

## **Notes to Accompany Gallahue Chapters 1 & 2**

Developmental Physical Education - emphasizes the acquisition of movement skills and increased physical competency based on the unique development of the individual

Children in general follow a basic pattern of development. However, each individual will follow his/her own unique pattern of development.

In fact, studies examining the skeletal age\* (reflects level of maturity) of youngsters show that a 5-to-6-year variation in maturity exists in a typical classroom.

For example, a class of third graders who are 8 years old chronologically would range in skeletal age from 5 to 11 years.

Think of the physical abilities of a 5-year old and imagine trying to teach a 5 year old the same skills that you would teach an 11 year-old. This illustrates the need to monitor your PE program and allow students to progress at their own rates. This also points out the folly of requiring all students to do the same amount of exercise.

Therefore, developmental physical education is based on the fundamental proposition that motor development is age-related, but not age-dependent.

Teachers should decide what to teach, when to teach it, and how to teach based primarily on the appropriateness of the activity for the individual and only secondarily on the appropriateness for a certain age group.

\* Note - differences in skeletal age must be determined by X-ray. Size is not a good determinant - In fact, the large or overweight child may be among the last to mature physically.

Motor Development - the progressive change in one's movement behavior brought about by the interaction of (1) the individual with (2) the environment and (3) the task. For example, one's hereditary make up combined with such factors as practice opportunities, encouragement, and instruction, as well as the mechanics of the movement.

Motor Learning - the study of physical skill acquisition and refinement

Cognitive Learning - progressive change in the ability to think, reason, act

Perceptual-Motor Learning - the establishment and refinement of sensitivity to (and sensory involvement) in one's world through movement. Sensory sensitivity involves developing and refining an adequate spatial and temporal world. (Spatial = space and Temporal = time)

Affective Learning - learning that increases the ability of children to act, interact, and react effectively with other people as well as with themselves (values, ethics, appreciations, attitudes)

Psychomotor Learning - progressive changes in the ability to perform physical (motor) skills

Following notes from:

Ellen Kreighbaum and Katharine M. Bartels. (1996). Biomechanics: A Qualitative Approach for Studying Human Movement. (4th ed.). Boston: Allyn and Bacon.

Developmental Biomechanics - the study of the role of forces in changing the composition, size, and structure of bones

Wolfs Law - to some extent the shape of bone determines function and conversely function may alter the shape of bone

For example, in throwing, a child with a long forearm may have a mechanical advantage over a child with a shorter forearm. Over time the child who is a good thrower may receive more practice throwing (ex. Pitcher on little league team) - that additional practice may shape the bones in his arm to such an extent that he gains an even greater mechanical advantage In throwing

Determinants of Bone Structure & Composition

1. Genetics - primary determinant
2. Amount and kind of stresses bone is subjected to
3. Nutritional status of the person - particularly mineral content of bone (related to mineral intake), especially calcium
4. Estrogen levels - particularly important in females: (also related to body fat percentage - too low a percentage of body fat, body low on estrogen, result can amenarcho and osteoporosis)
5. Age - bones change all through life, during infancy, childhood, adulthood and on into senior years

Examples of how bones are affected by the stresses placed upon them.

Traumatic Acute Injuries - fractures of weak areas, people prone to fractures due to genetics (brittle bone disease)

Repetitive Overuse Injuries - stress fractures, Osgood-Schlatters Condition/Disease, overthrowing by young pitchers

Mechanically Advantageous Adaptations - young baseball pitchers, young gymnasts

Bone Density Degeneration (Osteoporosis) - generally bone strength and density decreases with age

To maximize bone density/mineral content

- 1) Maintain normal estrogen levels (females!)
- 2) Intake adequate amounts of calcium
- 3) Maintain adequate level of physical activity

Absence of any 1 of these leads to bone loss that cannot be made up by the other 2 - but estrogen level is the most important of the 3

Increased risk of osteoporosis for post-menopausal women not taking estrogen replacement therapy

Amenorrhea and irregular menstrual cycles are linked to osteoporosis

- Menstrual irregularity/irregularity may be the best predictor of bone deterioration / decrease in bone density/ loss of bone mineral content
- Amenorrheic athletes have lower bone density and higher rates of osteoporosis than sedentary women with normal estrogen levels
  - Linked to low body fat interrupting menstrual cycle and hormone levels
  - Study showed 25 year-old amenorrheic athletes have the bone density of 52 year-old sedentary women
  - Another study revealed 4 amenorrheic athletes had bone density of 70 to 80 year-old sedentary women

Hip fractures in the elderly, especially elderly women:

- In actuality the hip fracture precedes the fall - the hip breaks then the person falls.
- 70% or more die within 1 year of the hip fracture