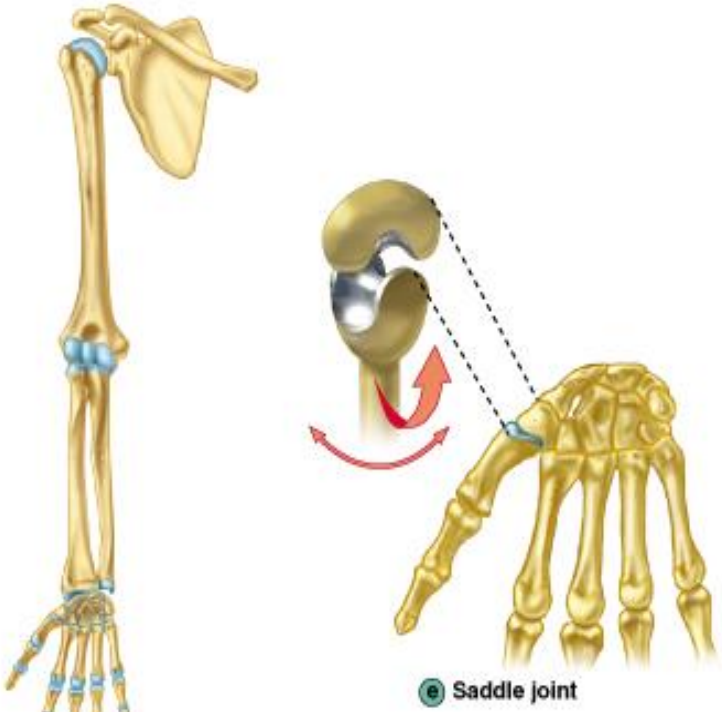
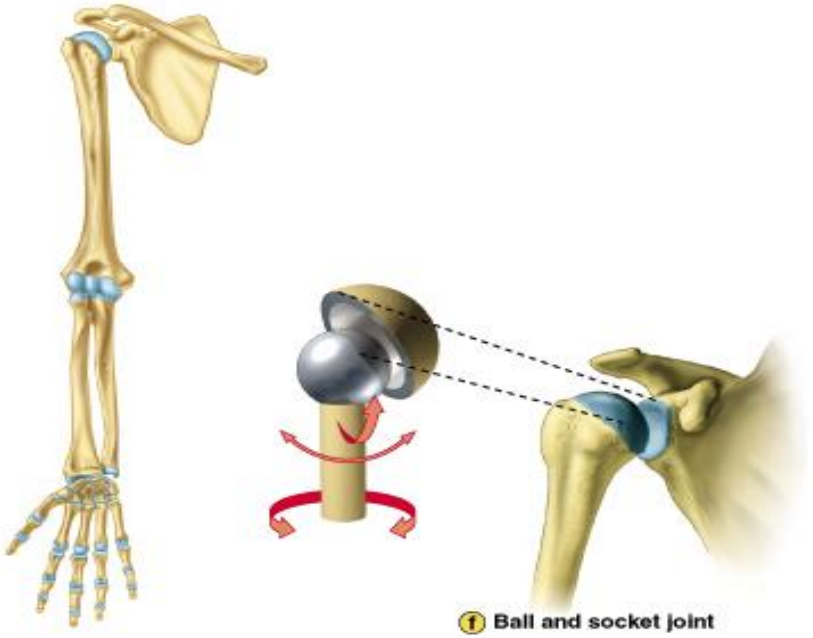
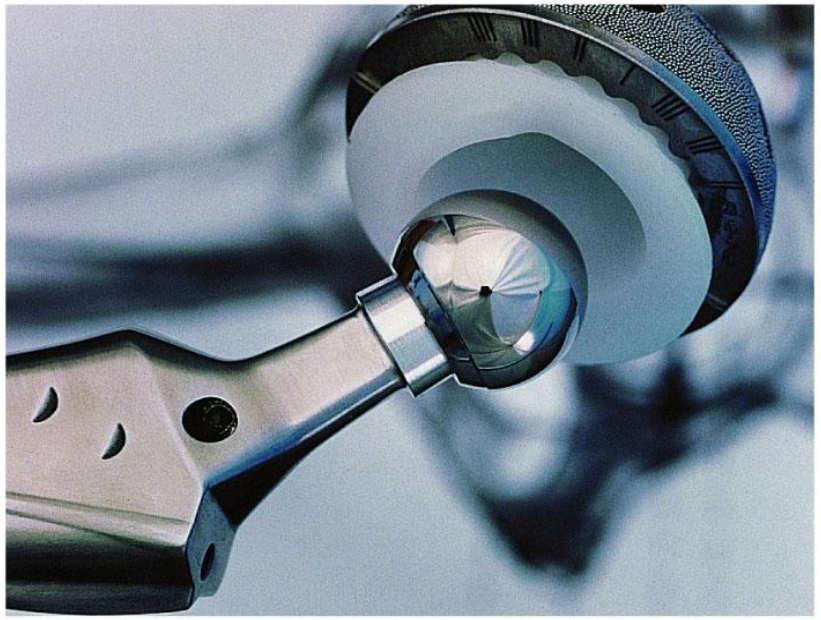
Saddle & Ball & Socket



