

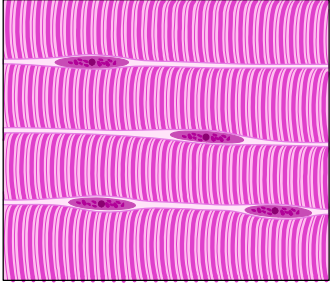
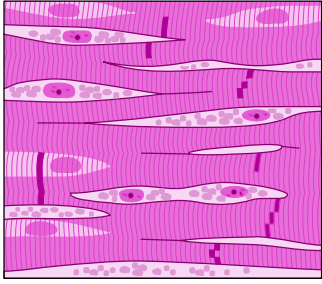
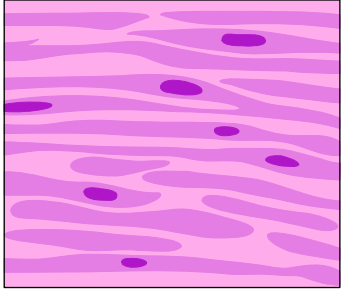
CHAPTER 11: THE MUSCULAR SYSTEM

Read: Chapter 11, pages 327-372 on muscle terminology, muscle anatomy, and specific muscles (axial and appendicular) of the body, and aging.

I. Functions of Muscles

II. Characteristics of Muscles

III. Types of Muscle

	A. Skeletal	B. Cardiac	C. Smooth
			
Microscopic structure			
Striations (present/absent)			
Voluntary / involuntary			
Example (s)			

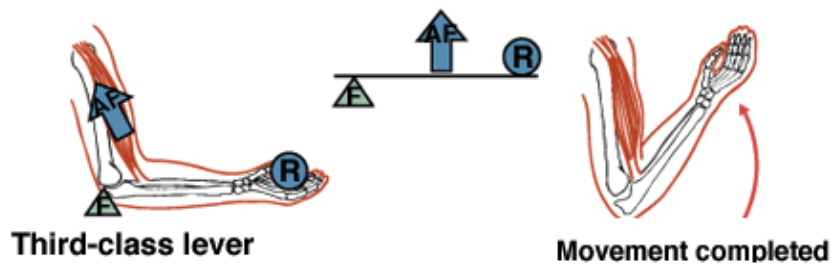
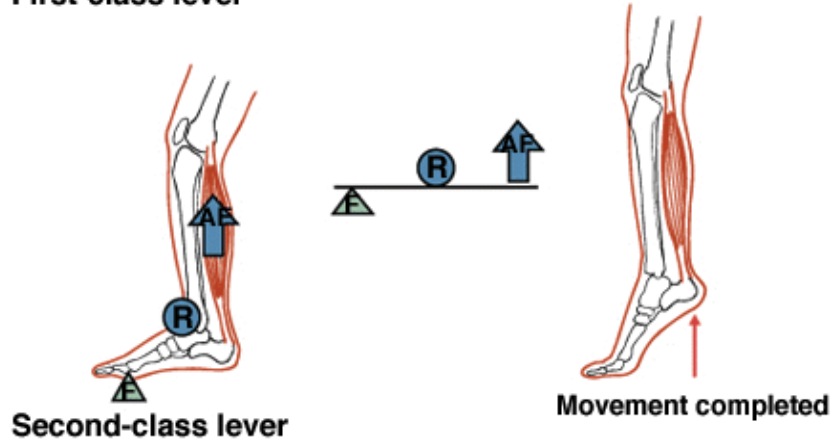
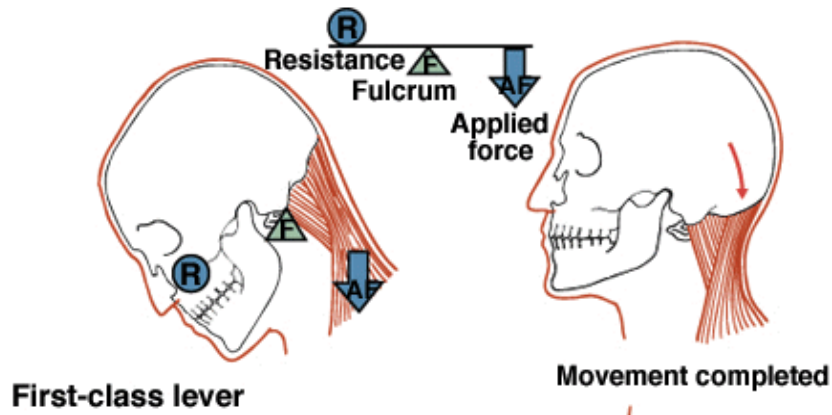
IV. How Do Muscles Produce Movement?

A.

B.

C. Classes of Levers

Everyday Example



D. Muscles Work in Groups

V. Muscle Nomenclature (System of Naming)

See Table 11-1 on page 317 for a complete list of muscle terminology.

Dr. Surmacz's Tips for Learning Muscles:

