SI A&P - Full Discipline Demo - Digital

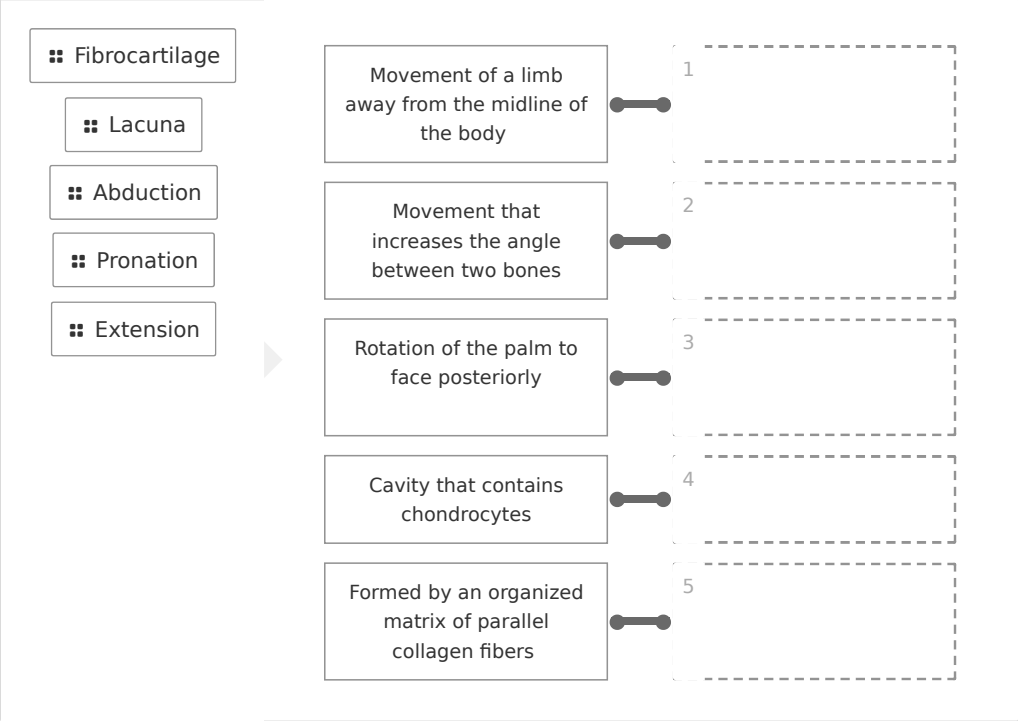
Joints - No Materials

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Digital
Course	SI A&P - Full Discipline Demo - Digital
Instructor	Sales SI Demo

Test Your Knowledge

Match each term with the best description.

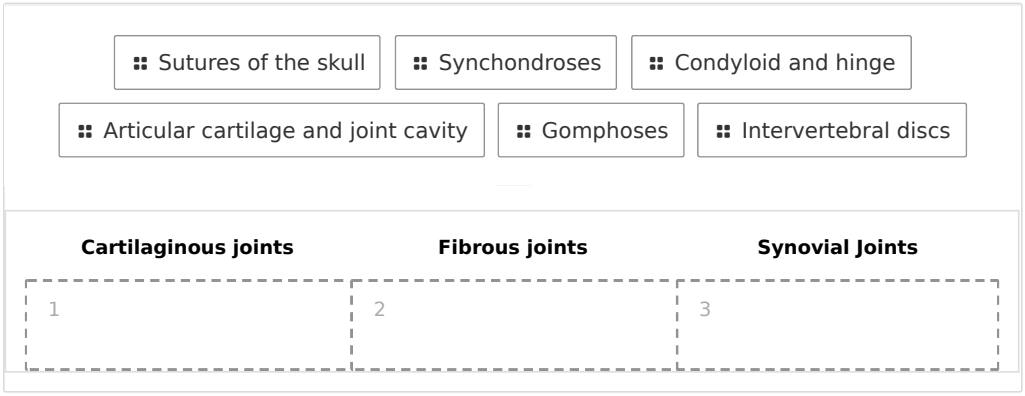


Correct answers:

1 Abduction 2 Extension 3 Pronation 4 Lacuna

5 Fibrocartilage

Classify each phrase as relating to cartilaginous, fibrous, or synovial joints.



Correct answers:

1 Synchondroses Intervertebral discs

2 Gomphoses Sutures of the skull

3 Condyloid and hinge Articular cartilage and joint cavity

Exploration

All cartilage types are composed of _____.