Nonaxial
Uniaxial
Biaxial
Multiaxial





Photograph of a hip prosthesis.

Joint Classif. Assign. (not collected)

Use the joint classification tables:

-review the selected examples

eg a) joint - fibrous
b) mobility - synarthrotic
c) joint type - suture
d) example - skull
e) bones - cranial & facial bones

- compare and contrast

teeth, teeth & socket, fibrous, gomphosis, synarthrotic

Axial Joints

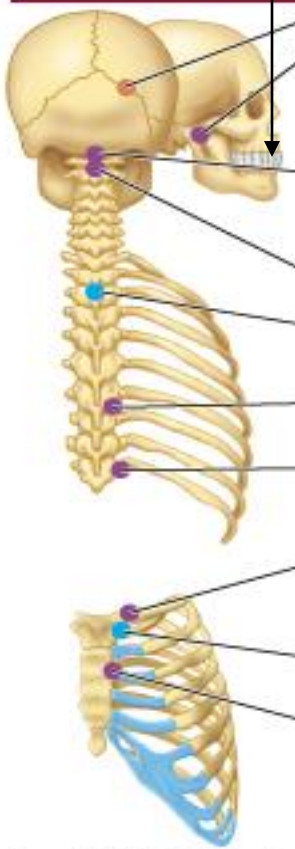


TABLE 8.2 Structural and Functional Characteristics of Body Joints

Illustration	*Joint*	*Articulating bones*	*Structural type**	*Functional type; movements allowed*
	Skull X	Cranial and facial bones	Fibrous; suture	Synarthrotic; no movement
	Temporo-mandibular	Temporal bone of skull and mandible	Synovial; modified hinge† (contains articular disc)	Diarthrotic; gliding and uniaxial rotation; slight lateral movement, elevation, depression, protraction, and retraction of mandible
	Atlanto-occipital	Occipital bone of skull and atlas	Synovial; condyloid	Diarthrotic; biaxial; flexion, extension, abduction, adduction, circumduction of head on neck
	Atlantoaxial X	Atlas (C_1) and axis (C_2)	Synovial; pivot	Diarthrotic; uniaxial; rotation of the head
	Intervertebral X	Between adjacent vertebral bodies	Cartilaginous; symphysis	Amphiarthrotic; slight movement
	Intervertebral	Between articular processes	Synovial; plane	Diarthrotic; gliding
	Vertebrocostal	Vertebrae (transverse processes or bodies) and ribs	Synovial; plane	Diarthrotic; gliding of ribs
	Sternoclavicular	Sternum and clavicle	Synovial; shallow saddle (contains articular disc)	Diarthrotic; multiaxial (allows clavicle to move in all axes)
	Sternocostal X	Sternum and rib 1	Cartilaginous; synchondrosis	Synarthrotic; no movement
	Sternocostal	Sternum and ribs 2–7	Synovial; double plane	Diarthrotic; gliding

epihyseal plate, humerus head, cartil. synchrondroses, synarthr.