VI. Two Divisions of the Muscular System:

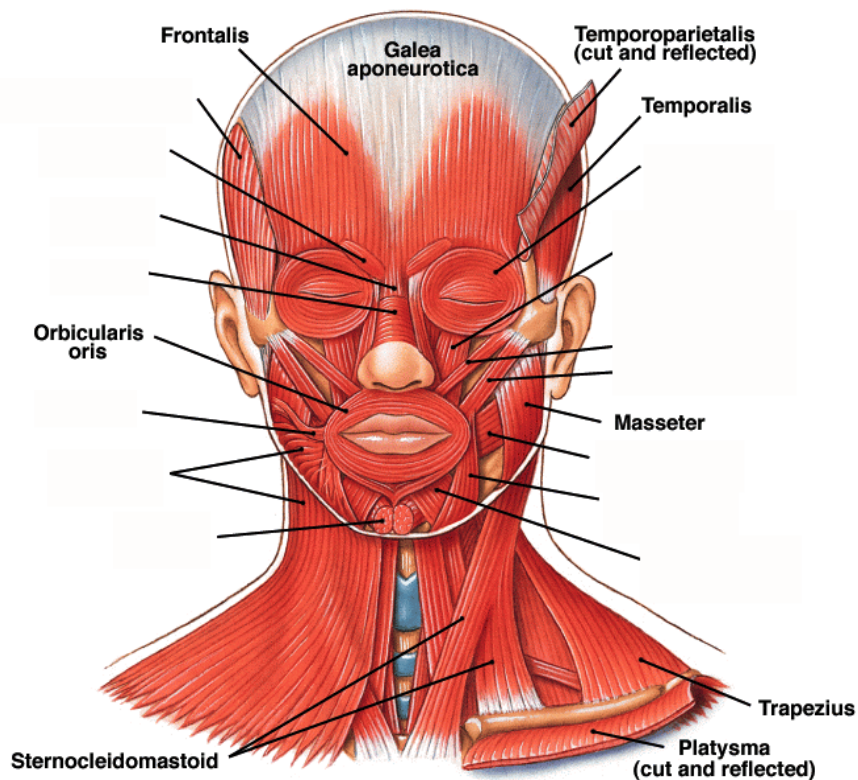
A. Axial Musculature

B. Appendicular Musculature

A. Axial Musculature

1) Muscles of the head

Name	Origin	Insertion	Action
Frontalis	Galea aponeurotica	skin of forehead	wrinkles forehead & elevates eyebrows
Orbicularis oris	mandible and maxillary via muscle fibers surrounding lips	lips	closes and presses lips against teeth; protrudes lips during speech and kissing
Temporalis	temporal bone	mandible	muscle of mastication, elevates mandible
Sternocleidomastoid	sternum (manubrium) and clavicle	temporal bone (mastoid process)	contraction of both L & R muscles flexes head at the neck. Contraction of one: tilts the head toward the shoulder of the contracting muscle and rotates the face to the opposite side
Masseter	zygomatic arch	mandible	muscle of mastication, elevates mandible

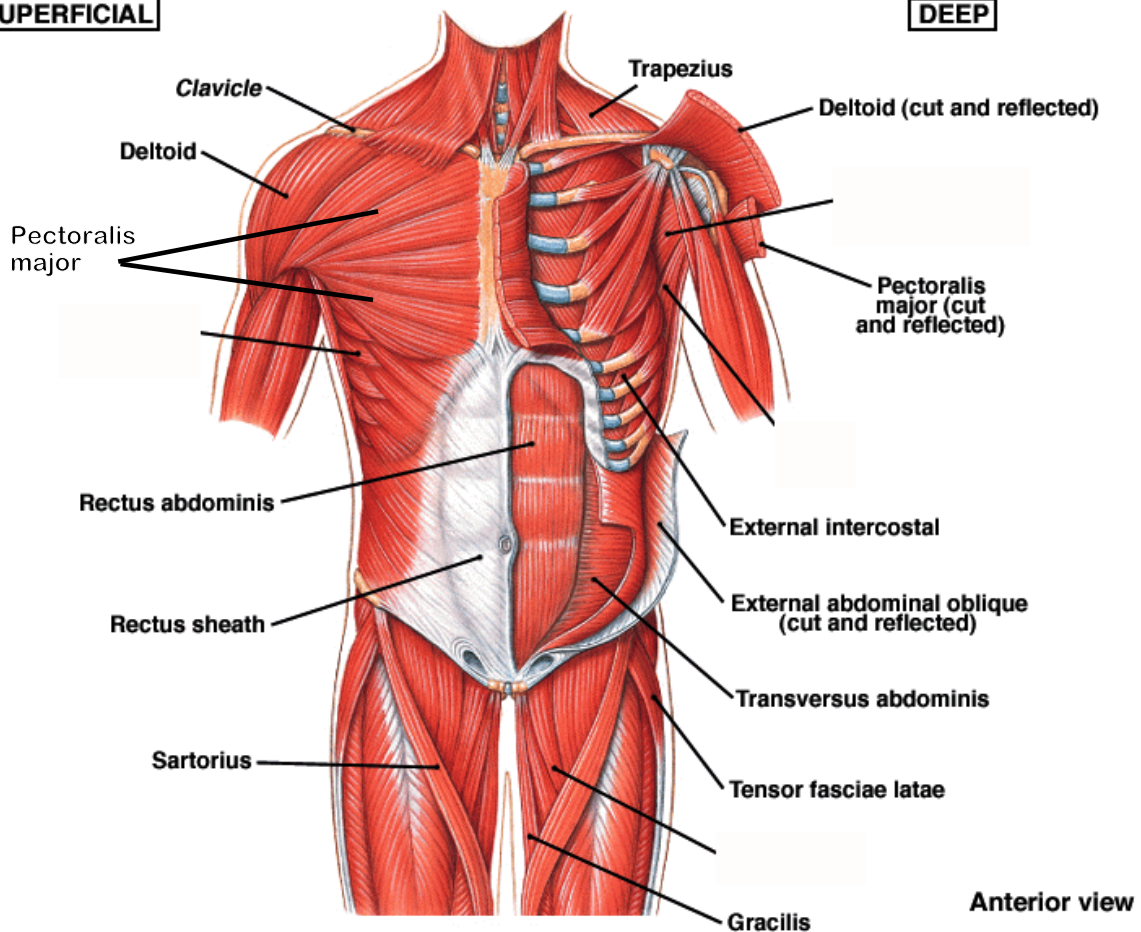


2) Upper Trunk Muscles (anterior view)

Name	Origin	Insertion	Action
Pectoralis major	clavicle, sternum, costal cartilages	humerus (intertubular groove)	flexes, adducts, and rotates the humerus medially (at shoulder)
Deltoid	clavicle and scapula	humerus (deltoid tuberosity)	abducts humerus at shoulder
External intercostals	inferior border of upper rib	superior border of lower rib	muscle of respiration, elevates rib cage in normal inspiration

