

Knee and Ankle Sports Injury Assessment Curriculum

Every effort has been made to trace the ownership of copyrighted material and to make full acknowledgement of its use. If errors or omissions have occurred, they will be corrected in subsequent editions, provided that notification is submitted in writing to the publisher.



© 2022, Realityworks, Inc. All rights reserved.

2709 Mondovi Road
Eau Claire, WI 54701 USA
800.830.1416
+1.715.830.2040
www.realityworks.com

1064570-01

Table of Contents

Table of Contents	3
Author	4
Curriculum Structure	5
Lesson Structure	5
Lesson One – Ankle Injury Assessment Trainer	6
FOCUS: Anatomy of the Ankle	7
LEARN: Ankle Injuries and Orthopedic Assessments	10
REVIEW: Ankle Injury Assessments	14
Sources	16
Lesson Two – Knee Injury Assessment Trainer	17
FOCUS: Anatomy of the Knee	18
LEARN: Knee Injury Assessment	21
REVIEW: Knee Injury Assessments	25
Sources	35

Author



Jaime Mann is a sports medicine and healthcare teacher with 20+ years of experience as an Outreach Athletic Trainer at the secondary school level. She has a Doctorate of Sports Psychology in Sport and Performance Psychology. She is also a certified athletic trainer and functional capacity evaluator. Ms. Mann provides outreach athletic training services to local high schools, supervises and mentors assistant athletic trainers at various local high schools. Her writing specialties include sports psychology, athletic training, sports medicine, e-learning, functional capacity evaluations, long-term disability, workman's compensation, life skills, and coaching philosophy.

This curriculum and the accompanying *Knee and Ankle Sports Injury Assessment Trainer* will help students learn the basics of knee and ankle injuries and how to assess and treat those injuries.

Curriculum Structure

The *Knee and Ankle Sports Injury Assessment* curriculum is composed of the following parts. Approximate lesson times are included.

Lesson	Title	Approximate Time
One	Ankle Injury Assessment Trainer	65-80 minutes
Two	Knee Injury Assessment Trainer	65-80 minutes
	Total	2 hours 30 minutes - 3 hours

Lesson Structure

Each lesson begins with a Lesson Overview, Lesson Objectives, and a Lesson at a Glance table which lists the lesson activities, materials required, suggested preparation steps and approximate class time.

Lesson Sections

The actual lesson follows the overview, which will contain some of the sections described below.

FOCUS

Every lesson begins with a FOCUS activity intended to capture participants' attention. This may be in the form of a small or large class discussion, a game, a review of previous lesson information, or a demonstration. During this activity, participants are introduced to the topic of the lesson.

LEARN

The LEARN activity in each lesson varies in its presentation mode. It may be a slide presentation, group activity, or demonstration.

REVIEW

The majority of lessons end with a REVIEW activity intended to briefly review the lesson's key messages or main points.

Lesson One – Ankle Injury Assessment Trainer

Lesson Overview

In this lesson, students will be introduced to the causes, assessments, and treatments of ankle injuries.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand the anatomy of ankle ligament and tendons injured in sports.
- Explain the types and classifications of ankle injuries.
- Demonstrate the ability to perform orthopedic special tests of the ankle.

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Anatomy of the Ankle</i> worksheet • <i>Anatomy of the Ankle – Answer Key</i> • <i>Pre-Assessment</i>	1. Print/photocopy <i>Anatomy of the Ankle</i> (one per participant) and <i>Pre-Assessment</i>	15-20 minutes
LEARN	• <i>Ankle Injury Assessment</i> slide presentation • <i>Knee and Ankle Sports Injury Assessment Trainer</i>	1. Prepare <i>Ankle Injury Assessment</i> slide presentation for viewing	25-30 minutes
REVIEW	• <i>Knee and Ankle Sports Injury Assessment Trainer</i> • <i>Ankle Injury Assessment Lab</i> worksheet	1. Print/photocopy <i>Ankle Injury Assessment Lab</i> worksheet 2. Have participants get into groups of 2-4	25-30 minutes

Lesson One – Ankle Injury Assessment Trainer

FOCUS: Anatomy of the Ankle

15-20 minutes

Purpose:

Participants work individually and then in groups to complete the worksheet, testing their knowledge of the anatomy of the ankle.

Materials:

- *Anatomy of the Ankle* worksheet (one per participant)
- *Anatomy of the Ankle – Answer Key*
- *Pre-Assessment* (one per participant)

Facilitation Steps:

1. Hand out the *Pre-Assessment* and have students hand it in to track knowledge gained over the two lessons.
2. Pass out *Anatomy of the Ankle* (one worksheet per student).
3. Have participants fill out as much of the worksheet as they can on their own.
4. Ask the participants to pair up and work together to identify the remaining structures.
5. Once you have allowed enough time for students to attempt to find/know the answers, review the correct answers.

Name: _____

Class: _____

Anatomy of the Ankle

Label the bones and ligaments of the ankle by writing the name of the ligament or bone on the line.

1. _____

2. _____

3. _____

4. _____

5. _____

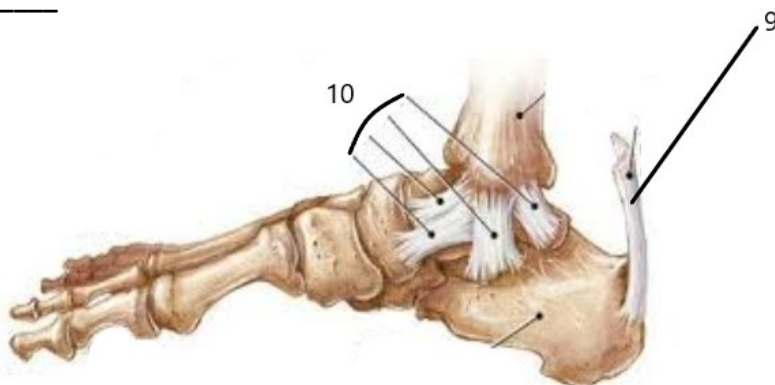
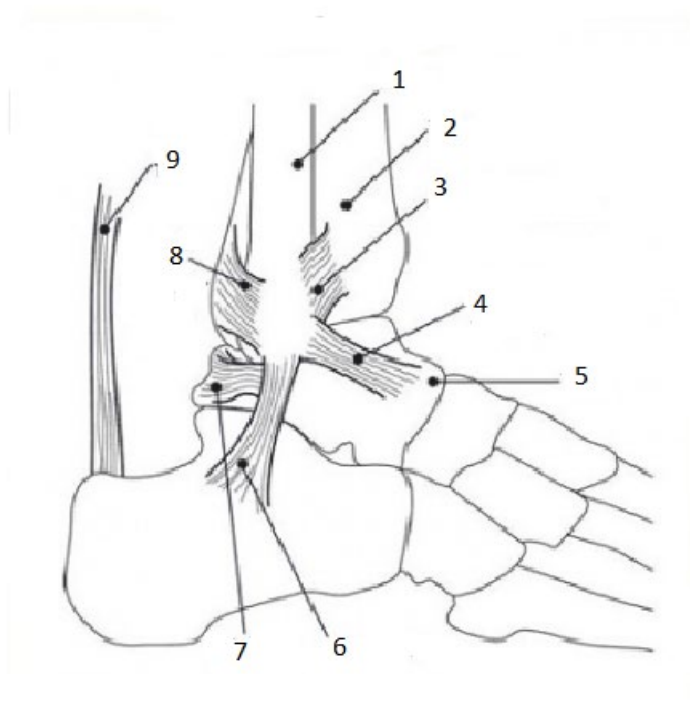
6. _____

7. _____

8. _____

9. _____

10. _____



Name: _____

Class: _____

Anatomy of the Ankle – Answer Key

Label the bones and ligaments of the ankle by writing the name of the ligament or bone on the line.