Arm & Shoulder Joints

TABLE 8.2 Structural and Functional Characteristics of Body Joints

Illustration	Joint		Articulating bones	Structural type*	Functional type; movements allowed
	Acromio-clavicular	x	Acromion of scapula and clavicle	Synovial; plane	Diarthrotic; gliding and rotation of scapula on clavicle
	Shoulder (glenohumeral)	x	Scapula and humerus	Synovial; ball and socket	Diarthrotic; multiaxial; flexion, extension, abduction, adduction, circumduction, rotation of humorus
	Elbow	x	Ulna (and radius) with humerus	Synovial; hinge	Diarthrotic; uniaxial; flexion, extension of forearm
	Radioulnar (proximal)	x	Radius and ulna	Synovial; pivot	Diarthrotic; uniaxial; rotation of radius around long axis of forearm to allow pronation and supination
	Radioulnar (distal)		Radius and ulna	Synovial; pivot (contains articular disc)	Diarthrotic; uniaxial; rotation (convex head of ulna rotates in ulnar notch of radius)
	Wrist (radiocarpal)		Radius and proximal carpals	Synovial; condyloid	Diarthrotic; biaxial; flexion, extension, abduction, adduction, circumduction of hand
	Intercarpal		Adjacent carpals	Synovial; plane	Diarthrotic; gliding
	Carpometacarpal of digit 1 (thumb)	x x	Carpal (trapezium) and metacarpal 1	Synovial; saddle	Diarthrotic; biaxial; flexion, extension, abduction, adduction, circumduction, opposition of metacarpal 1
	Carpometacarpal of digits 2–5		Carpal(s) and metacarpal(s)	Synovial; plane	Diarthrotic; gliding of metacarpals
	Knuckle (metacarpo-phalangeal)	x	Metacarpal and proximal phalanx	Synovial; condyloid	Diarthrotic; biaxial; flexion, extension, abduction, adduction, circumduction of fingers
	Finger (interphalangeal)	x	Adjacent phalanges	Synovial; hinge	Diarthrotic; uniaxial; flexion, extension of fingers

Hip & Leg Joints

TABLE 8.2 Structural and Functional Characteristics of Body Joints

Illustration	*Joint*	*Articulating bones*	*Structural type**	*Functional type movements allowed*
	Sacroiliac	Sacrum and coxal bone	Synovial; plane	Diarthrotic; little movement, slight gliding possible (more during pregnancy)
x	Pubic symphysis	Pubic bones	Cartilaginous; symphysis	Amphiarthrotic; slight movement (enhanced during pregnancy)
x	Hip (coxal)	Hip bone and femur	Synovial; ball and socket	Diarthrotic; multiaxial; flexion, extension, abduction, adduction, rotation, circumduction of thigh
	Knee (tibiofemoral)	Femur and tibia	Synovial; modified hinge† (contains articular discs)	Diarthrotic; biaxial; flexion, extension of leg, some rotation allowed
	Knee (femoropatellar)	Femur and patella	Synovial; plane	Diarthrotic; gliding of patella
x	Tibiofibular	Tibia and fibula (proximally)	Synovial; plane	Diarthrotic; gliding of fibula
	Tibiofibular	Tibia and fibula (distally)	Fibrous; syndesmosis	Synarthrotic; slight "give" during dorsiflexion
	Ankle	Tibia and fibula with talus	Synovial; hinge	Diarthrotic; uniaxial; dorsiflexion, and plantar flexion of foot
x	Intertarsal	Adjacent tarsals	Synovial; plane	Diarthrotic; gliding; inversion and eversion of foot
	Tarsometatarsal	Tarsal(s) and metatarsal(s)	Synovial; plane	Diarthrotic; gliding of metatarsals
	Metatarso-phalangeal	Metatarsal and proximal phalanx	Synovial; condyloid	Diarthrotic; biaxial; flexion, extension, abduction, adduction, circumduction of great toe
	Toe (interpha-langeal)	Adjacent phalanges	Synovial; hinge	Diarthrotic; uniaxial; flexion; extension of toes