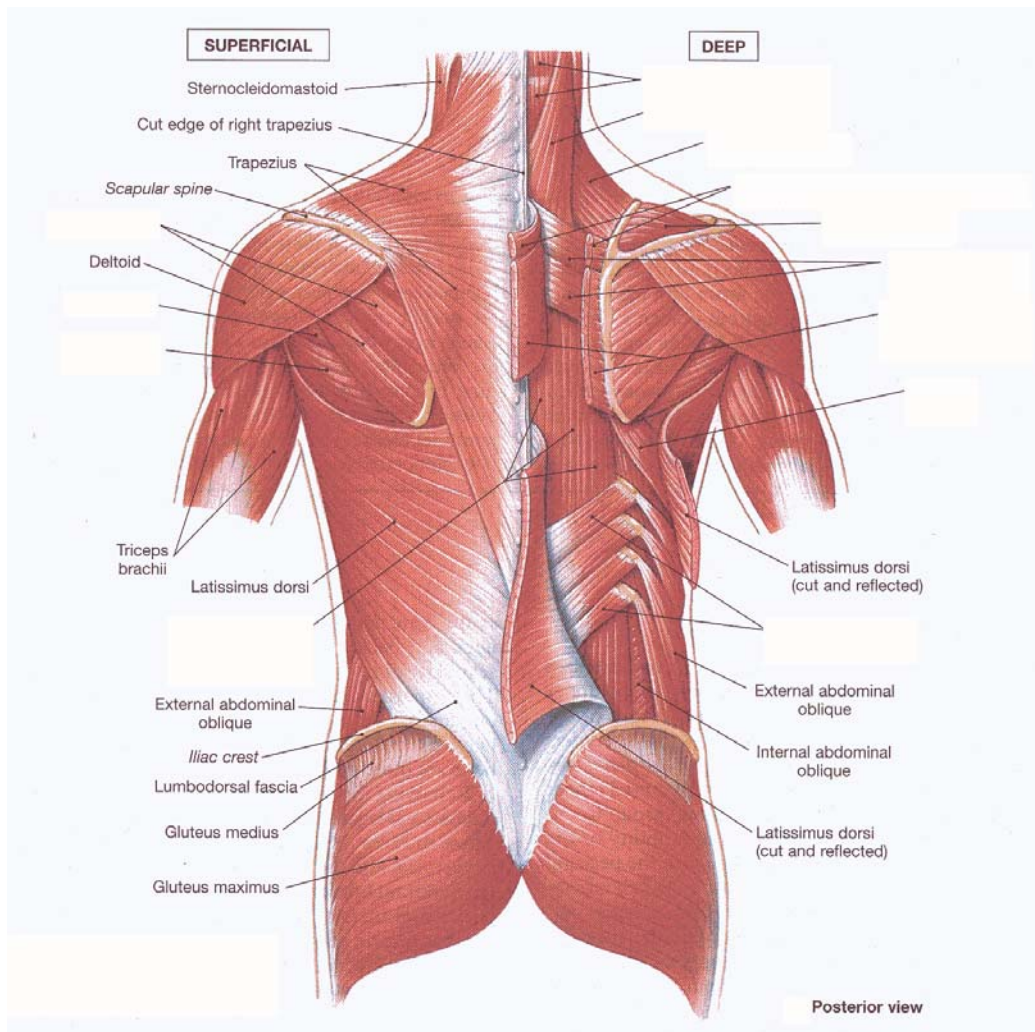
SUPERFICIAL

DEEP



3) Upper Trunk Muscles (posterior view)

Name	Origin	Insertion	Action
Latissimus dorsi	midline of lower back, lumbodorsal fascia; spinous processes of lower thoracic and lumbar vertebrae, lower ribs	humerus (intertubular groove)	extends, adducts, and rotates humerus medially (compare to pectoralis major)
trapezius	midline of neck and back; occipital bone, ligamentum nuchae, spinous processes of thoracic vertebrae	clavicle and scapula (acromion and spine)	several nerves supply different parts of the trapezius giving a variety of possible actions depending on which part is stimulated: extends head, elevates, depresses, and rotates scapula, elevates clavicle

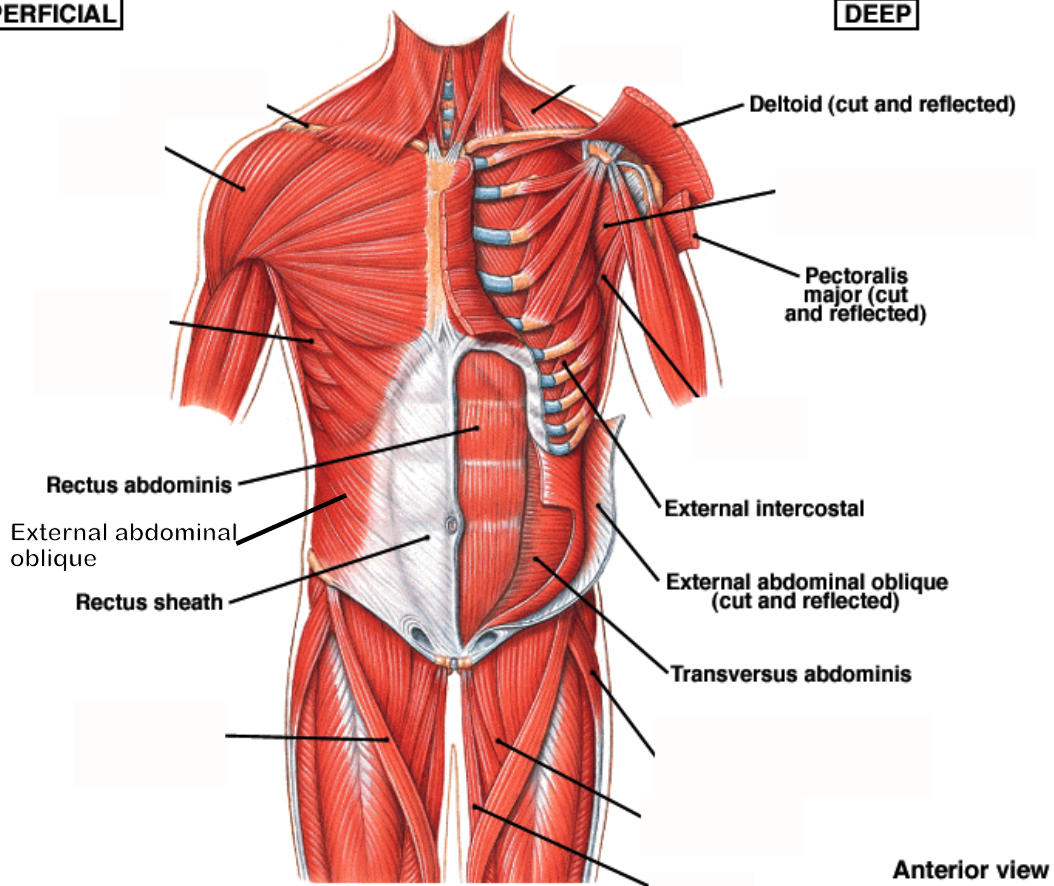


4) Abdominal Muscles

Name	Origin	Insertion	Action
External abdominal oblique	lower ribs	linea alba (means white line—a fibrous band in the midline of the abdomen)	contractions of both L & R flexes the vertebral column; contraction of one bends the vertebral column to one side. Supports and compresses the abdominal viscera
Rectus abdominus	pubis	sternum (xiphoid process) and costal cartilages of some ribs	flexes vertebral column, supports and compresses abdominal viscera

