

Table of Contents

Dedications	xi
About the Authors	xiii
Introduction	xv
How to Use This Book	xv
Chapter 1: Introduction	1
Anatomical Position and Terms of Direction	1
Anatomical Planes of the Body	3
Hierarchy of the Body	5
Regions of the Abdomen	7
Organ Systems	9
Body Regions (Anterior)	15
Body Regions (Posterior)	17
Body Cavities	19
Chapter 2: Cells, Tissues, and Integument	21
Overview of Cell and Cell Membrane	21
Simple Epithelia	23
Stratified Epithelia	25
Glands	27
Connective Tissue	29
Cartilage	33
Bone and Blood	35
Muscle and Nervous Tissue	37
Integumentary System	39
Hair and Nails	41
Chapter 3: Skeletal System	43
Frontal Aspect of the Skull	43
Lateral View of the Skull	45
Skull—Top and Bottom Views	47
Midsagittal Section of the Skull	49
Sphenoid, Temporal, and Ethmoid Bones	51
Vertebral Column	53
Atlas	55
Axis	55
Atlas and Axis	55

Hyoid	55
Cervical, Thoracic, and Lumbar Vertebrae	57
Sacrum and Coccyx	59
Sternum/Ribs/Hyoid	61
Appendicular Skeleton—Pectoral Girdle and Upper Extremity	63
Scapula	65
Clavicle	67
Humerus	69
Forearm Bones	71
Hand Bones	73
Hip	75
Male and Female Pelvis	77
Lower Extremity—Femur/Patella	79
Tibia/Fibula	81
Left Foot	83
Chapter 4: Articulations	85
Classifications of Articulations	85
Fibrous Joints	85
Cartilaginous Joints	87
Synovial Joints, Bursa, and Tendon Sheath	89
Modified Synovial Structures—Bursae and Tendon Sheaths	89
Specific Synovial Joints	91
Specific Joints	95
Temporomandibular Joint	95
Humeroacromioclavicular and Acetabulofemoral Joints	97
Tibiofemoral Joint	99
Movement at Joints	101
Chapter 5: Nervous System	103
Overview of the Nervous System	103
Neuron	105
Neuroglia	107
Neuron Shapes/Synapse	109
Neural Development	111
Lateral Aspect of the Brain	113
Superior Aspect of the Brain	115
Inferior Aspect of the Brain	117
Midsagittal Section of the Brain	119
Coronal Section of the Brain	121
Limbic System	123
Functional Areas of the Cerebrum	125
Ventricles	127
Cerebrospinal Fluid Pathway	129
Spinal Cord	131
Cranial Nerves	133

Spinal Cord and Spinal Nerves	135
Plexuses and Thoracic Nerves	137
Nerves of Cervical Plexus	139
Nerves of Brachial Plexus	141
Nerves of Lumbar Plexus	143
Nerves of Sacral Plexus	145
Dermatomes	147
Autonomic Nervous System—Sympathetic Division	149
Autonomic Nervous System—Parasympathetic Division	151
Chapter 6: Sense Organs	153
Skin Receptors	153
Tongue	155
Nose	157
Anterior Surface of the Eye and Lacrimal Apparatus	159
Muscles of the Eye	161
Median Section of the Eye	163
Posterior View of the Eye	165
Overview of the Ear	167
Middle Ear	169
Inner Ear	169
Labyrinths of the Inner Ear	171
Cross Section of Cochlea	173
Chapter 7: Endocrine System	175
Overview of the Endocrine System	175
Organs of the Head	177
Hormones Secreted by the Pituitary and Their Target Organs	179
Thyroid Gland	181
Parathyroid Glands	183
Pancreas	185
Adrenal Glands	187
Gonads	189
Chapter 8: Cardiovascular System	191
Overview of the Cardiovascular System	191
Circulation	193
Blood	195
Anterior Surface View of the Heart	197
Posterior Surface of the Heart	199
Coronal Section of the Heart	201
Superior Aspect of the Heart	203
ECG—Conduction Pathway	203
Vessels Overview	205
Artery Overview	207
Head and Aortic Arteries	209