***Fibrous joints** indicated by orange circles; **cartilaginous joints** by blue circles; **synovial joints** by purple circles.
†These modified hinge joints are structurally bicondylar.

Knee Joint Assign. (collected)

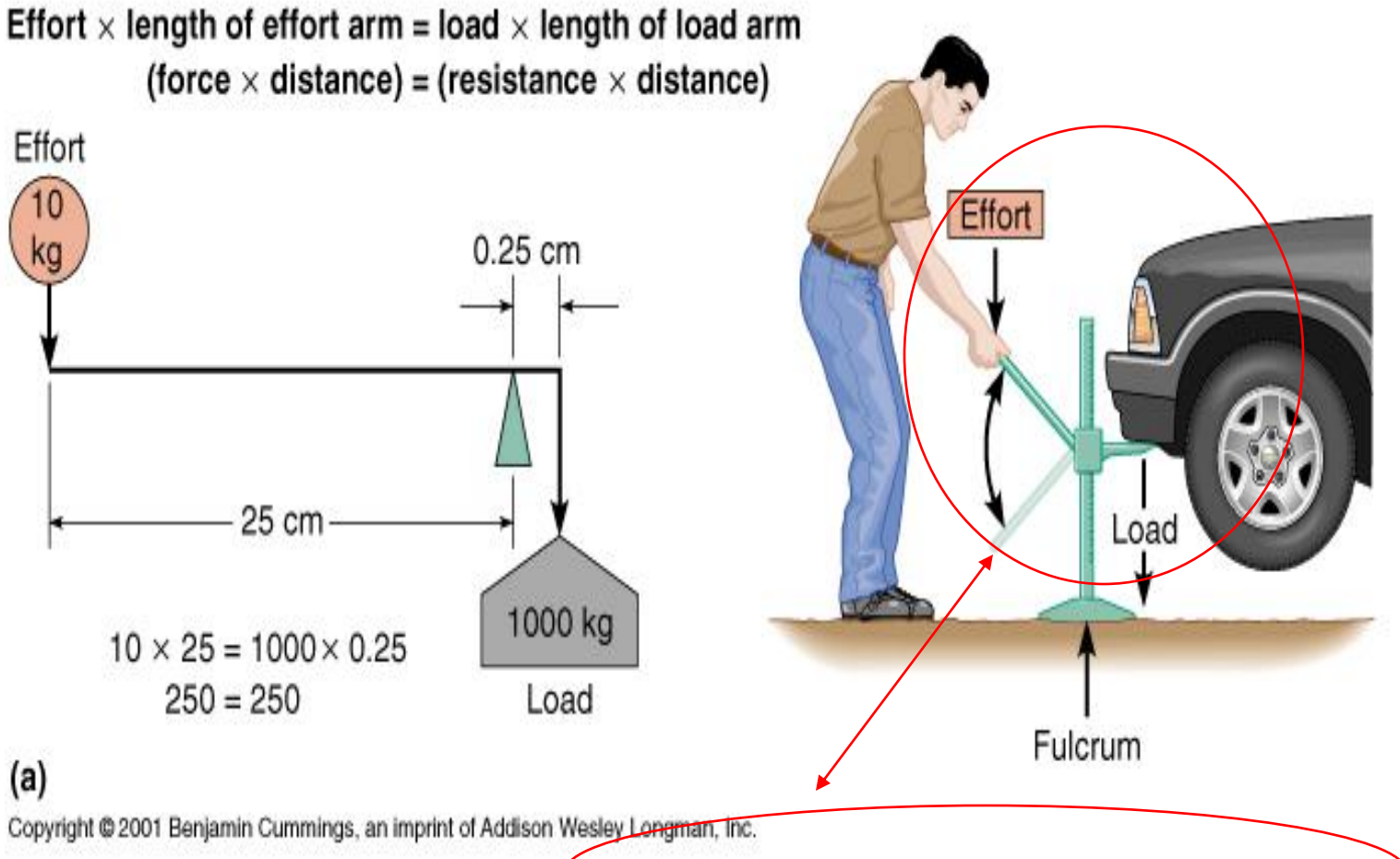
Draw the 3 views of the right knee:

1) **anterior - with & without muscles**
2) **posterior - without muscles**
3) **mid-sagittal**

They should illustrate the following:

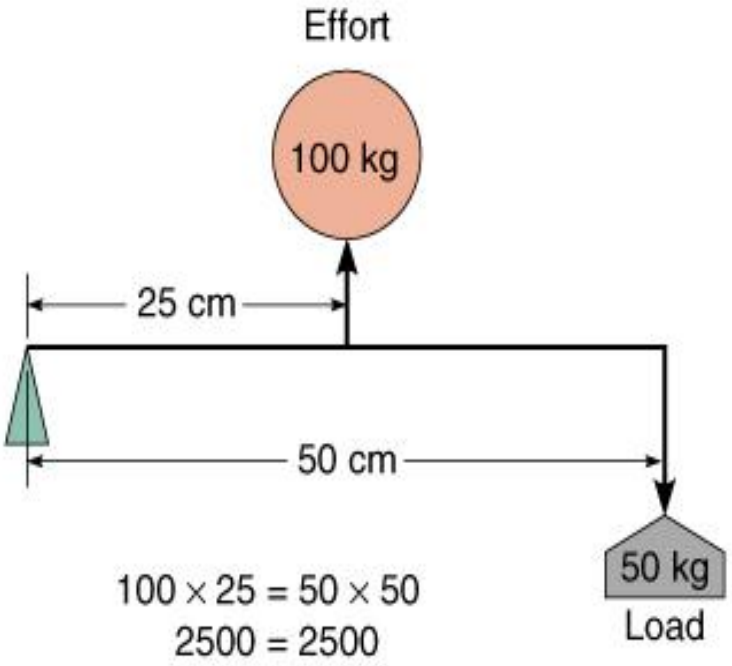
1) **4 bones, 3 joints, 2 menisci (anterior)**
2) **capsular ligaments (ant. & posterior)**
   - 2 intracapsular, 4 extracapsular
3) **3 anterior ligaments, 2 tendons (anterior)**
4) **Synovial cavity (mid-sagittal)**
   - 3 bursas, 1 fat pad