SUPERFICIAL

DEEP

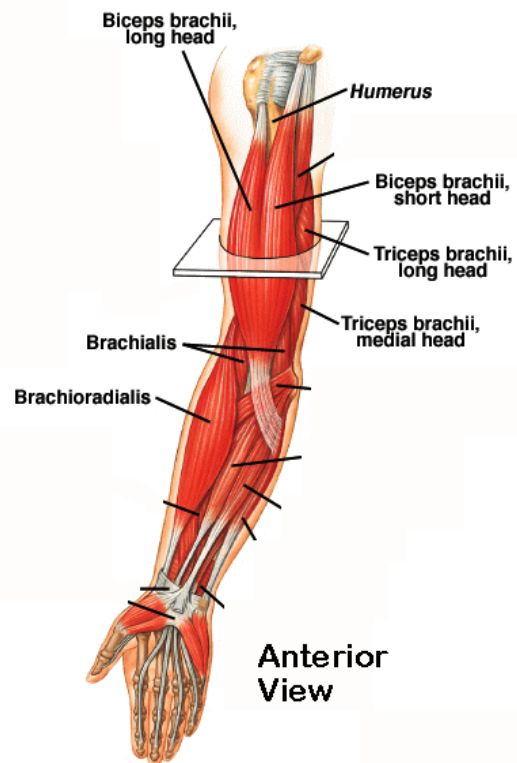
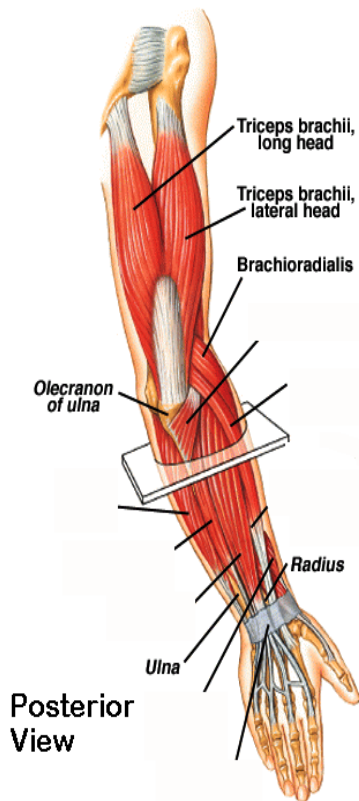


Anterior view

B. Appendicular Muscles

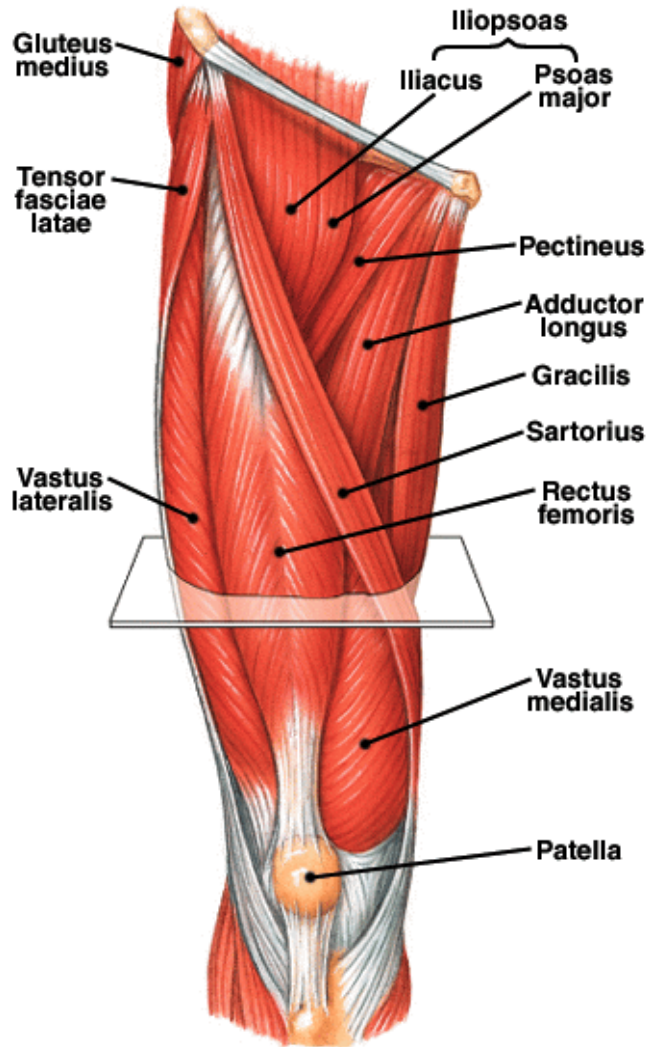
1) Arm

Name	Origin	Insertion	Action
Anterior			
Biceps brachii	Short head: scapula (coracoid process) Long head: scapula (tubercle above glenoid cavity)	Radius	Flexes elbow and shoulder, supinates forearm
Brachialis	Anterior humerus	Ulna	Flexes elbow
Brachioradialis	Humerus (lateral epicondyle)	Radius (near styloid process)	Flexes elbow
Posterior			
Triceps brachii	Lateral head: lateral humerus Medial head: posterior humerus Long head: scapula (tubercle below glenoid cavity)	Ulna (olecranon process)	extends elbow

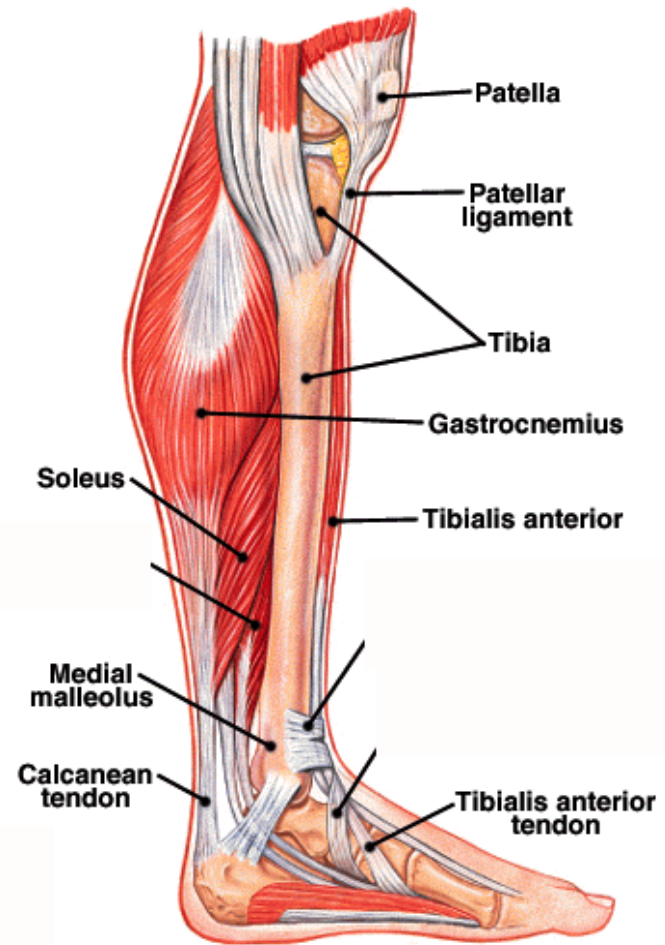


2) Leg Musculature (anterior)

