B. A program in Physical Education (Semester 2)
College: Raniganj Girls College (K.N.U)
Department: Physical Education

UNIT-I

THE SKELETAL SYSTEM & JOINT

The skeletal system is composed of bone and cartilage and has many functions. The framework of the human body is made up of just over 206 bones, which vary considerably in size and shape. Bones are often thought of as dry, inert structures, similar to a bone which has been dug up in the garden by the neighbour's dog! However, bone is not a dead structure. It is made up of living bone tissue, which is a type of connective tissue, the hardest of all connective tissues found in the body.

FUNCTIONS OF THE SKELETON

The skeleton has five important functions in the body:

1. Protection: The bones protect internal organs by forming strong protective enclosures, e.g. skull, ribs, spine.

2. Support: The skeleton gives rigidity to the body. Without the support of the skeleton, we would be shapeless lumps.

3. Movement: The skeleton provides attachment for muscles. The bones serve as levers in pulley systems whereby movements can be produced by muscles at the moveable joints in the body.

4. Blood cell production: Blood cells are manufactured in the red marrow within bones. Red blood cells transport oxygen around the body and white blood cells are responsible for the body's defence system to fight infection.

5. Calcium storage: Bones are the storehouse for minerals, in particular calcium. This is important for strength of bones, for if these minerals are depleted, it may lead to stress fractures and osteoporosis (brittle bones).

CLASSIFICATION OF BONES

Bones are normally classified according to their shape, which is related to their function.

Long bones: Provide effective levers to facilitate movement, e.g. femur, Humerus.

Short bones: Provide strength to resist compression, e.g. bones of the foot (tarsals) and wrist (carpals).

Flat bones: Provide protection to internal organs, e.g. ribs, cranium, pelvic girdle; and for attachment of large muscles, e.g. scapula.

Irregular bones: Usually have mixed functions, e.g. patella provides protection to the knee joint; collectively, the vertebrae provide support to the body and protect the spinal cord.

Sesamoid bones: Present in certain tendons to improve leverage by preventing friction, and by altering the angle of pull of the muscle, e.g. patella.