Mechanical Advantage

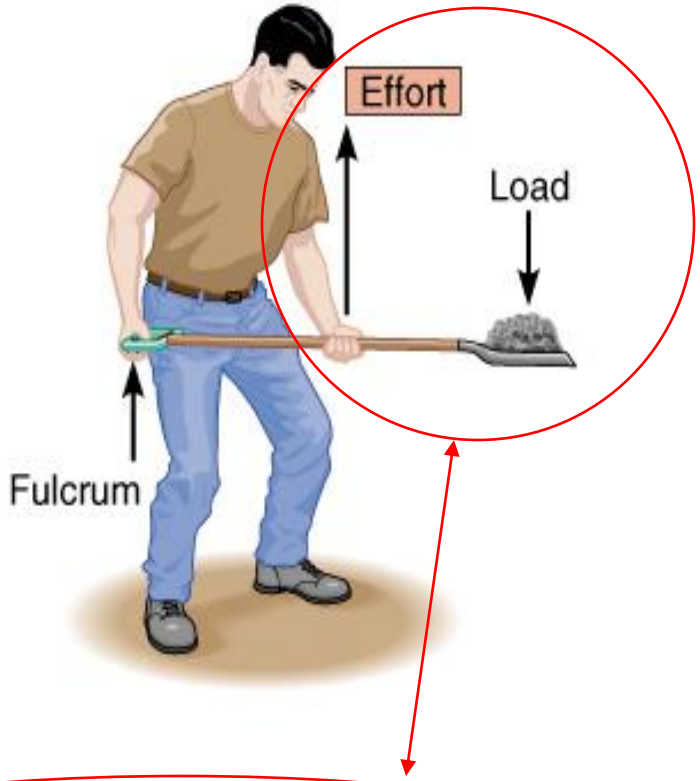


10 kg effort to lift 1000 kg load

Mechanical Disadvantage

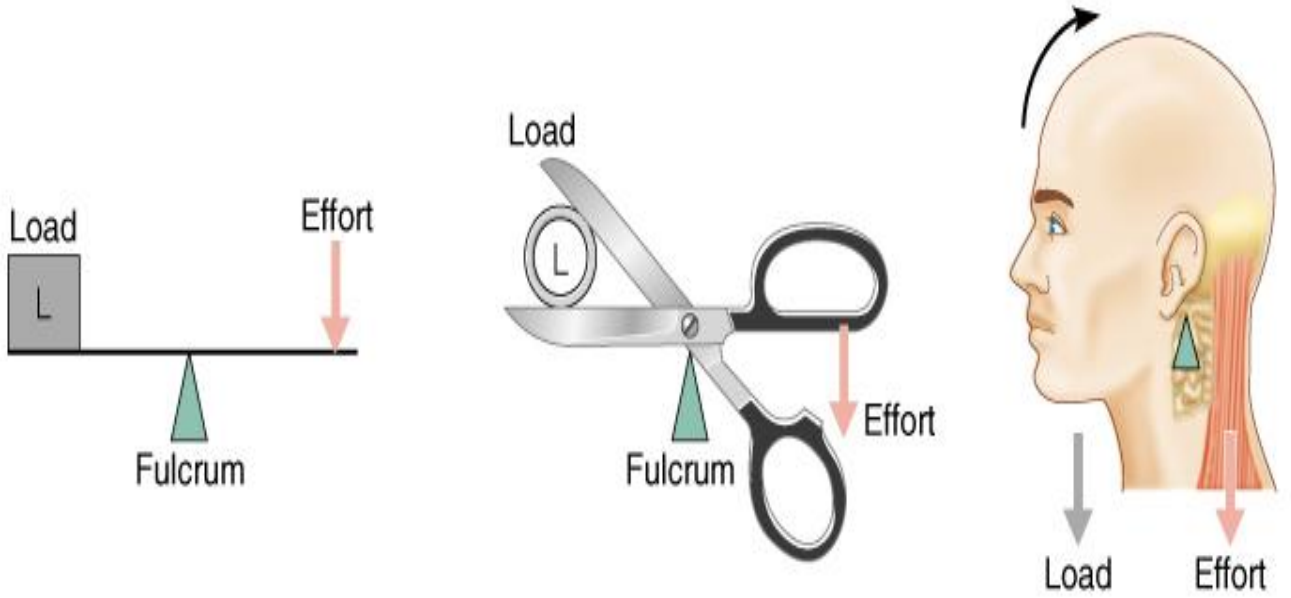


(b)



