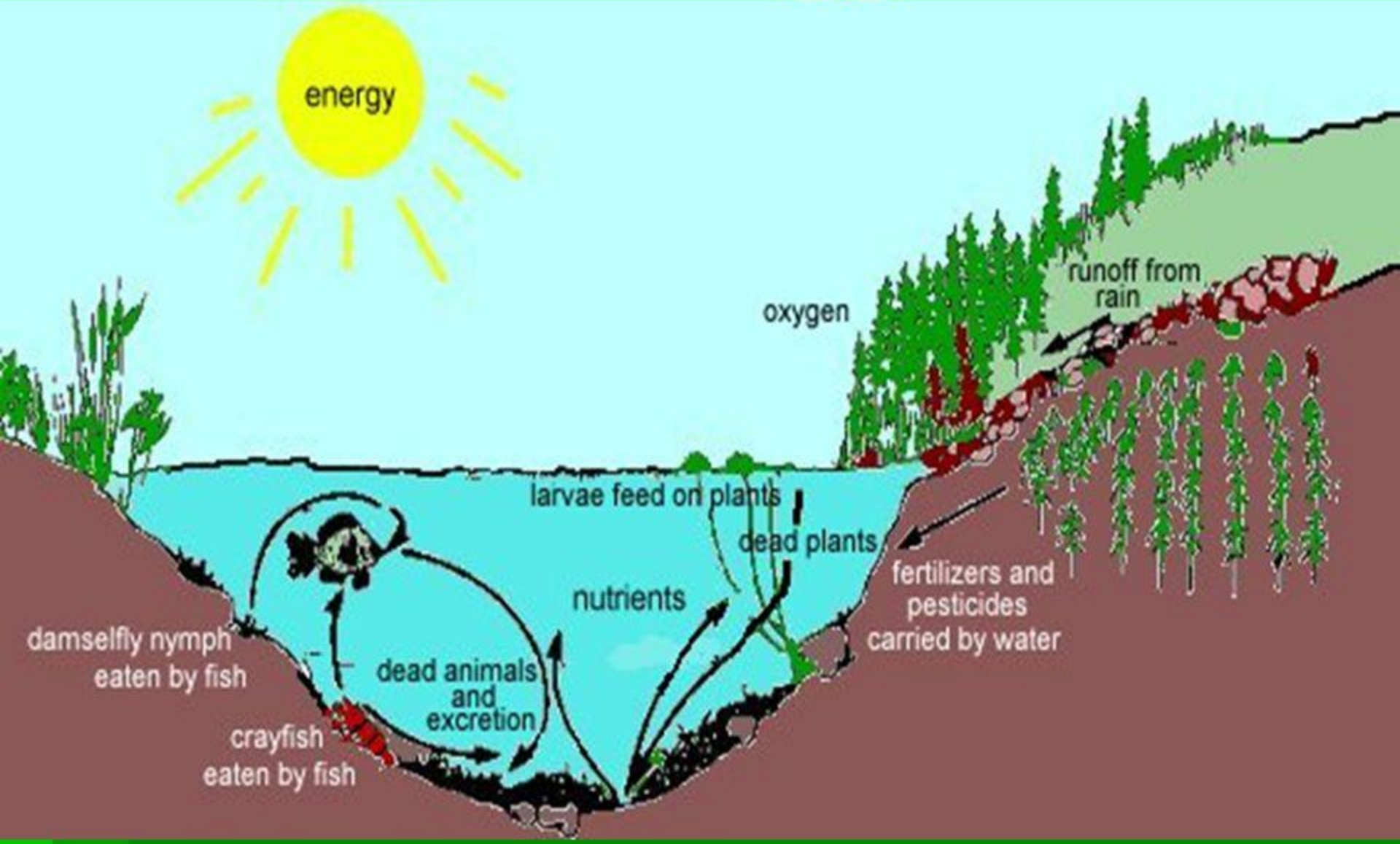
Animal ecology- It has been defined as the branch of biology that deals with the relations of living organisms to their surrounding environment, habits & their way of living. It is related with human society in respect of economy & the particulars production

- Herbivores animals are domesticated for their by-products & aptness to training & management to uplift the agricultural status for their economy & living standards (riding, transport, draught, meat, milk, wool, skin etc.)