1. Fibula

2. Tibia

3. Anterior Tibiofibular Ligament

4. Anterior Talofibular Ligament

5. Talus

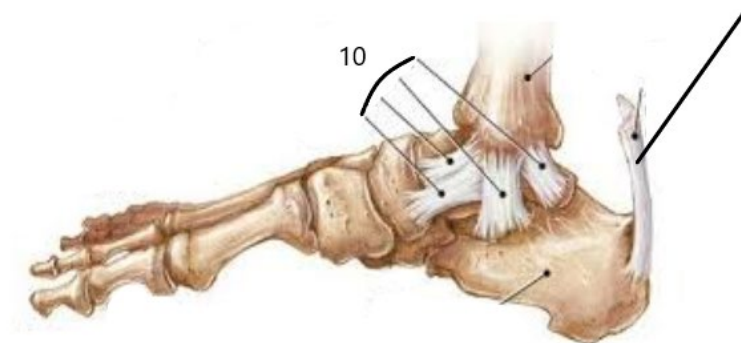
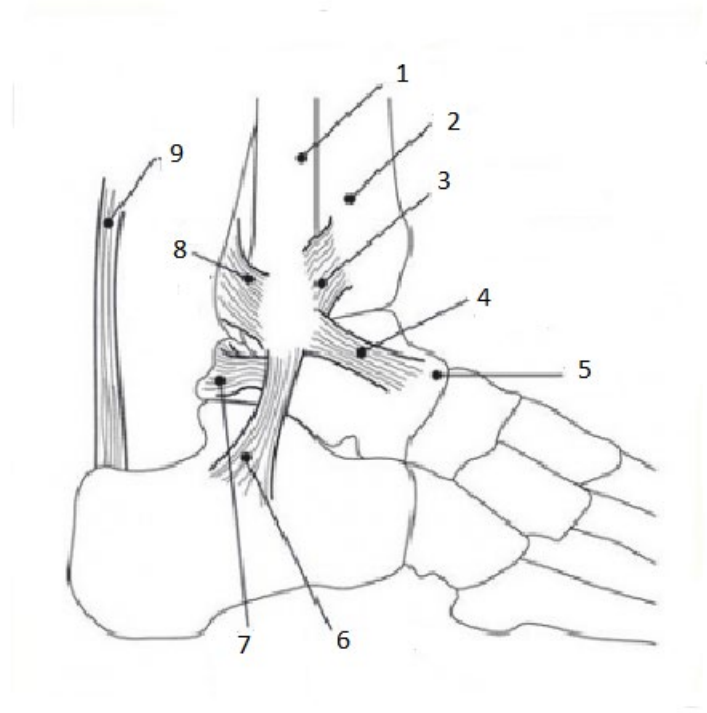
6. Calcaneofibular Ligament

7. Posterior Talofibular Ligament

8. Posterior Tibiofibular Ligament

9. Achilles Tendon

10. Deltoid Ligament



Lesson One – Ankle Sports Injury Assessment Trainer

LEARN: Ankle Injuries and Orthopedic Assessments

25-30 minutes

Purpose:

Participants work in groups to complete a puzzle, testing their knowledge of the male and female reproductive systems.

Materials:

- *Ankle Injury Assessment* slide presentation
- *Knee and Ankle Sports Injury Assessment Trainer*

Facilitation Steps:

1. Share the following information with the participants while showing the slide presentation.

Slide 1: Cover slide

Slide 2: Title slide

Slide 3: Ankle sprains are the most common musculoskeletal injury, accounting for anywhere between 10-30% of all injuries.

Ankle sprains occur when the foot twists, turns, or rolls beyond its normal motions. They can also occur if the foot is planted unevenly on a surface and forced beyond the normal range of motion of stepping.

Like other sprains, ankle ligament injuries occur when the ligaments stretch beyond their normal range into an abnormal position.

Slide 4: Ankle injuries are classified by severity and by the type of ankle sprain.

Ankle sprains are graded on a scale of one to three with a grade one being the mildest and grade three being the most severe.

There are also three types of ankle sprains, an inversion sprain, an eversion sprain, and a high ankle sprain.

We'll discuss the severity of ankle sprains first since they are the same for all types of ankle sprains and then discuss the three different types of sprains.

Slide 5: A grade one ankle sprain is characterized by a mild stretch of the ligament(s) beyond the normal length. There is no instability of the joint noted in a grade one sprain.

Signs and symptoms of a grade one sprain include: mild point tenderness over the involved ligaments, minimal swelling, some stiffness, and no or minimal pain with walking.

Slide 6: A grade two ankle sprain is characterized by complete tearing of one ligament or partial tearing of multiple ligaments. In a grade two ankle sprain, the athlete will notice mild to moderate instability of the ankle joint.

Signs and symptoms of a grade two ankle sprain include: moderate pain, localized swelling, mild to moderate bruising, point tenderness over the involved ligaments, and pain with walking.

Slide 7: Grade three ankle sprains are characterized by complete tearing of the involved ligaments and significant instability of the ankle joint.

Signs and symptoms of a grade three ankle sprain include: diffuse swelling throughout the joint, moderate to severe bruising, pain throughout the joint, and inability to bear weight fully on the involved foot.

Slide 8: All ankle sprains, regardless of type or severity, require three phases of recovery:

Phase 1: resting, protecting the ankle (tape or brace for support), and reducing any swelling

Phase 2: restoring ROM, strength, and flexibility

Phase 3: gradual return to activities and return to play activities.

Slide 9: Similarly, the treatment plan for an ankle sprain will be the same for all types of ankle sprains.

A grade one ankle sprain recovery time would be approximately one to three weeks. The treatment would include RICE (rest, ice, compression, and elevation) as needed. Some very minor ankle sprains may only need very minimal treatment and may be able to continue to participate while continuing treatment. The athlete may wear a brace or tape during activity for support.

A grade one rehabilitation program should focus on regaining any lost strength and improving proprioception of the ankle and return to activity.

Grade two ankle sprains will also require RICE but may also need immobilization to allow the ligaments to heal. The rehabilitation program for a grade two sprain should focus on improving ROM, proprioception, and strength before beginning return to play activities. Recovery from a grade two ankle sprain could take three to six weeks.

Slide 10: With a severe grade three ankle sprain, the athlete may need a cast or walking boot for immobilization in the early phases of recovery. Treatment would again include RICE followed by a

rehabilitation program focusing on ROM, proprioception, and strength with a gradual return to play activities. Recovery may take three to six months.

Surgery for ankle sprains is rare but may be required if the injury does not respond to non-surgical treatments.

Slide 11: This slide shows the direction the foot moves in comparison to the normal position when referring to inversion and eversion ankle sprains.

Slide 12: Inversion ankle sprains are the most common type of ankle sprain. These type of ankle sprains occur when there is an injury to the lateral ligaments (the ATFL, CFL, and PTFL). This may occur when the foot rolls inward causing the lateral ligaments to be overstretched.