- chondrocytes
- lacunae
- an extracellular matrix
- All of the above ✔

_____ joints are held together by an interosseous membrane.

- Cartilaginous
- Syndesmosis ✔
- Synovial
- Symphysis

_____ joints involve a round-shaped head of bone lying within a concave bony surface.

- [x] Ball and socket
- [ ] Gliding
- [ ] Hinge
- [ ] Pivot

Adduction moves a limb toward the midline of the body.

- [x] True
- [ ] False

Exercise 1

How did hyaline cartilage and fibrocartilage tissues observed in this exercise appear both similar and different?

Both the hyaline cartilage and fibrocartilage tissues contained chondrocytes located inside lacunae surrounded by an extracellular matrix. The matrix of the hyaline cartilage appeared as a uniform, glossy gel. The matrix of the fibrocartilage appeared organized with parallel collagen fibers.

How does the histology of each of the cartilage types observed in this exercise relate to where the tissues are found in the body?

Hyaline cartilage has a glossy appearance and produces a resilient surface with minimal friction. Hyaline cartilage is the most abundant cartilage in the human body, surrounding the articulating surfaces of most long bones, filling the junctions between the ribs and sternum, and forms the epiphysial plate in growing bones. The organized intracellular matrix of fibrocartilage can resist high degrees of tension and compression. Fibrocartilage is found in intervertebral discs, the pubic symphysis, menisci of knee joints, and the articulating surfaces of some long bones. The elastic fibers of the extracellular matrix of elastic cartilage provides flexibility, cushion, and support.

Elastic cartilage is not found in joints but is restricted to the outer ear, epiglottis, and Eustachian tube.

Data Table 1: Microscopic Examination of Cartilage
(SAMPLE ANSWER BELOW)

Structure	Magnification	Comments
Hyaline Cartilage	600X	Students should only comment if they were unable to identify a structure.
Elastic Cartilage	600X	Students should only comment if they were unable to identify a structure.
Fibrocartilage	600X	Students should only comment if they were unable to identify a structure.

Photo 1: Hyaline Cartilage
(SAMPLE ANSWER BELOW)

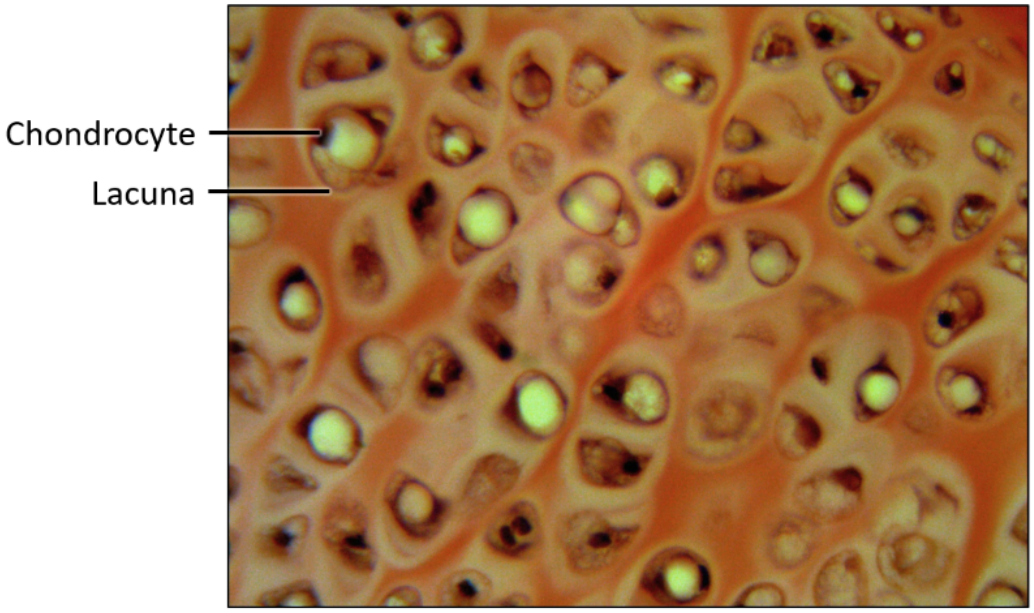


Photo 2: Elastic Cartilage

(SAMPLE ANSWER BELOW)