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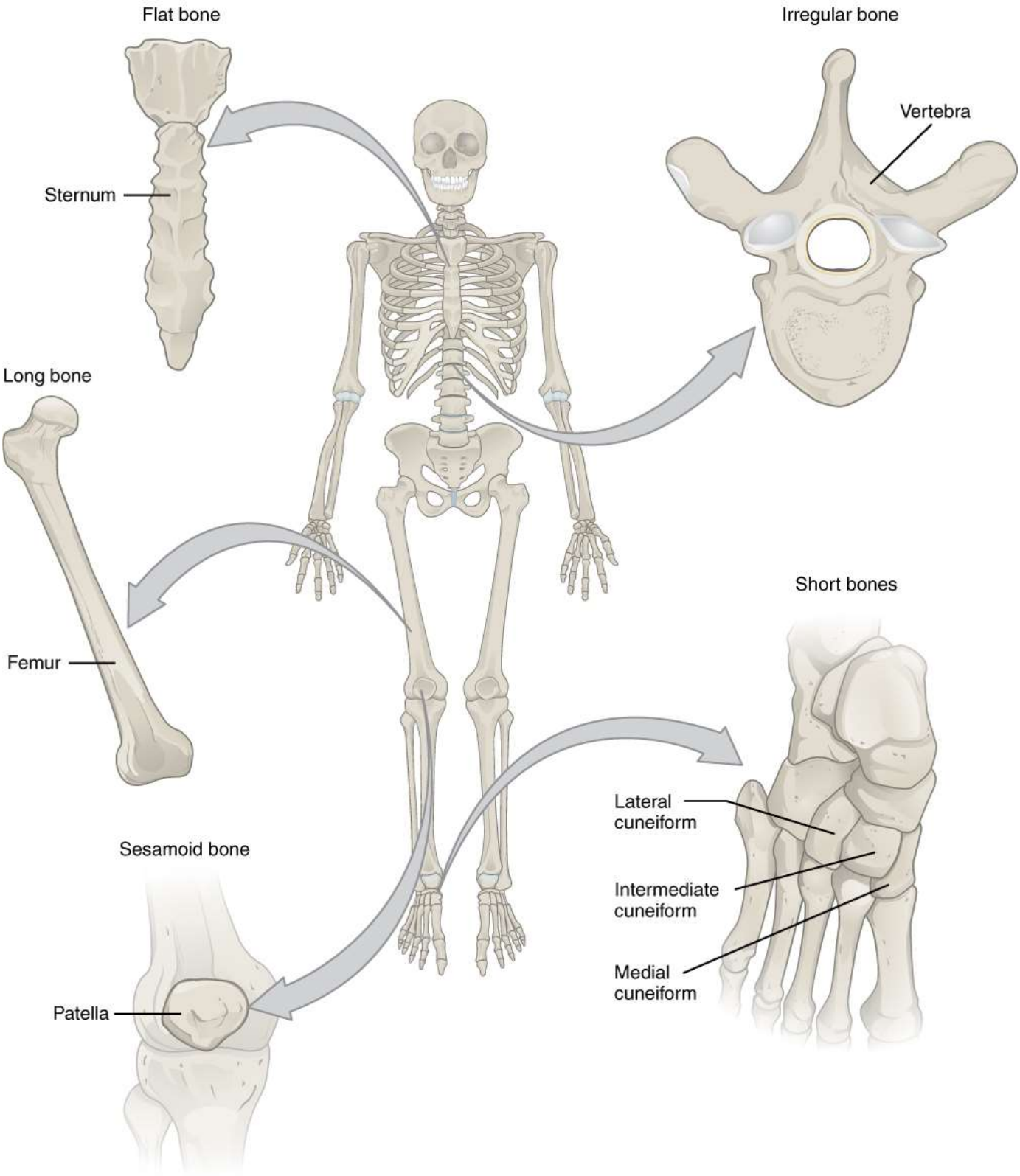