Growth- It may be defined as the progressive ↑ in the size or weight of an animal over time. The growth of the animal tissue defined as

a) Nervous tissue
b) bone
c) Muscle
d) fat

Ecology



http://itorganization2017.files.wordpress.com/2008/07/ecosystem.jpg

- Growth is characterized by an ↑ in the size of individual cells & so tissue
- The no. of cells ↑^{es} or added by the process of the cell division or differentiation process
- Differentiation may be involved in the recruitment of adipocytes in later stage of growth like muscle, bone & adipose tissue

Growth curves- It can be produced by plotting weight against age is sigmoid or 'S' shaped

- The general shape of the growth curve is produced by the interaction of two opposing forces
  - growth accelerating force (summation of cell multiplication) &
  - growth retarding force

Measure & measurement of growth- The measure of growth is ↑ in live weight but in addition to height & length it will be more informative of the particular animal growth status

1) growth rate may be expressed as absolute gain in weight per unit time & expressed as

$$w_2\text{-}w_1/t_2\text{-}t_1$$

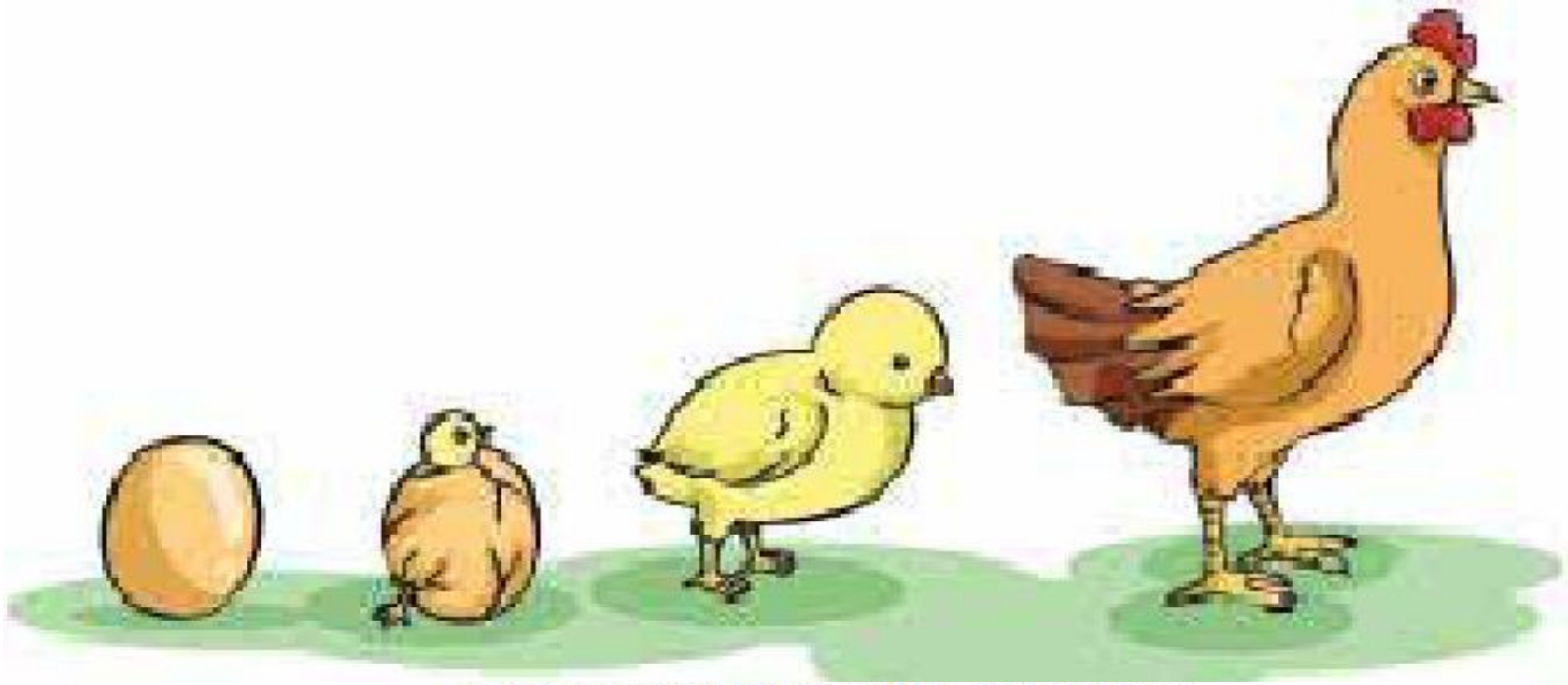
where, w_1 & w_2 are initial & final body wt.