Inversion ankle sprains are more common than other types of sprains because the medial malleolus is shorter than the lateral malleolus which allows the talus to invert more than it can evert. Also, the lateral ligaments are each separate ligaments and not as strong as the massive deltoid ligament on the medial aspect.

Slide 13: A grade one inversion ankle sprain involves stretching of the ATFL and may include stretching of the CFL.

A grade two inversion ankle sprain involves partial tearing of the ATFL and stretching or partial tearing of the CFL.

A grade three inversion ankle sprain involves complete tearing of the ATFL and CFL, with partial tearing of the PTFL and the tibiofibular ligaments.

Slide 14: Special tests for an inversion ankle sprain include the anterior drawer test and talar tilt test.

Knee and Ankle Sports Injury Assessment

The anterior drawer test of the ankle is used to evaluate the extent of the injury to the anterior talofibular ligament.

The talar tilt test, also called the inversion stress test, evaluates the integrity of the calcaneofibular ligament.

Slide 15: When performing the anterior drawer test, the examiner stabilizes the anterior distal leg with one hand and grasps the patient's calcaneus and rear foot with their second hand. The examiner then places the patient's foot into 10-15° of plantar flexion, pulling the rear foot anteriorly.

The test is positive if there is forward movement of the foot. The examiner may feel or hear a clunk as the talus slides forward.

Use the ankle model to demonstrate proper hand placement and force application while describing how to perform the test.

Slide 16: The talar tilt test is performed with the foot at 90°. The examiner inverts the calcaneus and looks for laxity of the joint. The test is positive if the athlete experiences pain and/or laxity, or excessive gaping of the joint, with inversion.

Use the knee model to demonstrate proper hand placement and force application while describing how to perform the test.

Slide 17: Eversion sprains are rare, accounting for only 5-10% of all ankle sprains.

In an eversion sprain, there is injury to the deltoid ligament, which is a strong, flat triangular band that incorporate four separate ligaments: anterior tibiotalar ligament, tibiocalcaneal ligament, posterior tibiotalar ligament, and the tibionavicular ligament. when the foot turns outward beyond the normal capacity of the ligament. An eversion sprain may

also be accompanied by an avulsion fracture of the medial malleolus.

Slide 18: Eversion ankle sprains are also graded from one (mild) to three (severe). A grade one eversion ankle sprain involves slight stretching of the deltoid ligament. A grade two sprain involves partial tearing of the deltoid ligament and a grade three sprain involves a complete tear of the deltoid ligament.

Slide 19: The special test used to determine the severity of an eversion ankle sprain is the eversion stress test. This test evaluates the integrity of the deltoid ligament and aids in determining the degree of instability of the ankle following this type of injury.

The examiner stabilizes the athlete's leg with one hand on the tibia and places the other hand on the calcaneus; force is then applied in an eversion motion. The test is positive if there is pain and/or laxity during the movement.

Use the ankle model to demonstrate proper hand placement and force application while describing how to perform the test.

Slide 20: The third type of ankle sprain is a high ankle sprain. This type of sprain occurs when there is a sudden twisting, turning, or cutting motion that forces the foot into extreme dorsiflexion. A high ankle sprain occurs when the anterior and posterior tibiofibular ligaments are torn and there is injury to the syndesmosis. This type of injury often occurs in conjunction with a severe inversion or eversion ankle sprain.

Slide 21: The special test to determine the severity of a high ankle sprain is the squeeze test. During this test, the examiner grasps the patient's leg midway up the tibia and performs a compress and release motion. A positive squeeze test will result in pain in the area of the syndesmosis.

******This test will not be practiced on the *Knee and Ankle Sport Injury Assessment Trainer* due to a positive test requiring the athlete to report pain.

Slide 22: The Achilles tendon is the most ruptured tendon, usually caused by a sudden, forceful plantarflexion of the ankle. It may also occur because of a direct blow.

Achilles tendon ruptures usually occur in sports that require ballistic movement, such as tennis and basketball. It is also a more common injury in athletes over the age of 30.

Slide 23: Signs and symptoms of an Achilles tendon injury include: feeling or hearing a pop, pain with plantarflexion, swelling around the tendon or heel, severe pain in the heel, and pain with weight bearing. The athlete may also have a noticeable visual or palpable defect along the Achilles tendon.

Slide 24: The Thompson test is used to evaluate for an Achilles tendon injury. The athlete lies prone with the knee bent at 90 degrees. The examiner places both hands around the calf muscles and squeezes.

A positive test would result in lack of plantarflexion when the calf is squeezed.

However, a false negative test can occur if plantar flexion is produced by intact extrinsic foot flexors.

Use the ankle model to demonstrate proper hand placement and force application while describing how to perform the test.

Slide 25: The common treatment plan for an athlete with an Achilles tendon rupture usually requires surgery; however, non-athletes may be treated with a conservative approach. With either method, early rehabilitation is essential to successful treatment.

Immobilization will be necessary for approximately six to eight weeks, with transitions to a walking boot after three to four weeks. The goal should in early phases of rehabilitation should be to reduce pain, inflammation, and protect healing while also restoring ROM. As rehabilitation progresses, the focus should include restoring normal muscle activation, restoring dynamic stability, and a gradual increase in sport specific training.

Recovery time following a complete Achilles tendon rupture is approximately four to six months.

Lesson One – Ankle Sports Injury Assessment Trainer

REVIEW: Ankle Injury Assessments

10 minutes

Purpose:

Participants will participate in a lab activity to practice performing ankle injury special tests on other participants and using the *Knee and Ankle Sports Injury Assessment Trainer*.

Materials:

- *Knee and Ankle Sports Injury Assessment Trainer*
- *Ankle Injury Assessment Lab* worksheet (one per participant)

Facilitation Steps:

1. Provide each participant with a copy of the lab worksheet.
2. Have participants work in pairs or groups to practice the knee special tests on each other as listed on the worksheet.
3. Each pair/group should rotate through performing the special tests on the *Knee and Ankle Injury Assessment Trainer* to feel each grade of the injuries for each special test and receive a sign off from instructor once the student has demonstrated proficiency with the special test.

Name: _____ Class: _____

Ankle Injury Assessment Lab

Perform each test below on two people and record + (positive) or – (negative).

Special Test	What are you testing for?	Left Leg 1	Right Leg 1	Left Leg 2	Right Leg 2
Anterior Drawer					
Talar Tilt					
Eversion Stress Test					
Thompson Test					

Perform each test below on the knee model to assess each grade of the ligament injury. Place a check mark in the column for each assessment that you have completed correctly and make sure to get initials from teacher to mark that you have demonstrated proficiency in each test.

Special Test	Grade 1	Grade 2	Grade 3	Teacher Initials
Anterior Drawer				
Talar Tilt				
Eversion Stress Test				
Thompson Test				

Sources

1. France, R. C. (2021). *Introduction to Sports Medicine and Athletic Training* (3rd ed.). Boston, MA: Cengage
2. Magee, D. J. (2008). *Orthopedic Physical Assessment* (5th ed.). St. Louis, MO: Saunders Elsevier
3. Park, S. H., Lee, H. S., Young, K. W., & Seo, S. G. (2020). Treatment of Acute Achilles Tendon Rupture. *Clinics in orthopedic surgery*, 12(1), 1–8. <https://doi.org/10.4055/cios.2020.12.1.1>
4. Prentice, W. E. (2021). *Essentials of Athletic Injury Management* (10th ed.). McGraw-Hill Education.