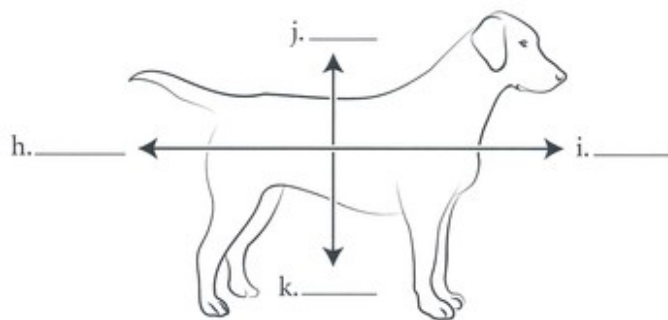
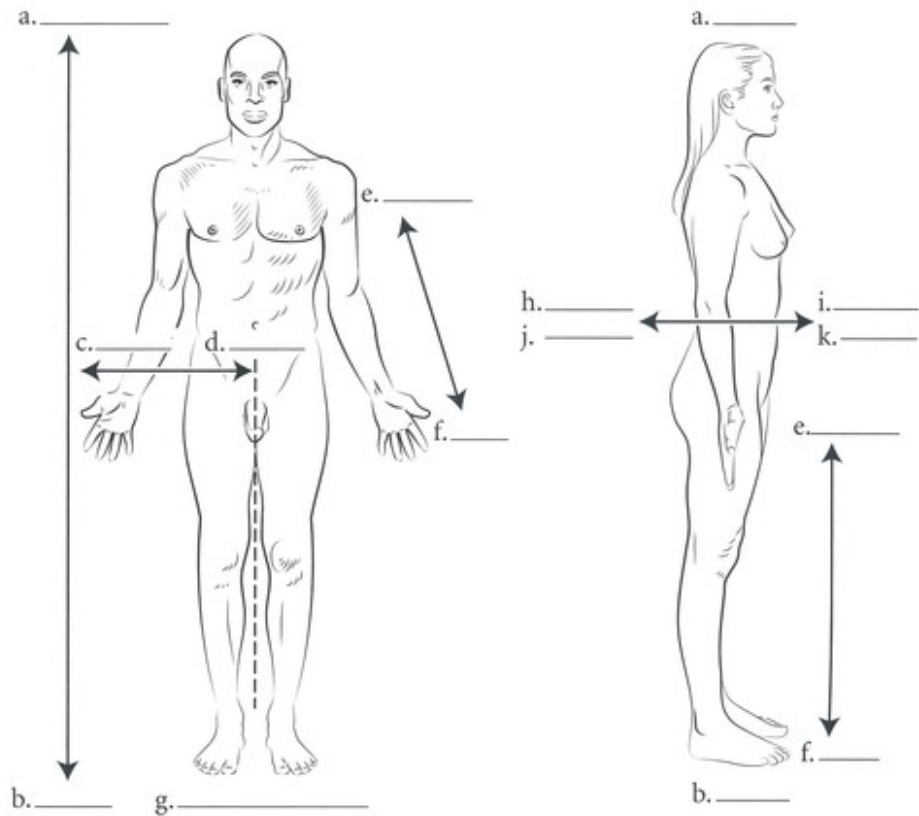
Brain Arteries	211
Upper Limb Arteries	213
Lower Limb Arteries	215
Abdominal/Thoracic Arteries	217
Arteries of the Digestive System	219
Male and Female Pelvic Arteries	221
Veins	223
Head/Neck Veins	225
Upper Limb Veins	227
Lower Limb Veins	229
Hepatic Portal Veins and Trunk Veins	231
Fetal Circulation	233
Chapter 9: The Lymph System	235
Overview of the Lymph System	235
Return Drainage	237
Tonsils	239
Spleen	241
Lymph Nodes	243
Lacteals	245
Two Types of Immunity	247
Chapter 10: Respiratory System	249
Overview of the Respiratory System	249
Larynx, Trachea, and Lungs Overview	251
Nose and Nasal Septum	253
Lateral Wall of Nasal Cavity and Respiratory Epithelium	255
Coronal View of the Nasal Conchae and Larynx	257
Larynx and Trachea	259
The Trachea and Bronchial Tree	261
Lungs and Membranes	263
The Pathway of Air	265
Chapter 11: Digestive System	267
Overview of the Digestive System	267
Mouth and Oral Cavity	269
Salivary Glands	271
Teeth	273
Esophagus	275
Stomach	277
Small Intestine and Associated Organs	279
Large Intestine	281
Liver	283
Pancreas/Gallbladder	285