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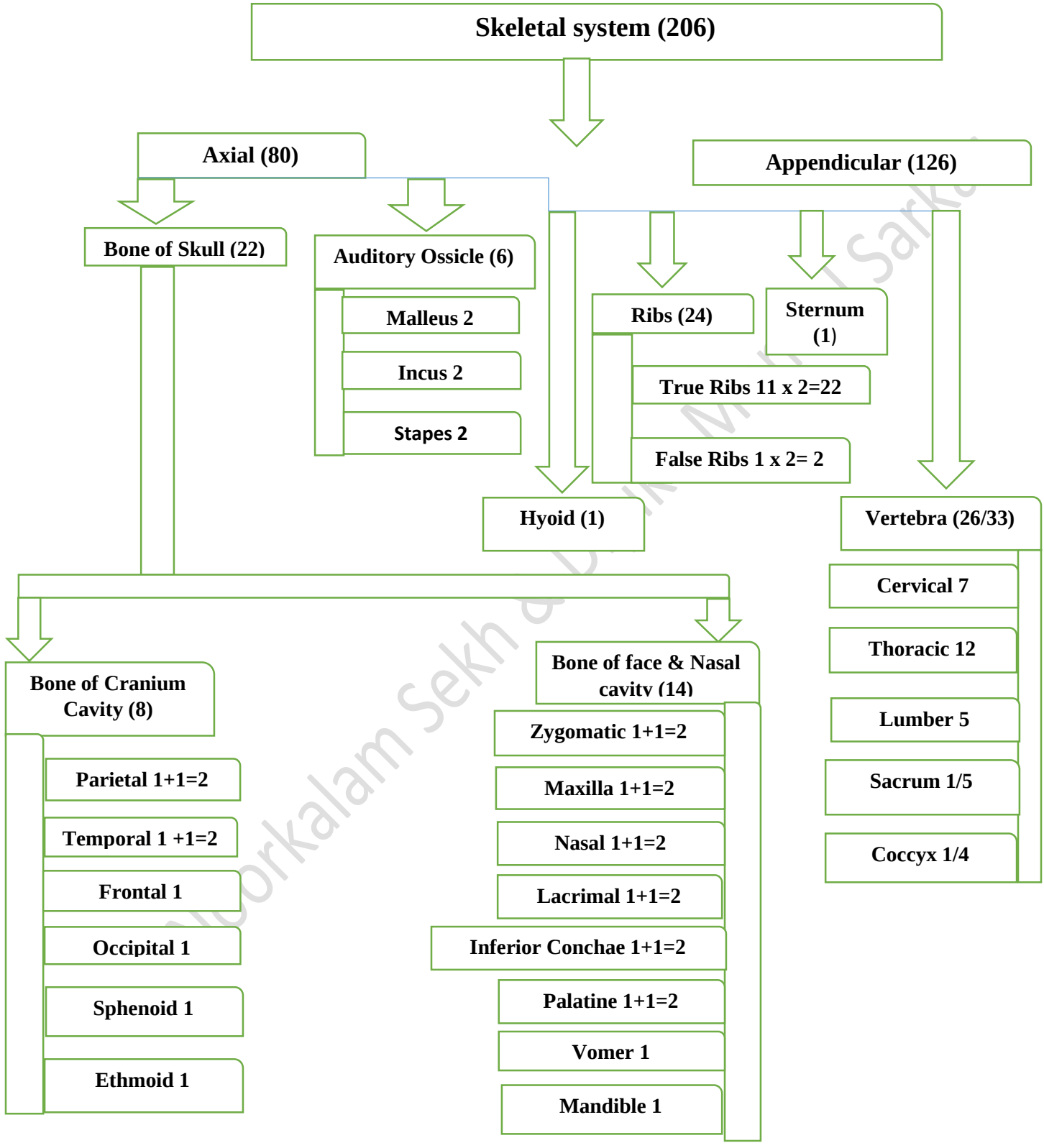
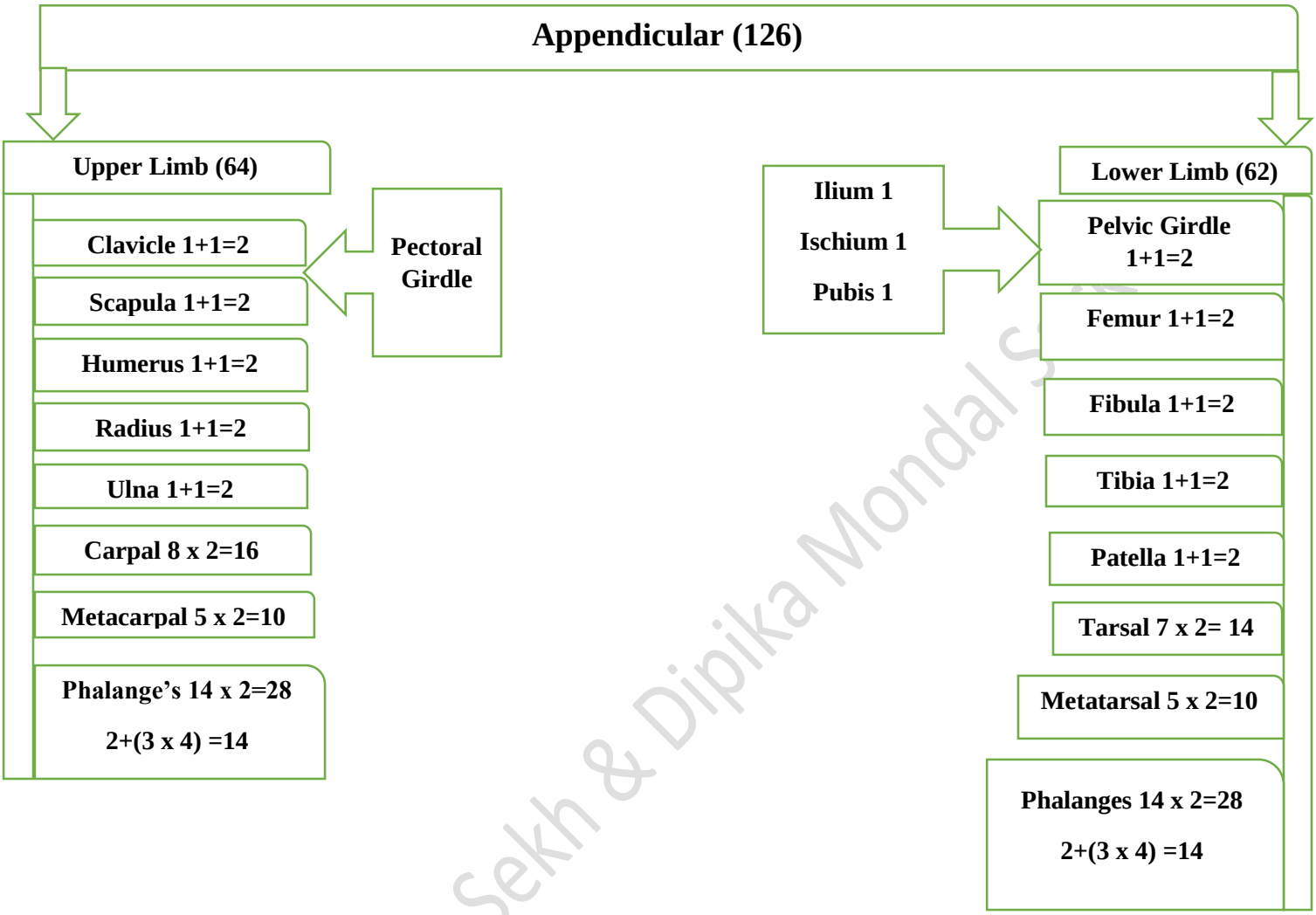
NAME OF THE VARIOUS BONE IN OUR BODY