Lesson Two – Knee Injury Assessment Trainer

Lesson Overview

In this lesson, students will be introduced to the causes, assessments, and treatments of ligament injuries of the knee.

Lesson Objectives

After completing this lesson, participants will be able to:

- Understand the anatomy of the ligaments of the knee.
- Explain the different grades of injury and the care of those injuries.
- Demonstrate the ability to perform orthopedic special tests to determine the nature of a knee injury.

Lesson at a Glance

Activity	Materials	Preparation	Approximate class time
FOCUS	• <i>Anatomy of the Knee – Bones and Ligaments</i> worksheet • <i>Anatomy of the Knee – Bones and Ligaments</i> – Answer Key	1. Print/photocopy <i>Knee Anatomy</i> (one per participant)	10-15 minutes
LEARN	• <i>Knee and Ankle Sports Injury Assessment Trainer</i> • <i>Knee Injury Assessment</i> slide presentation	1. Prepare <i>Knee Injury Assessment</i> slide presentation for viewing	25-30 minutes
REVIEW	• <i>Knee and Ankle Sports Injury Assessment Trainer</i> • <i>Knee Injury Assessment Lab</i> worksheet • <i>Post-Assessment</i>	1. Print/photocopy <i>Knee Injury Assessment Lab</i> worksheet and <i>Post Assessment</i> 2. Have participants get into groups of two to four	25-30 minutes

Lesson Two – Knee Injury Assessment

FOCUS: Anatomy of the Knee

10-15 minutes

Purpose:

Participants will use worksheet to demonstrate prior knowledge of knee anatomy and be able to identify knee ligaments addressed during lesson.

Materials:

- *Anatomy of the Knee* Worksheet (one per participant)
- *Anatomy of the Knee Answer Key*

Facilitation Steps:

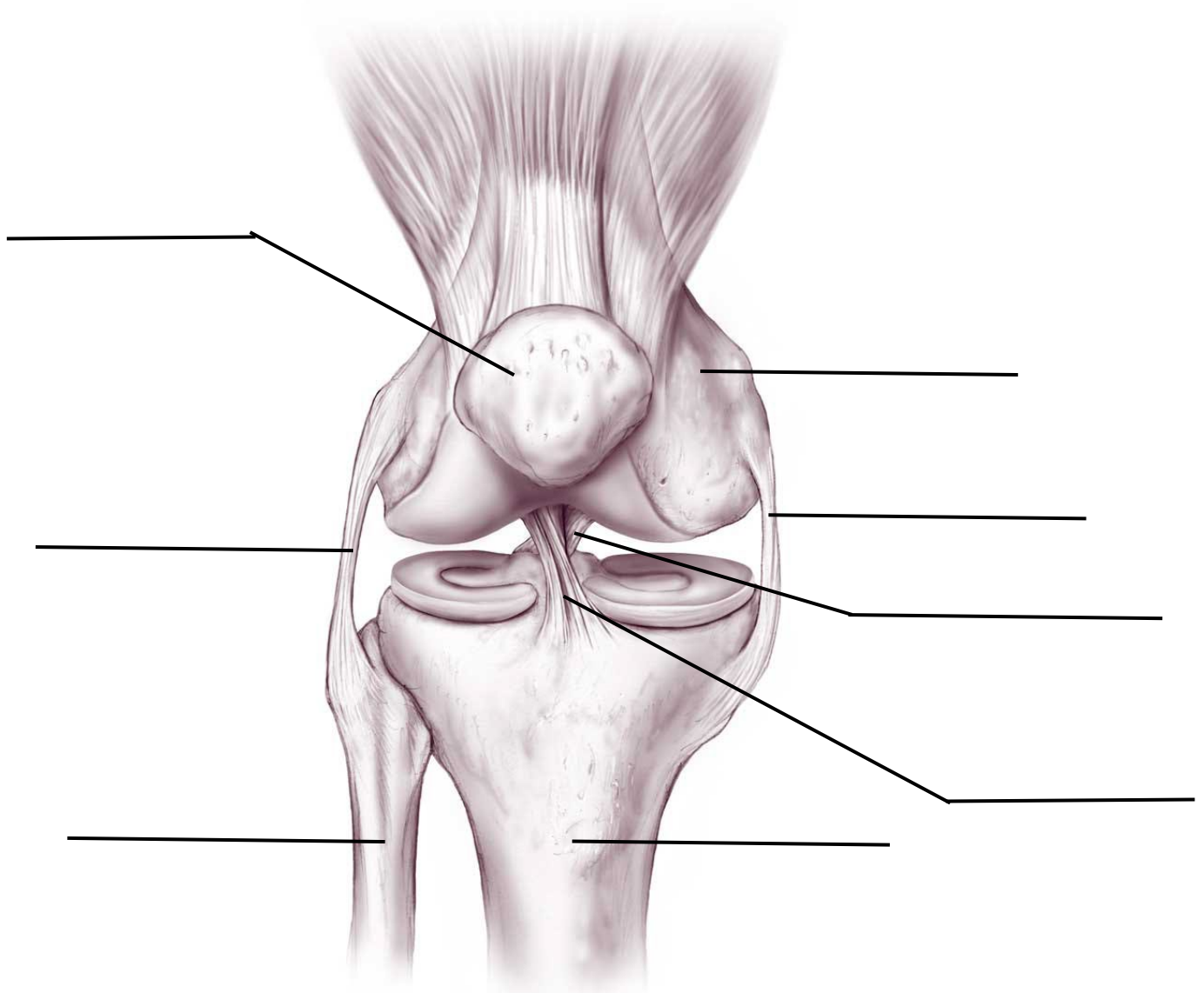
1. Pass out one worksheet per student.
2. Have participants fill out as much of the worksheet they can on their own.
3. Then ask the participants to pair up and work together to identify the remaining structures.
4. Once you have allowed enough time for students to attempt to find/know the answers, review the correct answers.