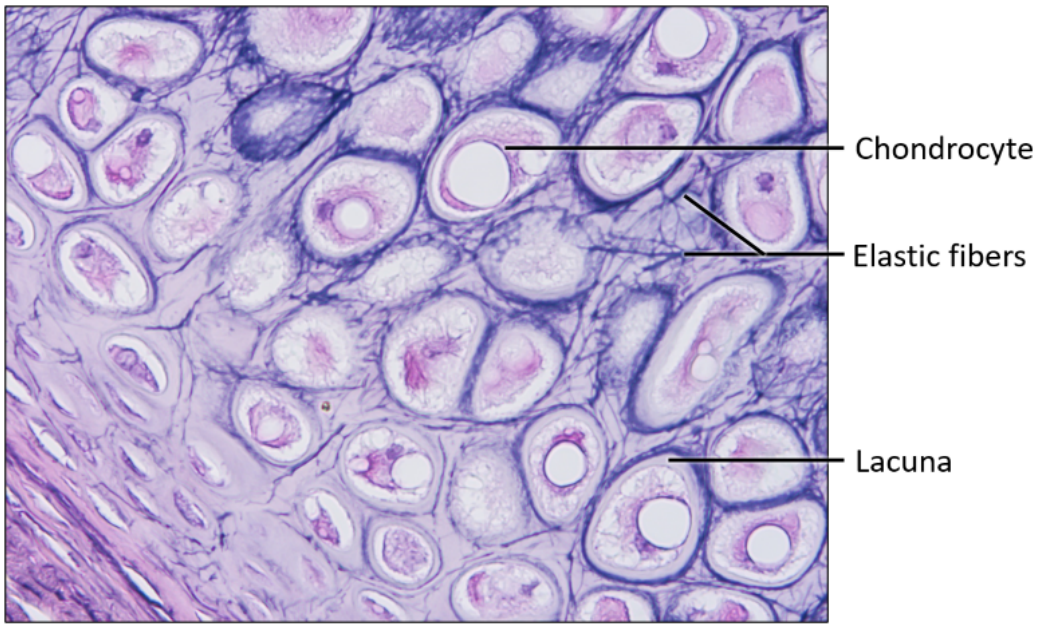
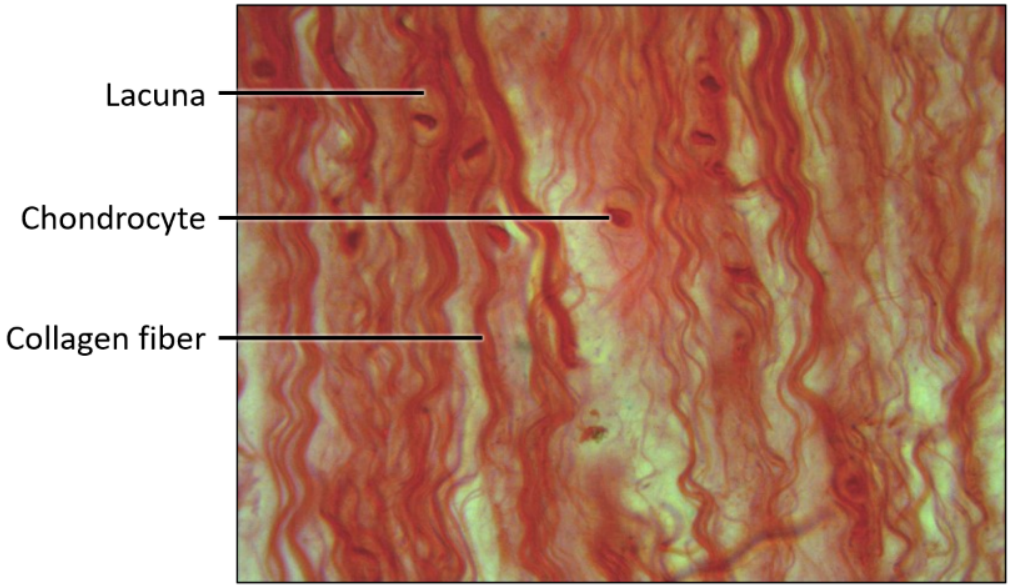


Photo 3: Fibrocartilage
(SAMPLE ANSWER BELOW)



Exercise 2

Use your observations recorded in Data Table 2 to determine what type of synovial joint the elbow is. Explain your answer.