Name	Origin	Insertion	Action
Sartorius	Ilium (anterior iliac spine)	Medial tibia	Flexes both hip and knee and rotates thigh laterally (e.g., when crossing your legs)
Gracilis	Pubis	Medial tibia	Adducts femur, flexes knee
Adductor longus	Pubis	Femur	Adducts and flexes thigh
Adductor magnus	Pubis and ischium	Femur (linea aspera)	adducts and extends thigh
QUADRICEPS FEMORIS GROUP			
a) rectus femoris	Ilium (anterior iliac spine)	All of the quadriceps femoris have a common tendon called the patellar ligament which inserts on the tibia (tibial tuberosity—between the lateral and medial condyles)	Extends knee, flexes hip
Vastus lateralis	Femur (greater trochanter)		Extends knee
Vastus intermedius	Femur (anterior and lateral aspects)		Extends knee
Vastus medialis	Femur (linea aspera)		Extends knee
Tibialis anterior	Tibia (lateral condyle and shaft)	Tarsal and metatarsal	Dorsiflexes and inverts foot

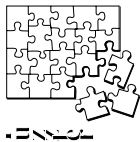


Anterior view of right thigh

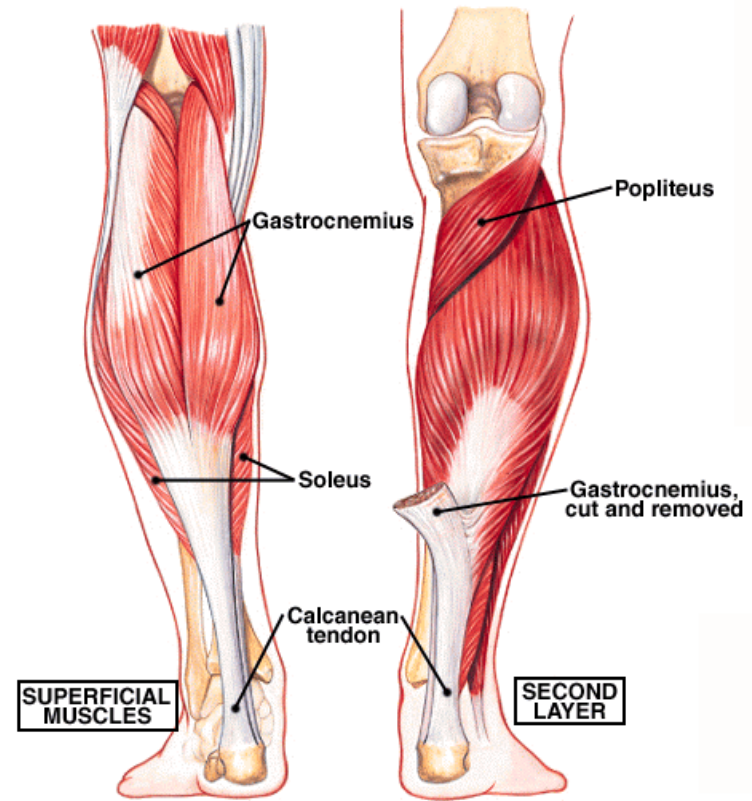
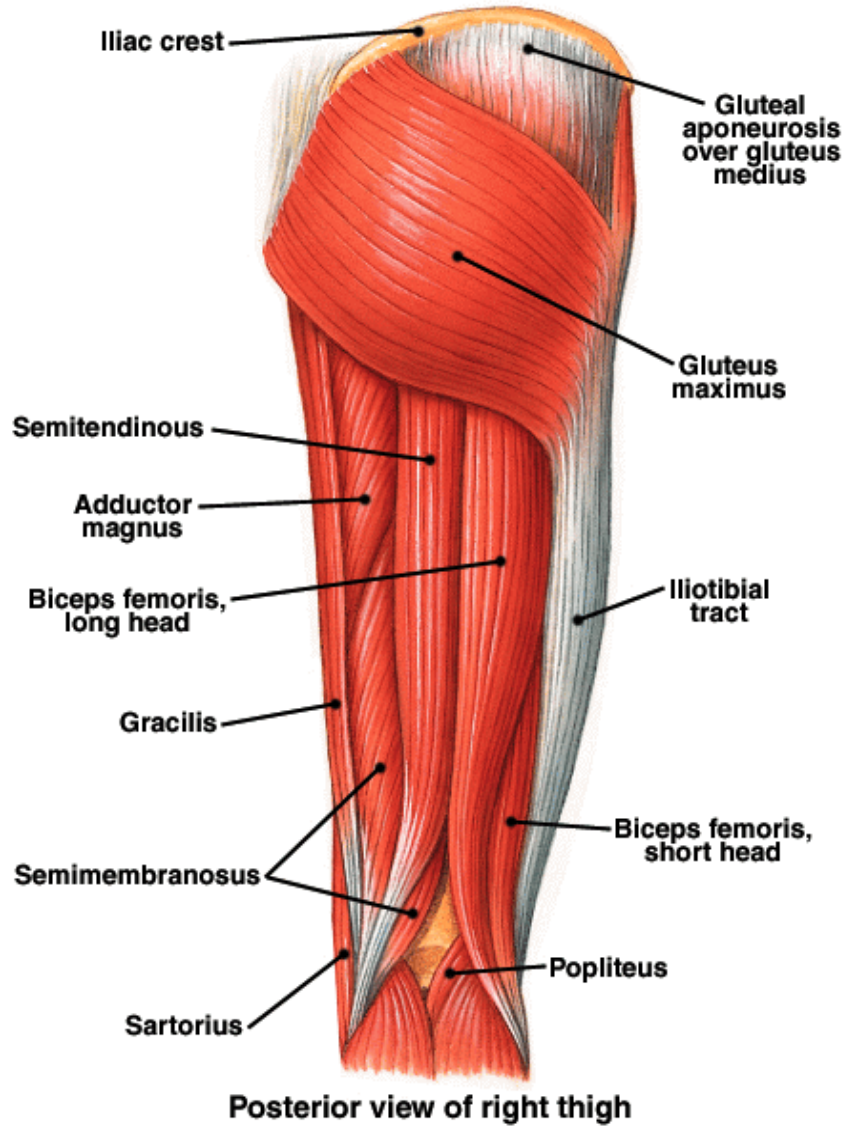


