Objectives:

1. To be able to discuss the characteristics of muscles
2. To be able to identify the major skeletal muscles and three types of muscles
3. To be able to identify the major components and functions of skeletal muscle fibers
MUSCLE FACTS:

- There are more than 600 muscles.
- Muscles are bundles of muscle fibers held together by connective tissue.
CHARACTERISTICS OF ALL MUSCLES:

- **Excitability** – irritability, the ability to respond to a stimulus such as a nerve impulse

{receives & responds to stimuli}
CHARACTERISTICS OF ALL MUSCLES:

- **Contractibility** – muscle fibers that are stimulated by nerves **contract** (become short and thick), which causes movement.

{able to shorten & thicken}
CHARACTERISTICS OF ALL MUSCLES:

- **Extensibility** – the ability to be stretched

{able to stretch without damage}
CHARACTERISTICS OF ALL MUSCLES:

- **Elasticity** – allows the muscle to return to its original shape after it has contracted or stretched.

{able to return to shape}
Muscles can be voluntary or involuntary.

- **Voluntary** – you have control over its action; example moving your arm
- **Involuntary** – they function without conscious thought or control; example your diaphragm muscle for breathing
3 KINDS OF MUSCLE:

1. **Cardiac** – forms the walls of the heart; contracts to circulate blood
TEST YOUR KNOWLEDGE

Is cardiac muscle voluntary or involuntary?

✓ INVOLUNTARY
3 KINDS OF MUSCLE:

2. **Visceral (smooth)** – found in the internal organs (digestive and respiratory system), blood vessels, and eyes; contract to cause movement in these organs.
Is visceral muscle voluntary or involuntary?

INVOLUNTARY
3 KINDS OF MUSCLE:

3. **Skeletal** – attached to bones; contracts to cause body movement
TEST YOUR KNOWLEDGE

Is skeletal muscle voluntary or involuntary?

✓ VOLUNTARY
FUNCTIONS OF SKELETAL MUSCLE:

1. Attach to bones to provide voluntary movement
2. Produce heat and energy for the body
3. Help maintain posture by holding the body erect
4. Protect internal organs
One of the characteristics of muscle is extensibility. This allows muscles to:

A) React to an impulse
B) Contract
C) Stretch
D) Consume oxygen

And the answer is...C
DO YOU KNOW?

• Which of the following is a characteristic of muscles?
  A) Excitability
  B) Portability
  C) Stability
  D) Feasibility

And the answer is... A
DO YOU KNOW?

• Where would you find a voluntary muscle?
  A) In blood vessel walls
  B) Attached to the femur
  C) Inside the heart
  D) Lining the stomach

And the answer is... B
DO YOU KNOW?

• After you swallow food, what kind of muscle moves the food toward your stomach?
  A) Cardiac
  B) Skeletal
  C) Voluntary
  D) Smooth

And the answer is...D
Objectives:
To describe the process of muscle contraction through attachment, and origin and insertion
SKELETAL MUSCLE:

Skeletal muscles attach to bones in different ways:

• **Tendons** – strong, tough, fibrous connective tissue cords that can attach muscles to bones.

  ex: gastrocnemius on the calf attaches to heel bone by Achilles tendon
TENDONS
• **Fascia** – tough, sheet-like membrane that covers and protects the muscle tissue

  ex: deep muscles of the trunk and back are surrounded by the lumbodorsal fascia
ORIGIN VS INSERTION:

• When a muscle attaches to a bone, the end that does not move is called the *origin*.
• The end that moves when the muscle contracts is called the *insertion*. 
Example: the origin of the deltoid (shoulder muscle) is by the clavicle & scapula. Its insertion is on the humerus. When the deltoid contracts, the area by the scapula remains stationary, but the area by the humerus moves and abducts the arm away from the body.
ORIGIN VS INSERTION

- **Gastrocnemius**
  - **Origin**: Femur
  - **Actions**: Ankle Plantar-flexion & Knee flexion
  - **Insertion**: Achilles Tendon