Name: _____

Class: _____

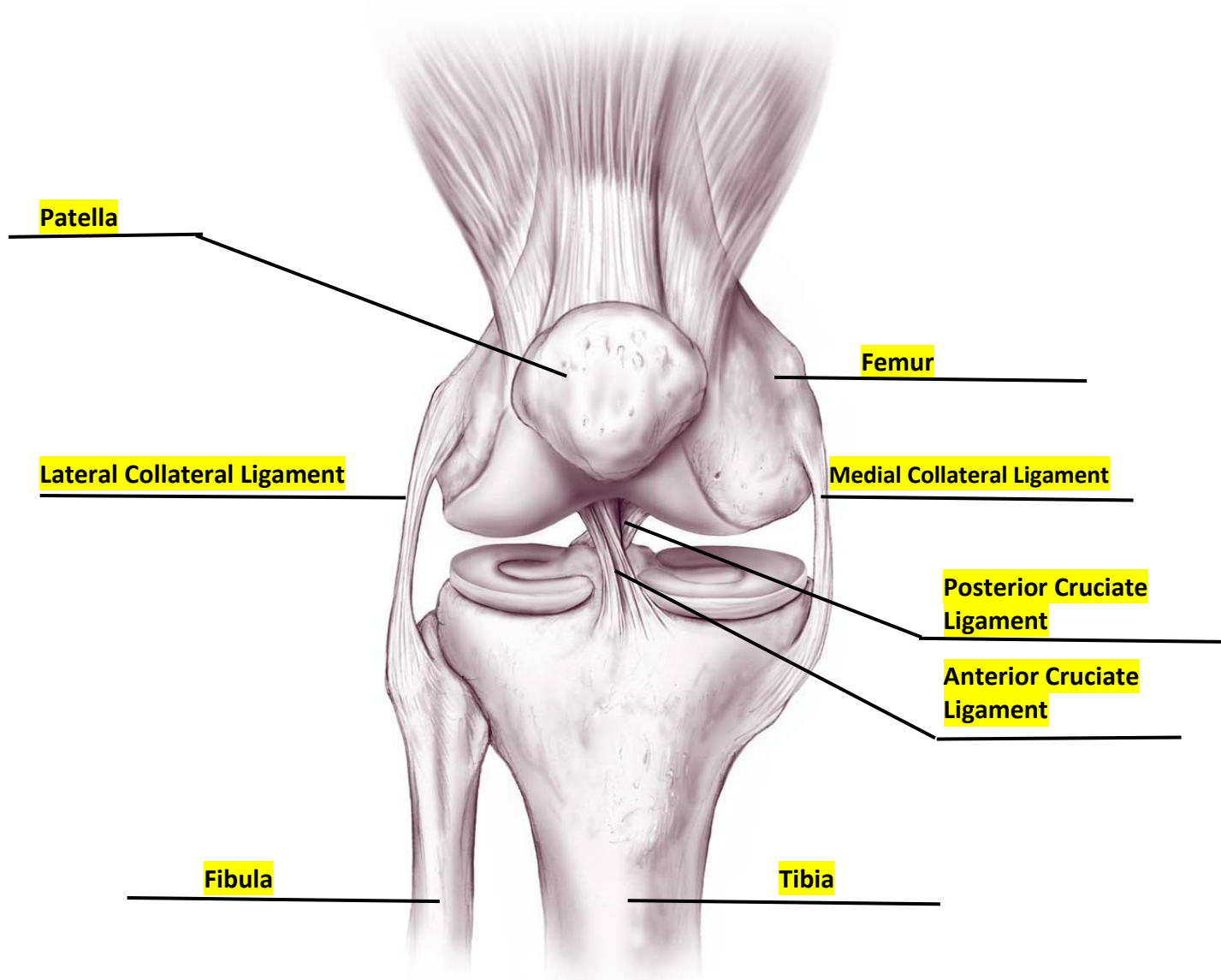
Anatomy of the Knee

Label the bones and ligaments of the knee by writing the name of the ligament on the line.



Anatomy of the Knee Answer Key

Label the bones and ligaments of the knee by writing the name of the ligament on the line.



Lesson Two – Knee Injury Assessment

LEARN: Knee Injury Assessment

30-35 minutes

Purpose:

Participants will view the slide presentation and be introduced to basic knee anatomy, knee injuries, and immediate care of these injuries.

Materials:

- *Knee Injury Assessment* slide presentation
- *Knee and Ankle Sports Injury Assessment Trainer*

Facilitation Steps:

1. Share the following information with the participants while showing the slide presentation.

Slide 1: Cover slide

Slide 2: Title slide

Slide 3: Knee ligament injuries are classified by the severity of the injury. A grade one injury is the least severe and a grade three is the most severe.

Slide 4: Grade one sprain occurs when the ligament is stretched but only a few fibers are torn. The athlete may experience mild pain and a little to no swelling. With this type of injury, the joint remains stable during activity. When performing special tests with this type of injury, there will be a firm end feel to the ligament.

Slide 5: A grade two sprain is characterized by fibers of the ligament being partially torn. The athlete will experience mild to moderate pain and swelling with some loss of function. They may be unable to bear weight on the leg and may complain of feeling like the knee is unstable.

When performing special tests, there will be increased anterior translation of the tibia, but the ligament continues to have a firm end point.

Slide 6: In a grade three sprain, the fibers of the ligament are completely torn or ruptured. There is moderate to severe pain and will progress to a dull ache. There may be varying levels of swelling, but typically this level of injury results in moderate to severe swelling of the knee. The athlete will experience significant instability and may complain of the knee giving out if they are able to put weight on the leg. When performing special tests, no end point is evident.

Slide 7: The four ligaments are divided into two categories, the collateral ligaments, and the cruciate ligaments.

The collateral ligaments are found on the outside of the knee and control the sideways motion of the knee, bracing against unusual movement. These ligaments are the medial collateral ligament (MCL) and the lateral collateral ligament (LCL).

The cruciate ligaments are found on the inside of the knee and are the primary rotary stabilizers of the knee.

The anterior cruciate ligament (ACL) prevents forward movement of the tibia in relation to the femur and controls lateral rotational movements of the tibia when the knee is flexed.

The posterior cruciate ligament (PCL) prevents the femur from sliding forward off the top of the tibia.

Slide 8: The collateral ligaments are the supportive ligaments on either side of the knee. The medial

collateral ligament (MCL) is the broad, fan-shaped ligament that joins the medial femoral condyle to the tibia.

The MCL contains both a deep and a superficial portion. The deep portion inserts directly into the edge of the tibial plateau and the meniscus. The superficial portion inserts more distally, onto the flare of the tibia.

Slide 9: The mechanism of injury for a MCL injury is excessive valgus force on the medial tibiofemoral joint. This occurs during contact injuries when there is a blow to the outside of the knee cause stress on the medial aspect of the knee. An MCL sprain can also be a non-contact injury when the athlete experiences a high-energy, twisting maneuver that places stress on the medial collateral ligament.

Slide 10: Signs and symptoms of an MCL sprain include: tenderness over the ligament and medial joint line, swelling on the medial aspect of the knee, and limited ROM. Athletes with grade two or three injuries may have difficulty bearing weight on the leg injured.

Slide 11: The test for an MCL injury is called the valgus stress test. It is performed at both 0° and 30° of knee flexion.

Use the knee model to demonstrate proper hand placement and force application while describing how to perform the test.

The hand placement for the valgus stress test, explaining that pressure is applied to the lateral aspect of the knee and the examiner will look for gaping at the medial joint line or feel for laxity of the MCL. The examiner may also feel a clunk as the force is lateral force is released and the tibia and femur come into contact as the joint closes.

Slide 12: Treatment for a MCL sprain will vary based on the severity of the injury. All grades will need protection, rest, ice, compression, and

elevation in the early stages. If unable to bear weight, the athlete may need crutches. A hinged knee brace will also be worn during the early stages while the ligament heals.

Extended care for an MCL sprain includes physical therapy and functional bracing during activities. Occasionally, grade three tears will require reconstructive surgery.

Slide 13: The lateral collateral ligament (LCL) connects the lateral epicondyle and the fibular head and lies under the tendon of the bicep femoris muscle. It runs laterally and posteriorly along the joint line.

Slide 14: A LCL injury occurs when there is a varus force to the medial aspect of the knee. The most common cause is a direct force to the inside of the knee that causes the LCL to stretch beyond its normal abilities. The injury can also occur because of excessive internal rotation of the tibia. LCL injuries are a less common injury than an MCL injury.

Slide 15: Signs and symptoms of a LCL sprain include: point tenderness over the LCL, mild to severe pain depending on the severity of the injury, swelling over the lateral aspect of the knee, and loss of range of motion of the knee. The athlete may also have difficulty bearing weight on the injured leg.