t_1 & t_2 are initial & final body wt.

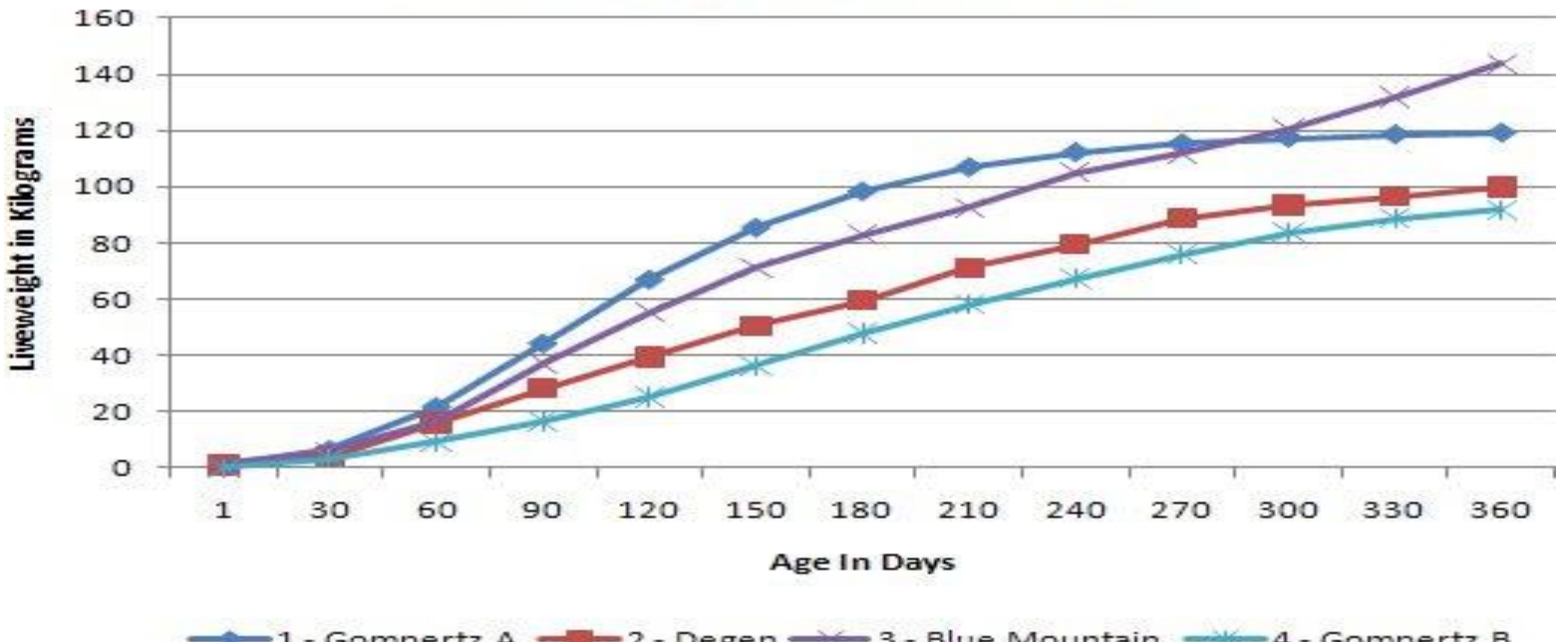
2) An another method to express growth rate is by means of the relative growth rate i.e.