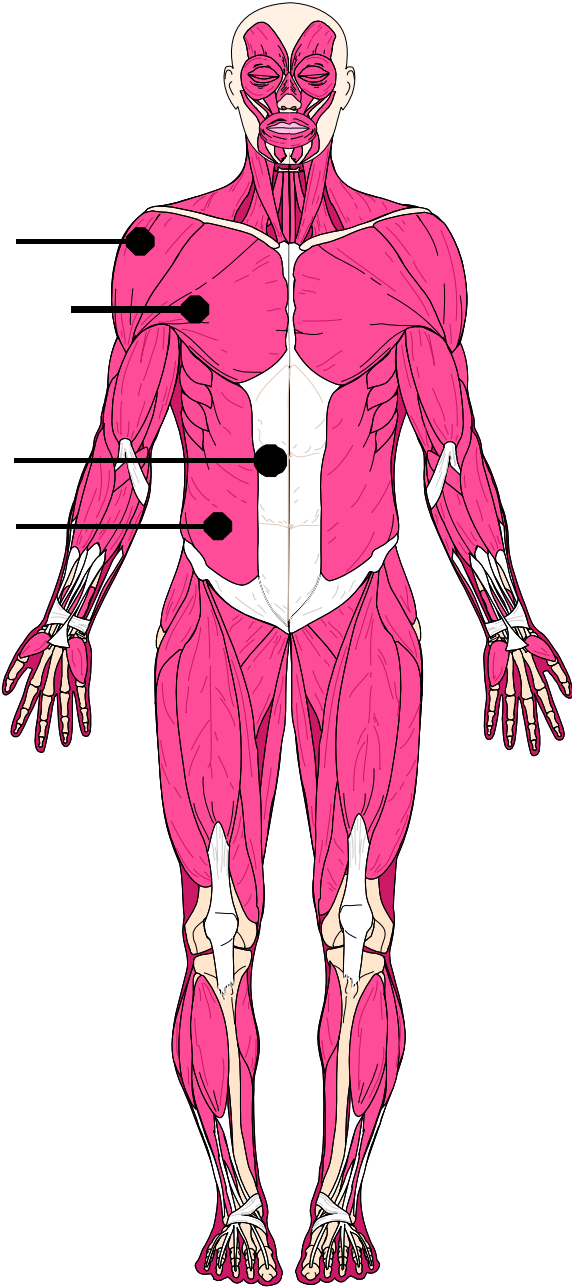
3) Leg Musculature (posterior)

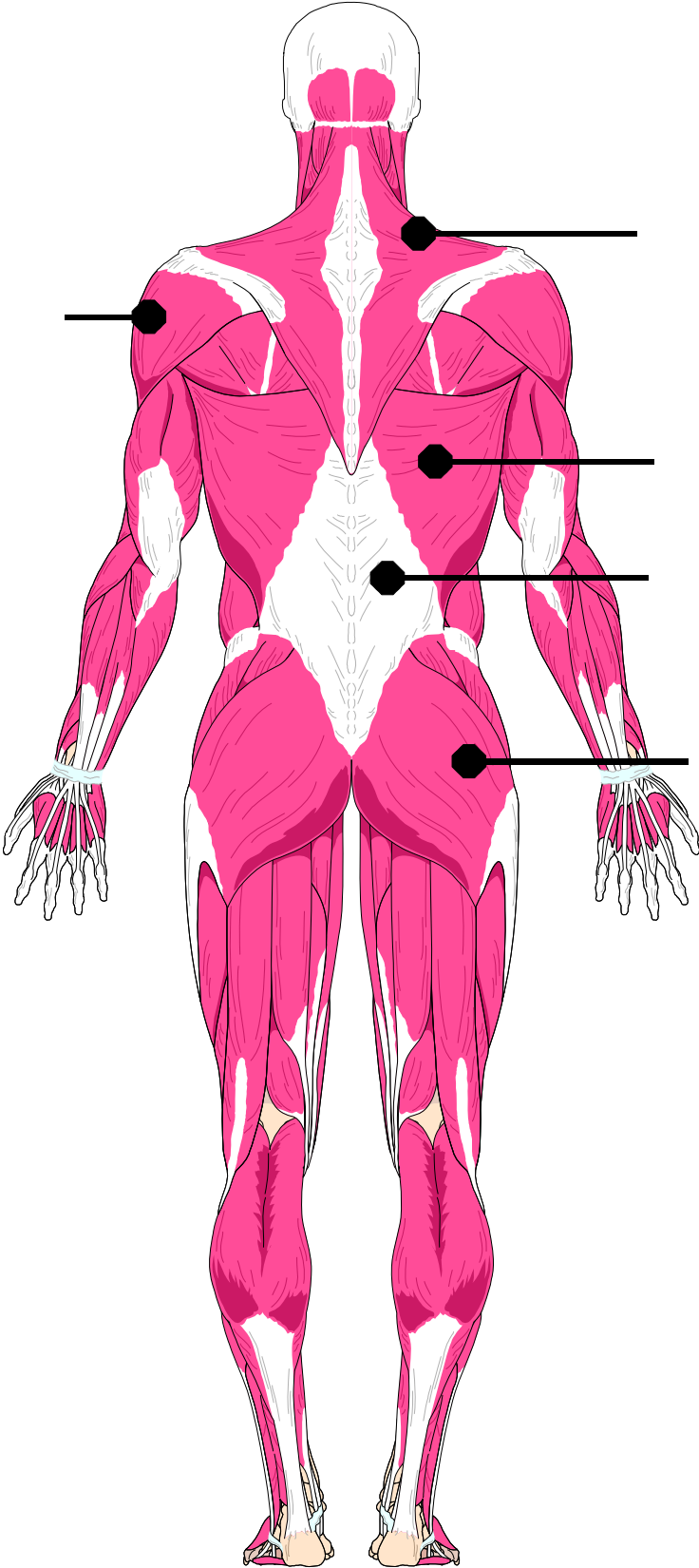
Name	Origin	Insertion	Action
Gluteus maximus	Pelvis (ilium, sacrum, coccyx) and lumbodorsal fascia	Iliotibial tract (a fibrous band on the lateral surface of the leg; inserts on the lateral tibia); femur	Extends and rotates femur laterally
Gluteus medius	Ilium (lateral surface)	Femur (greater trochanter)	Abducts and medially rotates thigh
HAMSTRINGS GROUP			
a) Biceps femoris	Long head: ischium (ischial tuberosity) Short head: femur (linea aspera)	Fibula (head) and tibia (lateral condyle)	flexes knee; extends thigh at hip
b) Semitendinosus	Ischium (ischial tuberosity)	Medial tibia	Flexes knee
c) Semimebranosus	Ischium (ischial tuberosity)	Tibia (medial condyle)	Flexes knee
Gastrocnemius	Femur (lateral and medial condyles)	Achilles tendon to calcaneous	Plantar flexes and inverts foot; flexes knee
Soleus	Fibula (head) and tibia (medial)	Achilles tendon to calcaneous	Plantar flexes and inverts foot