- **Triceps Brachii**
  - **Origin**: Scapula & Humerus
  - **Action**: Elbow extension & Shoulder extension
  - **Insertion**: Ulna

- **Soleus**
  - **Origin**: Tibia & Fibula
  - **Action**: Ankle plantar flexion
  - **Insertion**: Tarsals
ORIGIN VS INSERTION

Pectoralis Major

- Origins: Sternum & Clavicle
- Insertion: Humerus, Ribs
- Actions: Shoulder flexion, Horizontal shoulder flexion, Upward diagonal flexion & Downward diagonal flexion

Rectus Abdominus

- Insertion: Ribs & Sternum
- Action: Trunk flexion
- Origin: Pelvis
Objectives:
To identify the vocabulary associated with active and passive range of motion
MUSCLE VOCABULARY:

- **Superficial** – closer to the surface of the body
- **Deep** – farther away from the surface of the body
MUSCLE VOCABULARY:

Back muscles from superficial to deep
**MUSCLE VOCABULARY:**

- **Muscle tone** – state of partial contraction or readiness to act. Muscles are partially contracted at all times, even when not in use.

  *the state of muscle tension inside a muscle when it’s at rest*
MUSCLE VOCABULARY:

**Muscle Tone**
How alert are your muscles?
MUSCLE VOCABULARY:

- **Muscle atrophy** – muscles shrink in size and lose strength; can occur in severe illness (paralysis) when muscles aren’t used for a longtime.
MUSCLE VOCABULARY:

• Muscle atrophy
MUSCLE VOCABULARY:

- **Contracture** – lack of use resulting in a severe tightening of a flexor muscle resulting in bending of a joint.

  ex: foot drop, but can also happen to the fingers, wrists, knees, & other joints
MUSCLE VOCABULARY:

Contractures
DO YOU KNOW?

• When a muscle attaches to a bone, the end that does not move is the:
  A) Tendon
  B) Root
  C) Origin
  D) Insertion

And the answer is...C
• Of the following, what muscle is superior to the other three?
A) Intercostals
B) Gastrocnemius
C) Sternocleidomastoid
D) Trapezius

And the answer is...C
DO YOU KNOW?

• Which muscle would do the most work if you ran 5 miles?
  A) Sternocleidomastoid
  B) Quadriceps femoris
  C) Biceps
  D) Pectoralis major

And the answer is... B
DO YOU KNOW?

• What muscle is located above the waist?
  A) Deltoid
  B) Tibialis anterior
  C) Gastrocnemius
  D) Gluteus maximus

And the answer is...A
• Karina’s leg was in a cast for ten weeks. You would expect her leg muscles to experience some degree of:

A) Atrophy
B) Hypertrophy
C) Circumduction
D) Rotation

And the answer is... A
DO YOU KNOW?

• What would cause a muscle contracture?
  A) Twisting
  B) Pulling
  C) Lack of use
  D) Overuse

And the answer is... C
Objectives:
To identify active and passive range of motion
To identify the different patient positions
TYPES OF MUSCLE MOVEMENTS:

1. **Adduction** – moving a body part toward the midline
2. **Abduction** – moving a body part away from the midline
TYPES OF MUSCLE MOVEMENTS:

3. **Flexion** – decreasing the angle between 2 bones, or bending a body part

4. **Extension** – increasing the angle between 2 bones, or straightening a body part
5. **Rotation** – turning a body part around its own axis

6. **Circumduction** – moving in a circle at a joint or moving one end of a body part in a circle while the other end remains stationary
TYPES OF MUSCLE MOVEMENTS:

7. **Supination** – turning a body part upward

8. **Pronation** – turning a body part downward
POSITIONING A PATIENT:

- **Semi-Fowlers** – HOB 45 degrees
POSITIONING A PATIENT:

• **Supine (horizontal recumbent)** – flat on the back
POSITIONING A PATIENT:

- **Prone** – pt lies on their abd
POSITIONING A PATIENT:

• **Left lateral (Sims’)** – pt lies on their left side
POSITIONING A PATIENT:

- **Trendelenburg** – pt lies on their back with their head lower than their feet