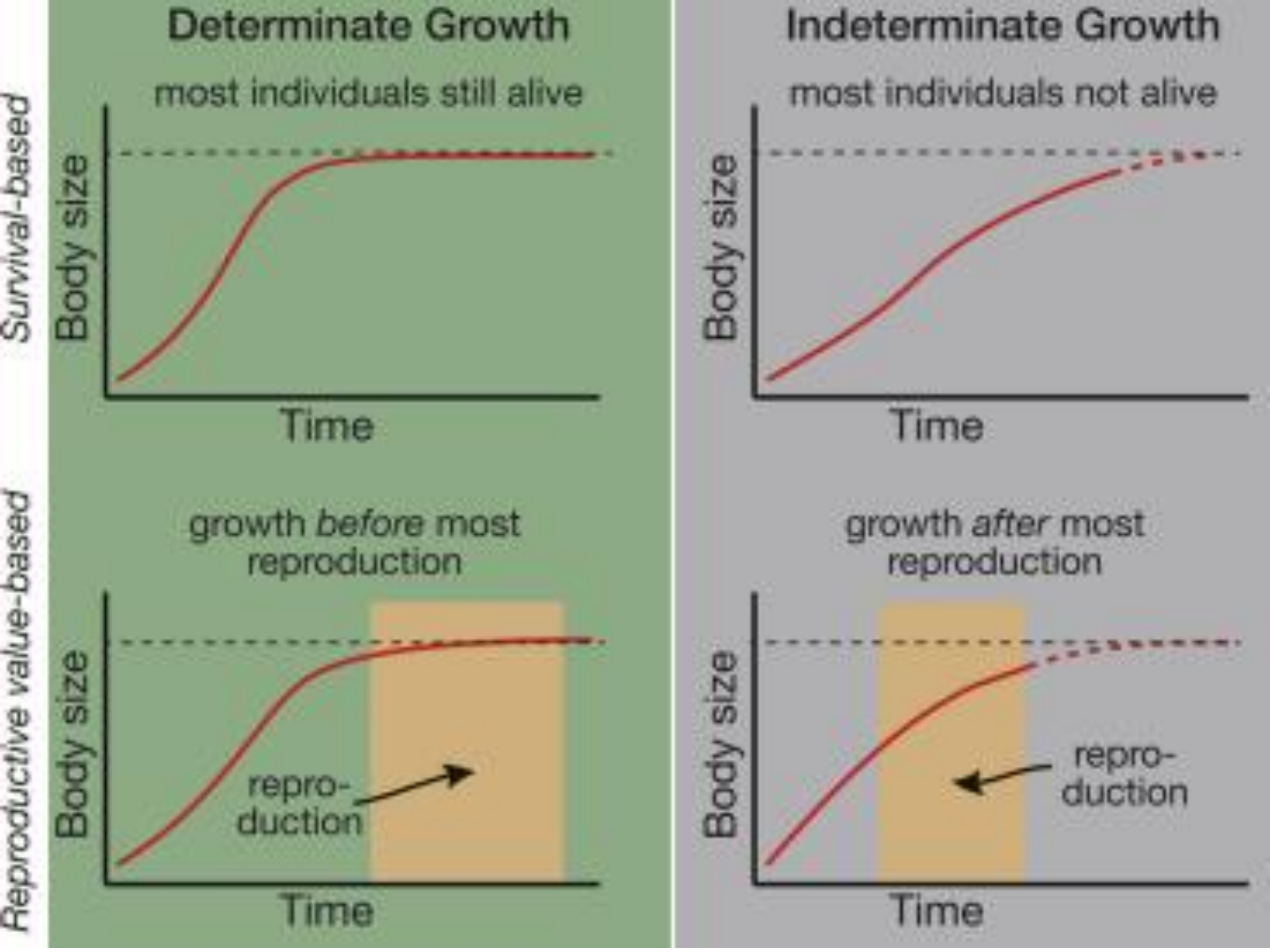
$$w_2\text{-}w_1/w_1$$

Now, the days measurement of body growth in animals are very easy & up to the mark about the features involving growth likewise; MRI (magnetic resonance imaging, urea dilution measurement of body composition, x-ray, computerised tomography (CT) etc.



COMPARATIVE GROWTH CURVES




Survival-based
Reproductive value-based
Determinate Growth
most individuals still alive
Body size
Time
Indeterminate Growth
most individuals not alive
Body size
Time
growth *before* most reproduction
Body size
repro-duction
Time
growth *after* most reproduction
Body size
repro-duction
Time

Growth consists of two stages-

1) **Embryonic stage (pre-natal growth)-** It consists of two stage, which is semi-independent

- **Stage of embryo-** Generally in this stage developing embryo needs the sufficient & suitable space in the uterus & sufficient nutrition for ultimate development to come into fetal stage
- **Stage of fetus-** Fetus get placenta for nourishment. Prior to develop, the liver & circulatory system generates them & also the key organs like brain, limb, bones, digestive tract, lungs & etc.

2) **Adult stage (post-natal growth)-** It consists generally of 4 phases

- **Pre-pubertal phase-** It comprises of pre weaned when a new born is dependent on the dam for nutritional aspect. On going post weaning period the animal collect the nutrition & food material from their environment for growing. Nutritional resources change the animal's growth rate unexceptionally

- **Pubertal phase-** It comprises the dormant gonads to function in full from as it get activate through hypothalamus & pituitary. Animal behavior also takes a great change during this stage or phase
- **Reproductive phase-** Females get repeated reproductive cycle tends to an annual or seasonal rhythm depending upon the species, so as follows after successful mating; pregnancy, gestation, parturition & lactation. These all stages signify the prompt growth & body development & are about to reflection of accelerating force