Slide 16: The special test for an LCL injury is the Varus Stress Test. This test is again performed at 0° and 30° of flexion.

Use the knee model to demonstrate proper hand placement and force application while describing how to perform the test.

The examiner places one hand on the medial aspect of the knee and one hand on the lateral aspect of the ankle. Force is then applied to the medial aspect of

the knee while the examiner looks and feels for laxity at the lateral joint line.

Slide 17: Acute care of a LCL sprain includes protection, rest, ice, compression, and elevation. The athlete will need a hinged brace to support the LCL during healing and may need crutches if weight bearing is limited by pain, swelling, or laxity.

It is important to note that the LCL has a good blood supply and often heals well with conservative treatment.

Slide 18: The cruciate ligaments cross each other inside the knee. These ligaments are named in relation to their attachment on the tibia. Each of the ligaments has an anteromedial and posterolateral portion, with the ACL also having an intermediate portion.

****Only the ACL will be covered due to the rarity of PCL tears in athletics.**

Slide 19: The anterior cruciate ligament (ACL) extends superiorly, posteriorly, and laterally, twisting on itself as it extends from the tibia to the femur. This can be remembered by using the acronym APEX. APEX stands for Anterior-to-Posterior Externally.

Slide 20: The mechanism of injury (MOI) of the ACL can be a non-contact injury, occurring 70% of the time, or a contact injury, which occurs 30% of the time. Mechanically, ACL injuries occur when an excessive tension force is applied on the ACL.

Non-contact injuries typically occur when the joint is loaded and placed in a combined position of flexion, valgus, and rotation of the tibia on the femur. This occurs when the foot is planted and there is a sudden change of direction. They may also occur when landing from a jump incorrectly.

Contact injuries of the ACL occur when there is direct contact to the knee or a collision occurs, such as in tackle football.

Slide 21: The signs and symptoms of an ACL injury will vary depending on the severity of the injury, typically including pain and diffuse knee swelling. Instability and an inability to stand or walk may be present in grade two and three sprains.

Slide 22: Special tests that can be performed to determine the extent of an ACL injury are the Lachman's Test and the Anterior Drawer Test.

The Lachman's test is one of the best indicators of injury to the ACL and tests for one-plane anterior instability.

Use the knee model to demonstrate proper hand placement and force application while describing how to perform the test.

The Lachman's Test is performed with the patient in a supine position and completely relaxed. The patient's knee should be flexed to approx. 20-30°. The examiner will place one hand (outside hand) on the upper thigh just above the knee to stabilize the femur and the other hand (inside hand) just below the knee on the tibia. With the tibia slightly laterally rotated, the examiner should apply force from the posteromedial aspect to pull the tibia forward.

A negative Lachman's test will result in no anterior translation of the tibia and a firm end point. A positive Lachman's test will result in a soft end point or no end point. With a grade two or three sprain, there will be anterior translation of the tibia on the femur.

The Anterior Drawer test is used to assess one-plane anterior instability of the knee joint. *Again, use the knee model to demonstrate proper hand placement and force application.*

When performing the anterior draw test, the athlete lies in a supine position with the knee flexed to 90°

and the hip flexed to 45°. The athlete's foot is anchored to the table by the examiners body. In this position, the ACL is almost parallel with the tibial plateau.

With both hands just below the knee joint to ensure the hamstrings are fully relaxed, the examiner will draw the tibia forward on the femur.

The anterior drawer test is negative if there is no anterior translation and a firm endpoint. The test is positive if there is a soft or no end point and the tibia anteriorly translates on the femur. It is important to note with the anterior drawer test that if the ACL is the only ligament injured, there may be a false negative because other structures will limit movement during the test. If the hamstring tendons are not completely relaxed during the test a false-negative may also be produced.

Slide 23: The common treatment plan for an ACL sprain will vary depending on the severity of the injury. The short-term care for all levels of injury includes PRICE (protection, rest, ice, compression, and elevation). The athlete may be unable to bear weight on the leg and need to use crutches immediately after the injury due to pain or instability.

Goals of the early phases of rehabilitation include reducing pain and swelling, regaining full ROM, and improving quad activation.

Slide 24: Extended care for ACL injuries will depend on the grade of the sprain. A grade one sprain will typically be treated with conservative treatment involving a period of rest followed by physical therapy. Return to play for grade one sprains is typically one to two months. However, some individuals may elect to have surgery for a grade one sprain due to the risk of recurrent injury.

Grade two and three sprains will require reconstructive surgery followed by a comprehensive rehabilitation program. Return to

play is typically 6-12 months from the date of surgery. All levels of sprains, especially grade two and three sprains, would benefit from wearing a functional knee brace during activity.

Lesson Two – Knee Injury Assessment

REVIEW: Knee Injury Assessments

25-30 minutes

Purpose:

Participants will participate in a lab activity to practice performing knee injury special tests on other participants and using the *Knee and Ankle Sports Injury Assessment Model*.

Materials:

- *Knee and Ankle Sports Injury Assessment Model*
- *Knee Injury Assessment Lab* worksheet (one per participant)
- *Post-Assessment* (one per participant)

Facilitation Steps:

1. Provide each participant with a copy of the lab worksheet.
2. Have participants work in pairs or groups to practice the knee special tests on each other as listed on the worksheet.
3. Each pair/group should rotate through performing the special tests on the *Knee and Ankle Sports Injury Assessment Trainer* to feel each grade of the injuries for each special test and receive a sign off from instructor once the student has demonstrated proficiency with the special test.
4. Hand out the *Post-Assessment* and allow 10 minutes for completion.
5. Peer grade, self-check, or have students hand the assessment in for grading.

Name: _____ Class: _____

Knee Injury Assessment Lab

Perform each test below on two people and record + (positive) or – (negative).

Special Test	What are you testing for?	Left Leg 1	Right Leg 1	Left Leg 2	Right Leg 2
Valgus Stress Test (0° and 30°)					
Varus Stress Test (0° and 30°)					
Anterior Drawer					
Lachman's Test					

Perform each test below on the knee model to assess each grade of the ligament injury. Place a check mark in the column for each assessment that you have completed correctly and make sure to get initials from teacher to mark that you have demonstrated proficiency in each test.

Special Test	Grade 1	Grade 2	Grade 3	Teacher Initials
Valgus Stress Test (0° and 30°)				
Varus Stress Test (0° and 30°)				
Anterior Drawer				
Lachman's Test				