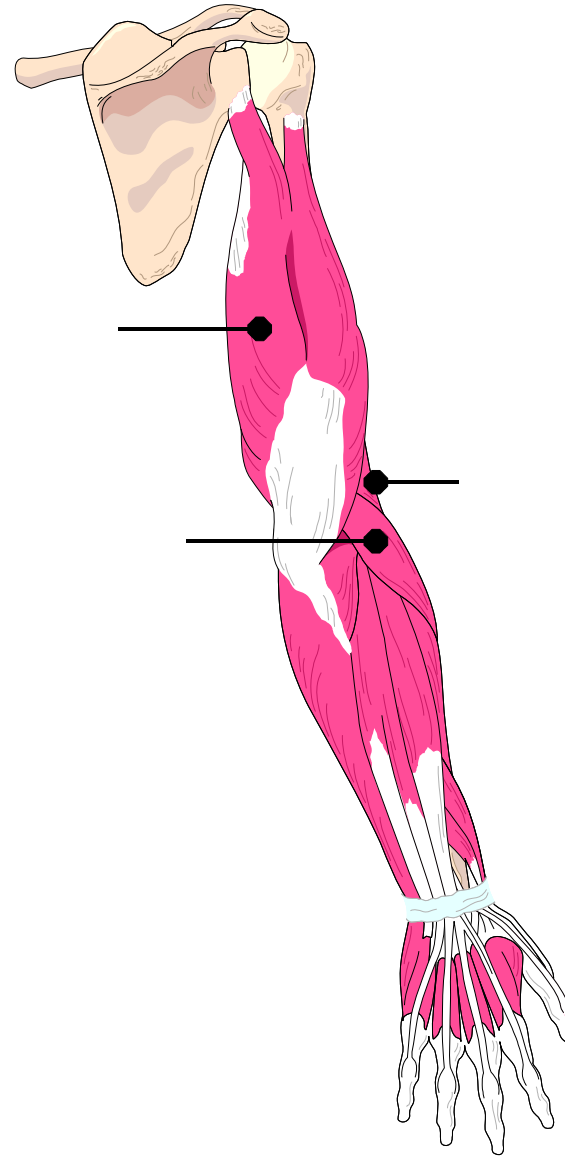
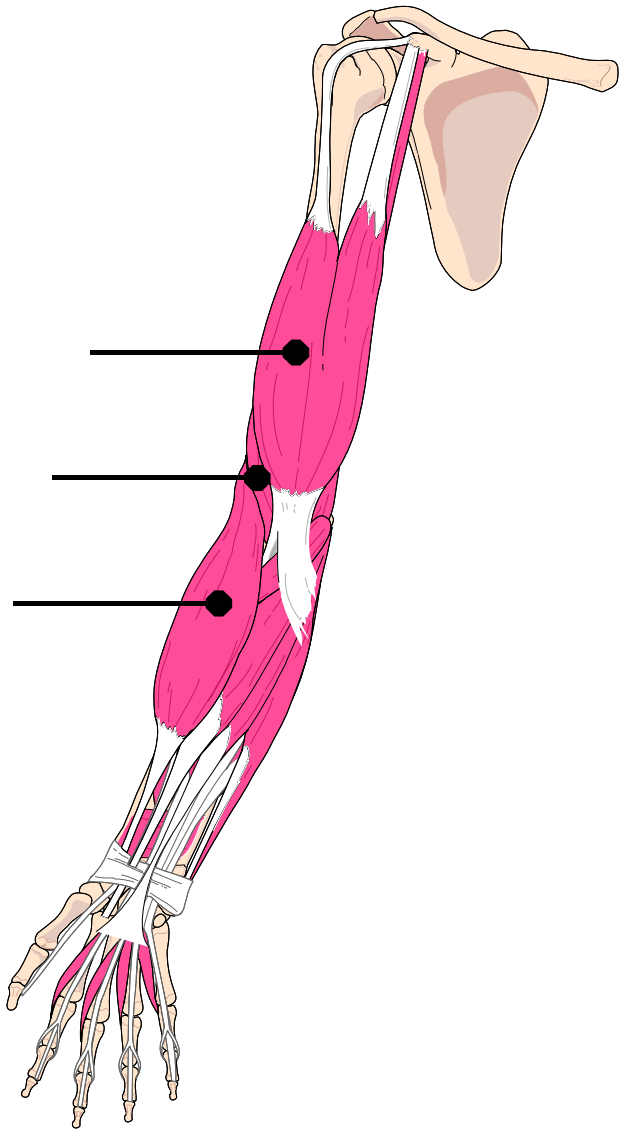


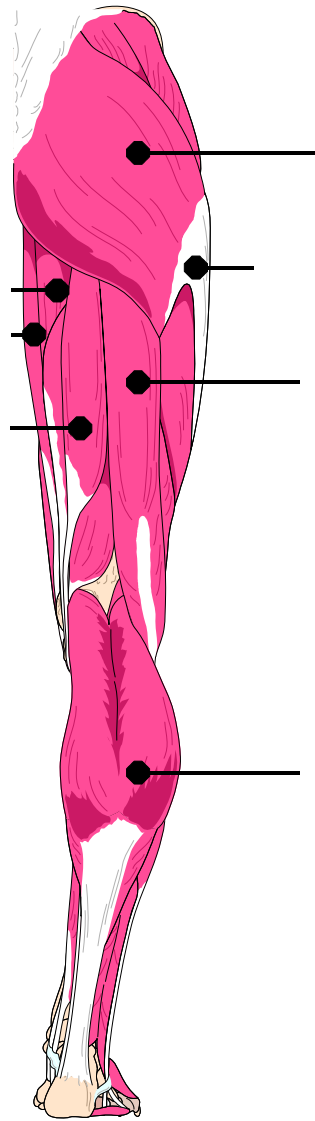
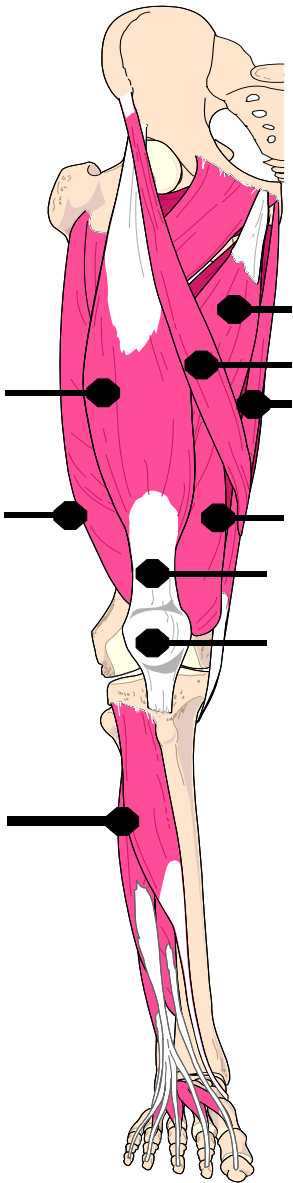
LABEL the muscles in the diagrams on pages 18 - 22 of this guide. (Do this outside of class if we do not have time in class)