Chapter 12: Urinary System	287
Overview of the Urinary System	287
Kidney	289
Urinary Bladder.....	291
The Nephron	293
Chapter 13: Male Reproductive System	295
Overview of the Male Reproductive System	295
Organs of the Male Reproductive System	297
Midsagittal Section of Pelvis/Cross Section of Penis and Seminiferous Tubules.....	299
Chapter 14: Female Reproductive System	301
Overview of the Female Reproductive System	301
Midsagittal Section of Female Pelvis	303
Ovary	305
Section of Uterus and Vagina.....	307
Female Breast and External Genitalia	309
Chapter 15: Development	311
Pre-embryonic Stage.....	311
Embryonic Stage	313
Fetal Stage	315
Index	317
Special Flashcard Section: Muscles of the Human Body	331

ANATOMICAL POSITION AND TERMS OF DIRECTION

When studying the human body, it is important to place the body in anatomical position. **Anatomical position** is described as the body facing you, feet placed together and flat on the floor. The head is held erect, arms straight by the side with palms facing forward. All references to the body are made as if the body is in this position, so when you describe something as being above something else, it is always with respect to the body being in anatomical position.

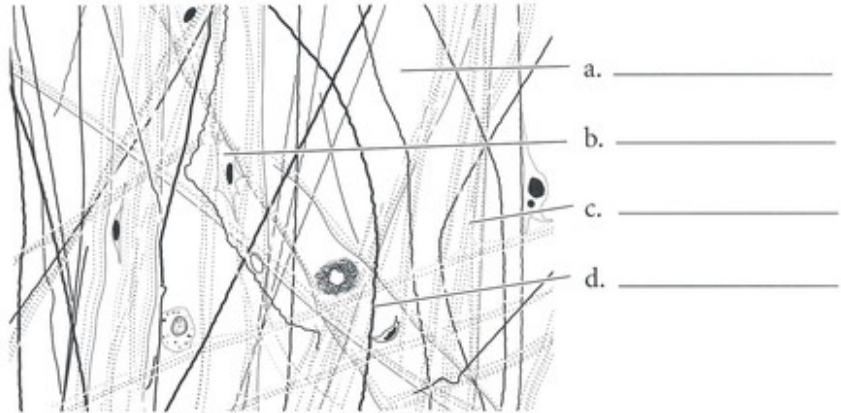
The relative positions of the parts of the human body have specific terms. **Superior** means above while **inferior** means below. **Medial** refers to being close to the midline while **lateral** means to the side. **Anterior** or **ventral** is to the front while **posterior** or **dorsal** is to the back. **Superficial** is near the surface while **deep** means to the core of the body. When working with the limbs, **proximal** means closer to the trunk while **distal** is toward the ends of the extremities. Write the directional terms in the spaces provided and color in the arrows in reference to these terms. Note that these terms are somewhat different for four-legged animals.



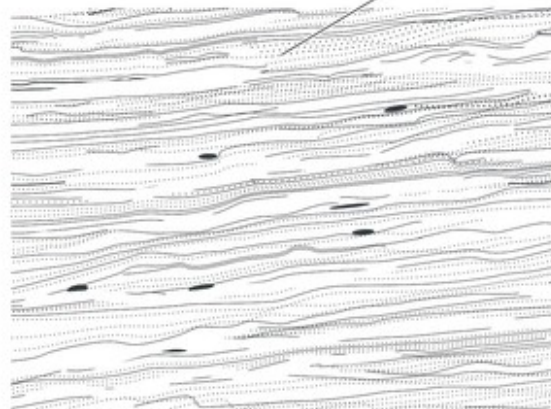
Answer Key: a. Superior, b. Inferior, c. Lateral, d. Medial, e. Proximal, f. Distal, g. Anatomical position, h. Posterior, i. Anterior, j. Dorsal, k. Ventral