100 kg effort to lift 50 kg load

1st Class Lever

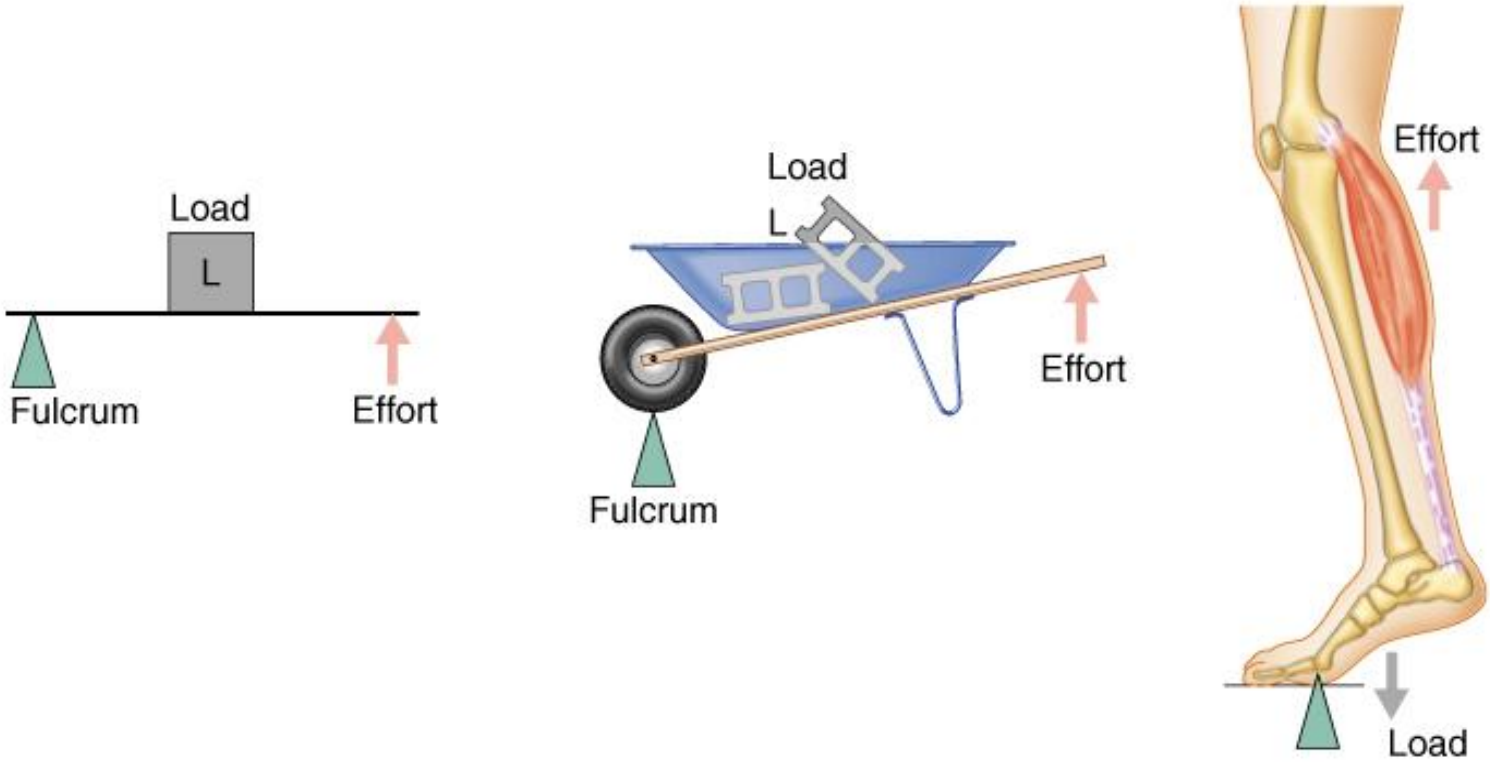


(a) First-class lever

L=facial weight
F = occipito-atlanto joint

E = posterior neck muscles
action: raise head

2nd Class Lever

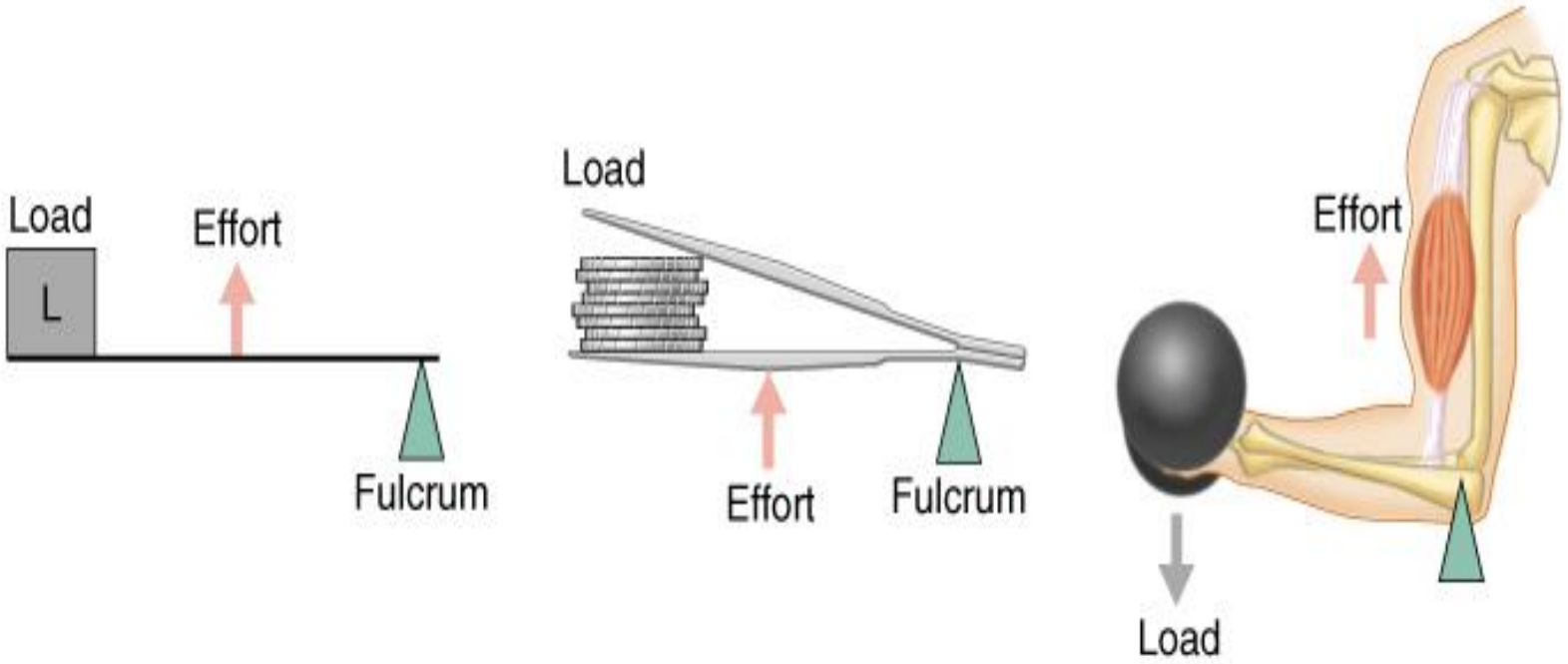


(b) Second-class lever

L = body weight
F = ball of foot

E = calf (gastrocnemius)
action: raise body (tiptoe)

3rd Class Lever



(c) Third-class lever

L = forearm & weights
F = elbow

E = biceps brachii
action: lift forearm & weights

Diseases Assign. (not collected)

Make the following table:

Disease	cause	affected area	symptoms
eg. Rickets	poor diet in children	all bones	soft bones pain not bear wt.

1) **Calcium problems:**
   - **osteoporosis, rickets, Paget's Disease**

2) **Joint problems:**
   - **bursitis & tendonitis, sprain, Lyme's Disease, arthritis (osteoarthritis, rheumatoid arth., gout)**