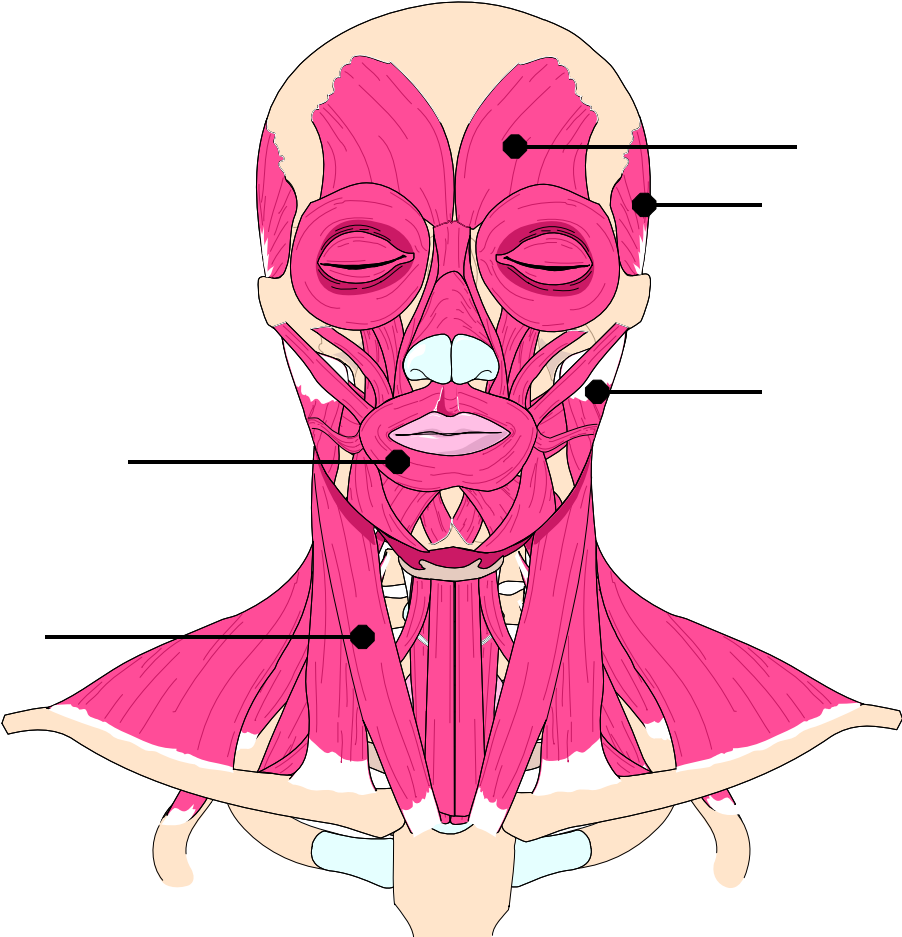












ASSIGNMENTS

Lecture Guide

- 1) What are the functions of muscle? How can you distinguish among the three types of muscle?
- 2) What is the difference between striated muscle and nonstriated muscle? What type(s) of muscle are striated? Nonstriated? What types of muscle are voluntary? Involuntary?
- 3) How do muscles produce movement?
- 4) What type of lever is a see-saw? A ladder? A wheel barrow?
- 5) Define the following: origin, insertion, belly, prime mover, antagonist, synergist, fixator.
- 6) Describe the system for naming muscles. Explain how the following muscle names are derived from this system: biceps brachii, gluteus maximus, rectus femoris, trapezius, adductor longus, masseter, deltoid, pectoralis major, brachioradialis, triceps brachii, external oblique, sternocleidomastoid, rectus abdominus, orbicularis oris, tibialis anterior.
- 7) For each muscle discussed in class, be able to state its name and identify it on a drawing. Describe its attachment sites to bone (origin and insertion) and its action. Be familiar how the muscles with other muscle groups (agonists and antagonists). From a picture or diagram showing an action, be able to discuss the muscles producing the action(s) shown.
- 8) What are the principle muscles of the mandible? Give their functions.
- 9) What muscles are used to indicate “yes” and “no” with your head?
- 10) What muscles are used in breathing? How are they attached to the skeleton?
- 11) Which muscles of the arm are flexors? Extensors? Which muscle(s) are used to shrug your shoulders? Which muscle(s) are used to raise your hand in class?
- 12) What leg muscles flex the hip? Flex the knee? Extend the thigh? Extend the lower leg?
- 13) What muscles did Groucho Marx use to raise his eye brows? Which muscles do you use to pucker your lips for kiss?
- 14) What muscles do you exercise when doing a bench press? To do a sit-up? Kick a ball? Hit a baseball? Do a pull-up?
- 15) What muscles have their origins on the pelvic girdle?
- 16) What muscle(s) perform dorsiflexion? Plantarflexion?
- 17) What muscles insert on the rib cage? Insert on the tibia? Which muscles have attachment to fibrous connective tissue sheets?

Textbook Chapter 11 (pages 381-383)

Level 1 Reviewing Facts and Terms: 1, 2, 5, 6, 8, 12-14, 17, 19, 22

Level 2 Reviewing Concepts: 27, 29, 32, 38, 39

Level 3 Critical Thinking and Clinical Application: 41

Answers to the above text questions are on pages Q-12 to Q13.

Study Guide Chapter 11 (pages 191-209)

(L1) Multiple Choice: 5-7, 9, 21, 22

Completion: 28, 30-36

Drawing/Illustration: Figures 11-1, 11-2, 11-7, 11-8, 11-9

(L2) Body trek (omit orbicularis oculi)

Multiple Choice: 53, 56, 58, 60, 62

Short Essay: 77, 78, 81 (3rd class levers only), 82, 83

(L3) Critical Thinking: 2, 3

Answers to Study Guide Questions are located on pages 623-625 of the guide.