CONNECTIVE TISSUE

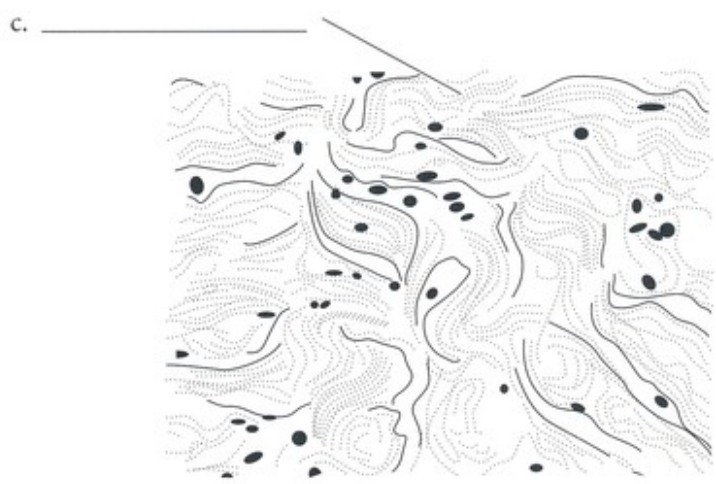
Connective tissue is a varied group of associated tissues, all of which are derived from an embryonic tissue known as **mesenchyme**. Connective tissue not only has cells, as do all of the other tissues, but it also has **fibers** and a large amount of background substance called **matrix**. There are many specific tissues that belong to connective tissue. **Loose connective tissue** is found wrapping around organs or under the epidermis and is composed of **collagenous fibers**, **elastic fibers**, and **reticular fibers**; a liquid matrix; and numerous cells, many of which have an immune function. **Dense regular connective tissue** has a few cells called **fibrocytes** and a small amount of matrix with most of the tissue composed of a regular arrangement of **collagenous fibers**. This specific tissue makes up tendons and ligaments. If the fibers are not in an orderly arrangement, then the tissue is called **dense irregular connective tissue**. This tissue is found in places like the white of the eye.



e. _____
c. _____



f. _____



g. _____

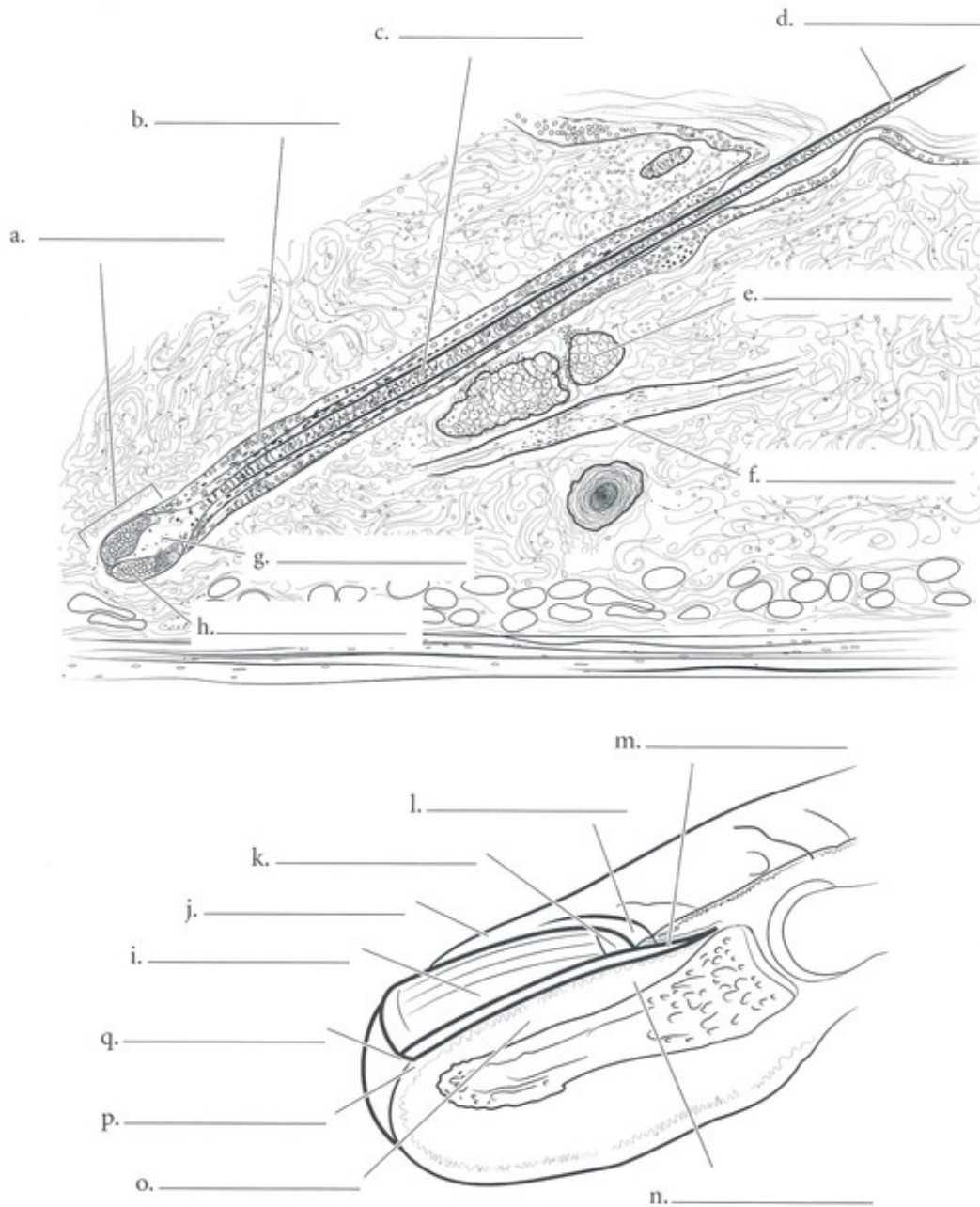
Answer Key: a. Matrix, b. Fibrocyte, c. Collagenous fiber, d. Elastic fiber, e. Loose connective tissue, f. Dense regular connective tissue, g. Dense irregular connective tissue