Joint

A joint, or articulation, is the interface (coming together) of two bones. Usually the purpose of the joint is to allow some movement, but the bones of the skull, for example, are joined so tightly that there is no movement. The structure and type of joint will depend on its specific function.

Fibrous joints

Where fibrous tissue unites the bones, e.g. between the radius and ulna above the wrist, and the tibia and fibula above the ankle. A joint such as this seems to occur where movement is undesirable but a little 'give' is necessary.

Cartilaginous joints

There are two types of cartilaginous joints: (a) hyaline cartilage, which is rigid and forms a bar uniting the first rib to the sternum (breastbone), and (b) fibro-cartilage which is less rigid, allowing freer movement, e.g. an intervertebral disc.

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Synovial joints

The freely moving synovial joints are more specialized joints and functionally are the most important for you, as a coach, to know about and understand.

CLASSIFICATION OF JOINTS

Immovable/ Synathardial or Fibrous joint

- **Sutures: -** Non-moveable joints binding the bones of the cranium
- **Syndesmosis: -** i.e. distal tibio-fibular joint and the interosseous joints between the radius/ulna & tibia/fibula.
- **Gomphoses: -** the fibrous joint that holds teeth to the alveolar processes of the mandible and maxilla.

Slightly Movable/ Ampithardial or Fibro-Cartilaginous joint

- **Synchondrosis:** i.e. the junction between the metaphysis and epiphysis of growing bone.
- **Symphysis:** I.e. Intervertebral disc, & pubic symphysis.

Freely Movable/ Dyathardial or Synovial joints

- **Gliding (plane) Joints:** i.e. intercarpals and intertarsals
- **Hinge Joints:** i.e. elbow, knee, ankle
- **Pivot Joints:** i.e. atlanto-axial joint proximal radioulnar joint
- **Condyloid Joints:** i.e. metacarpophalangeal joints and wrist.
- **Saddle Joints: i.e.** 1st carpo-metacarpal joint **(thumb)**, Sternoclavicular
- **Ball & Socket Joint:** i.e. Shoulder and hip