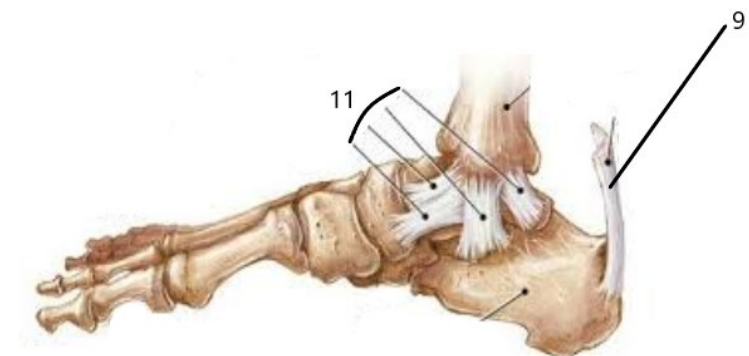
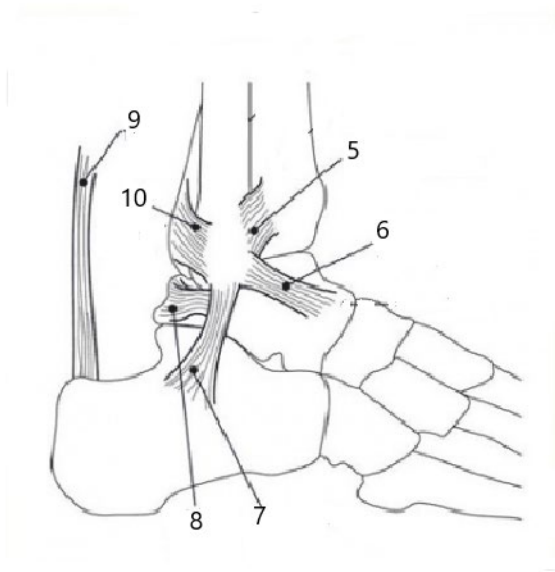
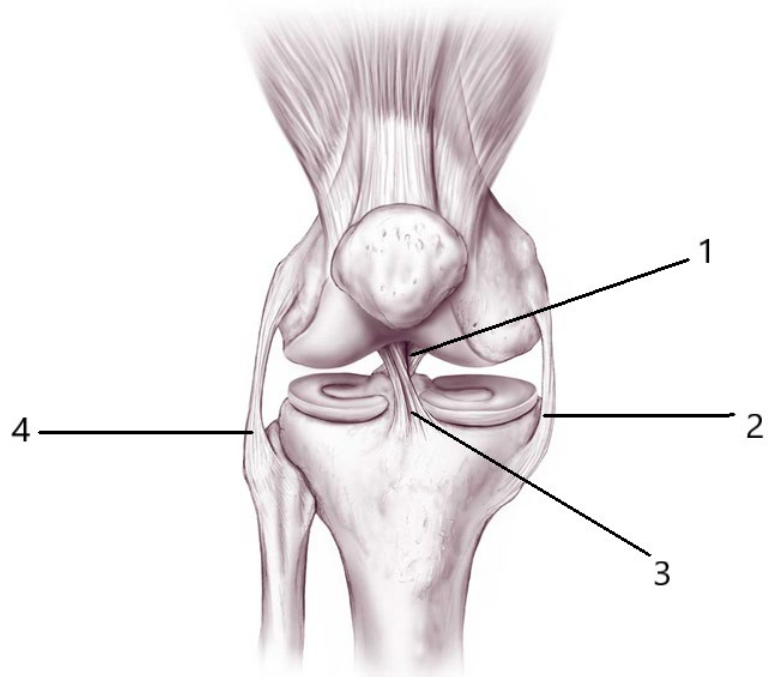
Name: _____

Class: _____

Pre-/Post-Assessment

Directions: Label the bones and ligaments in the following diagrams:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____



Knee and Ankle Sports Injury Assessment

Chose the best answer for the following questions:

1. The most common type of ankle sprain is:
 - a. Anterior Cruciate Sprain
 - b. Eversion Sprain
 - c. High Ankle Sprain
 - d. Inversion Ankle Sprain
2. The varus stress test evaluates which ligament:
 - a. Medial Collateral Ligament
 - b. Lateral Collateral Ligament
 - c. Anterior Cruciate Ligament
 - d. Posterior Cruciate Ligament
3. Which of the following tests would be most appropriate to determine an ACL injury?
 - a. Lachman's Test
 - b. Valgus Stress Test
 - c. Anterior Drawer Test
 - d. Varus Stress Test
 - e. All the above
 - f. A and C
4. The Talar Tilt test evaluates which ligament:
 - a. Anterior Talofibular Ligament
 - b. Posterior Talofibular Ligament
 - c. Calcaneofibular Ligament
 - d. Deltoid Ligament
5. The anterior drawer test of the ankle evaluates which ligament:
 - a. Posterior talofibular ligament
 - b. Anterior talofibular ligament
 - c. Calcaneofibular ligament
 - d. Deltoid Ligament
6. An athlete comes to you complaining of medial knee pain and states that someone fell on the outside of his leg during practice. He is point tender over the medial aspect of the knee and has mild swelling over the medial aspect of the knee. You suspect a medial collateral ligament sprain. Which special test should you perform?
 - a. Anterior Drawer
 - b. Valgus Stress Test
 - c. Varus Stress Test
 - d. Lachman's Test
7. The most severe type of ankle or knee sprain is a:
 - a. Grade 1
 - b. Grade 2
 - c. Grade 3
 - d. Grade 4

8. The eversion stress test evaluates which ligament:
 - a. Posterior tibiofibular ligament
 - b. Anterior tibiofibular ligament
 - c. Calcaneofibular ligament
 - d. Deltoid Ligament
9. An Achilles tendon ruptures is evaluated with the:
 - a. Posterior Drawer
 - b. Eversion Stress Test
 - c. Varus Stress Test
 - d. Thompson Test
10. A grade two inversion ankle sprain involves:
 - a. Stretching of the ATFL
 - b. Complete tearing of the ATFL and CFL, with partial tearing of the PTFL and the tibiofibular ligaments
 - c. Partial tearing of the ATFL and stretching or partial tearing of the CFL.
11. When evaluating a MCL or LCL injury, the special tests should be performed at:
 - a. 0 degrees
 - b. 15 degrees
 - c. 20 degrees
 - d. 30 degrees
 - e. All the above
 - f. A and D
12. An athlete has a knee injury, and the doctor performs a "drawer test" by pulling and pushing on the leg with the knee flexed. If the leg translates anteriorly, i.e., "gives" or moves anteriorly when the leg is pulled anteriorly, what joint structure is most likely injured?
 - a. Medial Collateral Ligament
 - b. Anterior Cruciate Ligament
 - c. Posterior Cruciate Ligament
 - d. Lateral Collateral Ligament
 - e. Anterior Talofibular Ligament
13. While water skiing in Florida following final exams, a medical student falls and twists her ankle. Her foot is forcibly everted, which could cause a sprain of which ligament?
 - a. Anterior Talofibular Ligament
 - b. Posterior Talofibular Ligament
 - c. Calcaneofibular Ligament
 - d. Deltoid Ligament