HAIR AND NAILS

Hair originates from the **dermal papilla**, which contains capillaries and nerves and is part of the **hair bulb**. Superficial to the hair bulb is the **hair root**, which is the part of the hair that is in the skin. The hair is enclosed by the **hair follicle**. Associated with the hair is the **arrector pili**, a bundle of smooth muscle that causes the hair to “stand on end” and also causes secretion of the **sebaceous glands** in an association known as the pilosebaceous unit. Once the hair erupts from the skin

it is known as the **hair shaft**, which consists of layers of dead, keratinized cells.

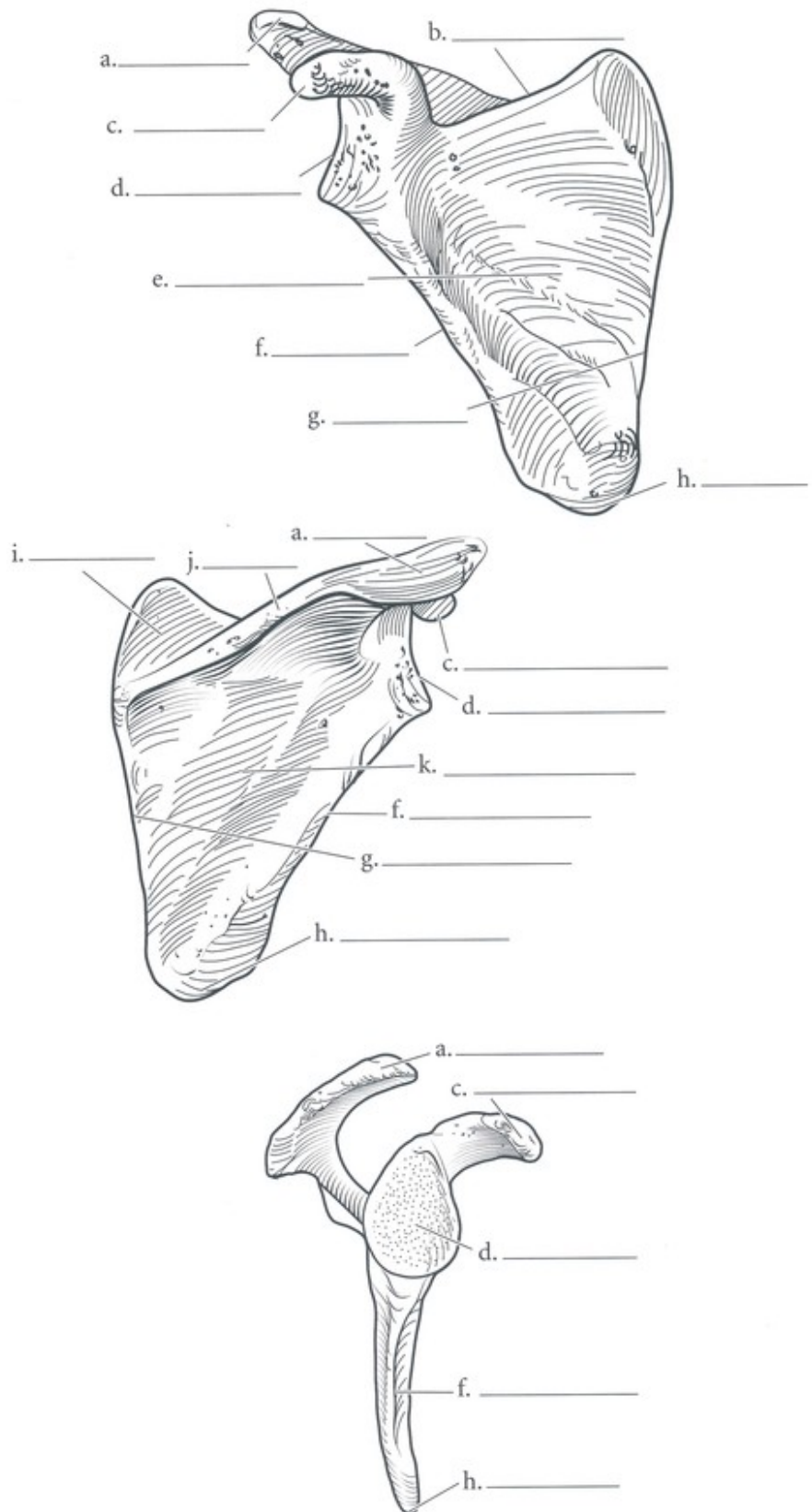
Fingernails and toenails are considered accessory structures of the integument. Color the diagram noting the **nail proper**, the **free edge** (the part that you cut with clippers), the **nail fold** (paronychia), and the **nail groove**. At the base of the nail is the **lunule**, the **eponychium** (cuticle), and the **nail root**. Note also the **hyponychium**, the **germinal matrix**, and the **nail bed**, which contributes cells that make up the nail proper.



Answer Key: a. Bulb, b. Hair follicle, c. Hair root, d. Hair shaft, e. Sebaceous gland, f. Arrector pili muscle, g. Papilla, h. Matrix, i. Nail plate, j. Nail fold (paronychia), k. Lunule, l. Eponychium, m. Nail root, n. Germinal matrix, o. Nail bed, p. Hyponychium, q. Free edge

SCAPULA

The pectoral girdle consists of the scapulae and the clavicles. Each scapula is a triangular bone, and the three edges are known as the **superior border**, the **lateral border**, and the **medial border**. The **scapular spine** is on the posterior surface, and it expands into a terminal process known as the **acromion**. Above the spine is the **supraspinous fossa**. Below the spine is the **infraspinous fossa**, and on the anterior side of the scapula are the **subscapular fossa** and the **coracoid process**. The **inferior angle** of the scapula is at the junction of the medial and lateral borders. Inferior to the acromion is the **glenoid cavity (fossa)**. This is a depression where the head of the humerus articulates with the scapula. Label the various features of the scapula and color in the regions of the bone with different colors. Locate as many of the features possible from the various angles presented.



Answer Key: a. Acromion, superior border, c. Coracoid process, d. Glenoid cavity, e. Subscapular fossa, f. Lateral border, g. Medial border, h. Inferior angle, i. Supraspinous fossa, j. Scapular spine, k. Infraspinous fossa