Unit 1:

Bones and joints of axial skeleton

GENERAL OBJECTIVES:

- recognize, name and correctly position vertebral bony elements
- explain how the structure of vertebral column serves its function
- understand vertebral movements
- name and describe all vertebral joints
- name and describe elements of the thoracic cage

SPECIFIC OBJECTIVES:

Identify major bony features of a typical CERVICAL, THORACIC & LUMBAR vertebrae

BODY
VERTEBRAL ARCH (pedicles, laminae)
PROCESSES (transverse, spinous, articular)
JOINT SURFACES - intervertebral disc
- for (zyg)apophyseal or "facet" joints
- for ribs (thoracic vertebra)

Cervical vertebrae

Identify the bony features on:
typical cervical vertebrae (C3 - C6), vertebrae prominens (C7), atlas (Cl) & axis (C2)
Deduce (from the articular facets) the movements of the:

(i) cervical spine (ii) atlanto-axial joint and (iii) atlanto-occipital joint

Indicate the bony attachments of major ligaments maintaining joint stability (while allowing movements).
Identify the boundaries of the intervertebral foraminae.
Indicate (i) the particular spinal nerve which emerges from each intervertebral foramen

(noting that there are 8 cervical spinal nerves yet only 7 cervical vertebrae)
(ii) where the vertebral vessels travel (including the relationship to the atlas).

Typical Cervical Joints
<u>of Bodies:</u>

Intervertebral Discs
Uncovertebral Joints

<u>of Vertebral Arches:</u>

Zygaphophyseal Joints

Ligaments of Cervical Joints
Movements of the Cervical Spine (Neck):

Flexion/Extension
Lateral Flexion

Atlanto-Occipital & Atlanto-Axial Joints
Ligaments of Joints of Atlas
Movements at the Joints of the Atlas (i.e. below & above)

Rotation (at Atlanto-Axial) of the Neck
Flexion/Extension (at Atlanto-Occipital) of the Head

Thoracic and lumbar vertebrae

Compare and contrast the following groups of thoracic and lumbar vertebrae:

Upper Thoracic, Middle Thoracic, Lower Thoracic, Upper Lumbar & Lower Lumbar
Define the boundaries of an intervertebral foramen (noting the intervertebral disc anteriorly and the zygapophyseal joints posteriorly).
Indicate where each spinal nerve emerges from an intervertebral foramen.
Deduce the movements of (i) the thoracic spine & (ii) the lumbar spine (from direction of articular facets).
Indicate the bony attachments of major ligaments maintaining joint stability (while allowing movements).

Joints of Thoracic & Lumbar Spine
Joints of Vertebral Bodies
Intervertebral Discs
Anterior and Posterior Longitudinal Ligaments
Joints of Vertebral Arches
Zygapophyseal (Facet) Joints
Ligamenta Flava
Interspinous & Supraspinous Ligaments
Movements
Flexion/Extension
Lateral Flexion
Rotation (at thoracic joints only)

Sacrum and coccyx
Describe the shape and position of sacrum and coccyx (surfaces, base, apex)
Describe features of dorsal surface of the sacrum, sacral hiatus and cornua
Describe main features on the lateral sacral surface

Thoracic Vertebrae, Ribs (& Costal Cartilages), Sternum
Arrangement of Thoracic Cage; *Superior & Inferior Apertures*
Parts, Bony Features & Articular Surfaces
Describe features on true, false and floating ribs (head, neck, tubercle, body)
What are atypical ribs?
How are ribs curved and why?
Where are weak regions on ribs?
What do costal cartilages connect and how?
Describe main features of the sternum

Joints
Costovertebral (Joints of Heads of Ribs, Costotransverse Joints)
Sternocostal, Interchondral, Costochondral
Sternal (Manubriosternal, Xiphisternal)
Describe biomechanical properties (movements) of thoracic cage in relation to respiration.
What are ‘bucket’ and ‘pump’ handle movements of ribs?