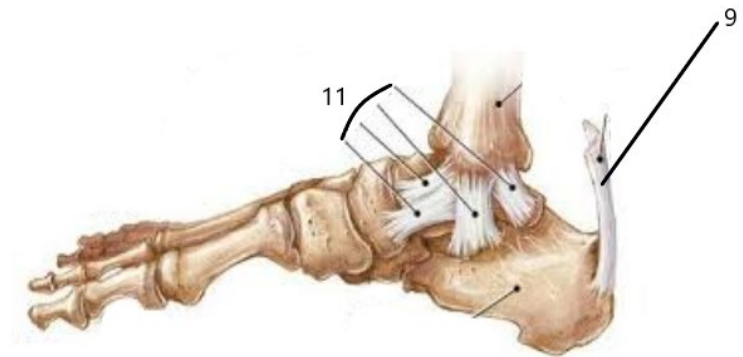
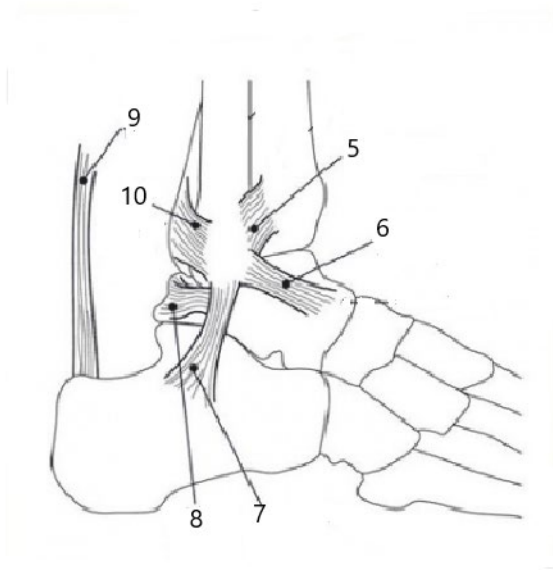
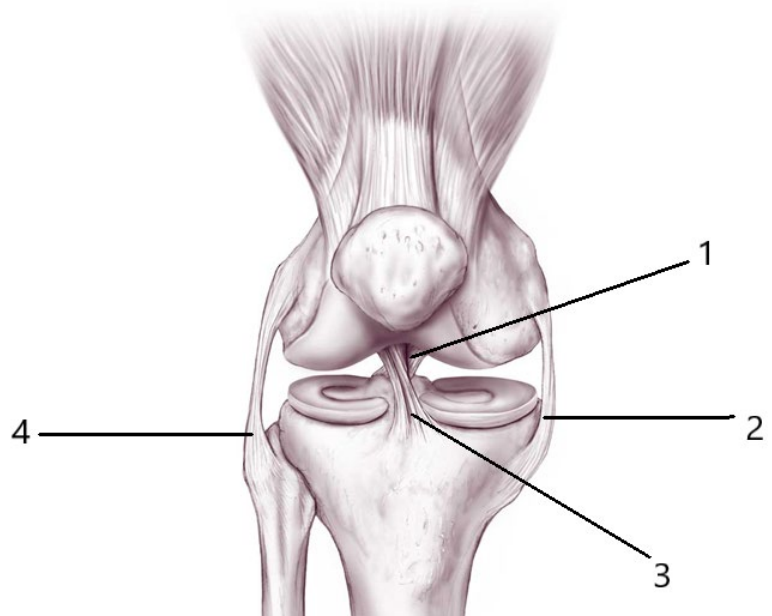
14. A young man involved in a head-on automobile collision had his flexed knee hit the dashboard of the car. He was later found to have a major instability of the knee, in that his tibia could be moved posteriorly relative to the femur. What ligament was likely damaged?
- a. Lateral collateral ligament
 - b. Deltoid
 - c. Medial collateral ligament
 - d. Anterior cruciate ligament
 - e. Posterior cruciate ligament

Name: _____ Class: _____

Pre-/Post-Assessment – Answer Key

Directions: Label the bones and ligaments in the following diagrams.

1. **Posterior Cruciate Ligament**
2. **Medial Collateral Ligament**
3. **Anterior Cruciate Ligament**
4. **Lateral Collateral Ligament**
5. **Anterior Tibiofibular Ligament**
6. **Anterior Talofibular Ligament**
7. **Calcaneofibular Ligament**
8. **Posterior Talofibular Ligament**
9. **Achilles Tendon**
10. **Posterior Tibiofibular Ligament**
11. **Deltoid**



Knee and Ankle Sports Injury Assessment

1. The most common type of ankle sprain is:
 - a. Anterior Cruciate Sprain
 - b. Eversion Sprain
 - c. High Ankle Sprain
 - d. Inversion Ankle Sprain**
2. The varus stress test evaluates which ligament:
 - a. Medial Collateral Ligament
 - b. Lateral Collateral Ligament**
 - c. Anterior Cruciate Ligament
 - d. Posterior Cruciate Ligament
3. Which of the following tests would be most appropriate to determine an ACL injury?
 - a. Lachman's Test
 - b. Valgus Stress Test
 - c. Anterior Drawer Test
 - d. Varus Stress Test
 - e. A and C**
 - f. All the above
4. The Talar Tilt test evaluates which ligament:
 - a. Anterior Talofibular Ligament
 - b. Posterior Talofibular Ligament
 - c. Calcaneofibular Ligament**
 - d. Deltoid Ligament
5. The anterior drawer test of the ankle evaluates which ligament:
 - a. Posterior talofibular ligament
 - b. Anterior talofibular ligament**
 - c. Calcaneofibular ligament
 - d. Deltoid Ligament
6. An athlete comes to you complaining of medial knee pain and states that someone fell on the outside of his leg during practice. He is point tender over the medial aspect of the knee and has mild swelling over the medial aspect of the knee. You suspect a medial collateral ligament sprain. Which special test should you perform?
 - a. Anterior Drawer
 - b. Valgus Stress Test**
 - c. Varus Stress Test
 - d. Lachman's Test
7. The most severe type of ankle or knee sprain is a:
 - a. Grade 1
 - b. Grade 2
 - c. Grade 3**
 - d. Grade 4

8. The eversion stress test evaluates which ligament:
 - a. Posterior tibiofibular ligament
 - b. Anterior tibiofibular ligament
 - c. Calcaneofibular ligament
 - d. Deltoid Ligament**
9. An Achilles tendon rupture is evaluated with the:
 - a. Posterior Drawer
 - b. Eversion Stress Test
 - c. Varus Stress Test
 - d. Thompson Test**
10. A grade two inversion ankle sprain involves:
 - a. Stretching of the ATFL
 - b. Complete tearing of the ATFL and CFL, with partial tearing of the PTFL and the tibiofibular ligaments
 - c. Partial tearing of the ATFL and stretching or partial tearing of the CFL.**
11. When evaluating a MCL or LCL injury, the special tests should be performed at:
 - a. 0 degrees
 - b. 15 degrees
 - c. 20 degrees
 - d. 30 degrees
 - e. A and D**
 - f. All the above
12. An athlete has a knee injury, and the doctor performs a "drawer test" by pulling and pushing on the leg with the knee flexed. If the leg translates anteriorly, i. e. "gives" or moves anteriorly when the leg is pulled anteriorly, what joint structure is most likely injured?
 - a. Medial Collateral Ligament
 - b. Anterior Cruciate Ligament**
 - c. Posterior Cruciate Ligament
 - d. Lateral Collateral Ligament
 - e. Anterior Talofibular Ligament
13. While water skiing in Florida following final exams, a medical student falls and twists her ankle. Her foot is forcibly everted, which could cause a sprain of which ligament?
 - a. Anterior Talofibular Ligament
 - b. Posterior Talofibular Ligament
 - c. Calcaneofibular Ligament
 - d. Deltoid Ligament**

14. A young man involved in a head-on automobile collision had his flexed knee hit the dashboard of the car. He was later found to have a major instability of the knee, in that his tibia could be moved posteriorly relative to the femur. What ligament was likely damaged?
- a. Lateral collateral ligament
 - b. Deltoid
 - c. Medial collateral ligament
 - d. Anterior cruciate ligament
 - e. Posterior cruciate ligament**

Sources

1. Magee, D. J. (2008). *Orthopedic Physical Assessment* (5th ed.). St. Louis, MO: Saunders Elsevier
2. France, R. C. (2021). *Introduction to Sports Medicine and Athletic Training* (3rd ed.). Boston, MA: Cengage