Were cartilaginous or fibrous joints involved with any of the movements observed in this exercise? Describe the functions of cartilaginous and fibrous joints in your explanation.

The symphysis (cartilaginous) joints of the vertebral discs allow for flexibility of the vertebral column which was necessary when throwing the frisbee or bending over to pick of the pencil. The syndesmosis (fibrous) joints between the radius and ulna and tibia and fibula allow for the lower arm and lower legs respectively to twist flex during each of the three movements simulated in this exercise.

Data Table 2: Movements of the Body
(SAMPLE ANSWER BELOW)

	Jumping Jacks	Bending to Pick up a Pencil	Throwing a Frisbee
Shoulder	Abduction followed by adduction	Protraction of one shoulder	Retraction of one shoulder
Elbow	N/A	Extension of one elbow	Extension of one elbow
Wrists	N/A	N/A	Flexion
Hip	Abduction followed by adduction	N/A or Flexion	N/A
Knee	Slight flexion	N/A or Flexion	N/A
Ankles	N/A	Slight flexion	N/A

Competency Review

All cartilage is composed of secretory cells called ____.

- chondrocytes ✔
- lacunae
- matrix
- collagen

Hyaline cartilage is the most abundant cartilage in the human body.

- True ✔
- False

____ are immobile joints between the teeth and their sockets in the mandible and maxillae.

- Sutures
- Syndesmoses
- Gomphoses ✔
- Symphyses

Synchondroses are immobile joints.

- True ✔
- False

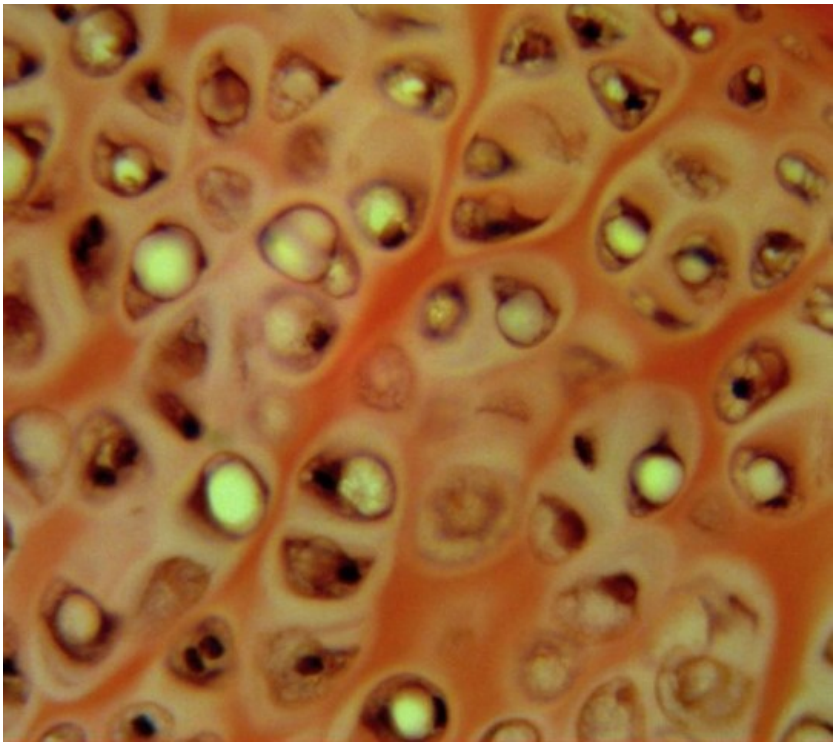
A _____ joint is a type of synovial joint.

- hinge
- saddle
- gliding
- All of the above ✔

Inversion and eversion involve movements of the ____.

- hands
- feet ✔
- neck
- ribs

The tissue in the micrograph below is an example of ____ .



- hyaline cartilage ✔
- elastic cartilage
- fibrocartilage
- brown fat

Throwing a frisbee involves flexion of the elbow.

- True ✔
- False

Extension Questions

Osteoarthritis is a degenerative joint disease, in which the tissues in the joint break down over time. Apply your knowledge of joint structure and function to predict the effects/symptoms of someone suffering osteoarthritis of the knee joint. (SAMPLE ANSWER BELOW)

An individual suffering from the breakdown of tissues surrounding the knee joint would lose the cushioning function of the cartilage within the knee joint and most likely experience pain when walking. The knee joint is a hinge joint that flexes and extends the lower leg. Compromise to the joint would limit the range of motion.