- **Senescence & Death-** Senescence is a gradual encroachment of retarding force. Any factor which accelerates metabolic rate, ↑^{es} such as muscular work, overfeeding, overactive nervous & endocrine systems and environmental temperature

  Death also may be possible due to a genetically preset program

Factors effecting live weight growth-

- **Nutrition-** The effect of plane of nutrition on live weight growth is important because of its relationship to the economics of meat & milk production. Plane of nutrition directly affect the rate of turnover & the efficiency of conversion of food into meat & milk. The best way to fed the domestic economic animals are high plane during calf-hood followed by moderate plane
- **Sex-** The effect of sex on live weight growth consists of 2 reasons:
  - Direct effect on growth resulting presume from genetic differences between male & female
  - Indirect effect of sex due to the influence of sex hormones
- **Hormones-**
  - Estrogen inhibits growth of the long bones
  - Hypothyroidism associate with low metabolic rate, reduced feed intake, low blood sugar & liver glycogen & low nitrogen retention > Body weight

- Hypo-function of Ant. pituitary results in dwarfism & hyper-function results in gigantism or acromegaly
- **Vitamins-** Vit. B_{12} concern with hemopoisis & also with the metabolism of proteins. Vitamins act as co-enzyme in different enzyme system in the animal body
- **Antibiotics-** It helps in ↑ animal live weight growth rate by oral administration being checked unwanted growth of microflora in GI tract tends to positive growth response eg: Aureomycin, streptomycin, bacitracin
- **Genetic factor-** By selection of genetically crossed superior germ plasm as desirable traits for fast growth rate, food conversion efficiency & desirable carcass quality would be of great economical up-liftment
- **Immunological factor-** IgM, IgG, IgA & IgE are the immunoglobulins which present retardation of growth due to diseases or infections