I. Bones and Bony Landmarks of the Hip Region

1. Bones of the Hip Region (figure 4.1, page 109)
   1. Os coxae: Composed of ilium, ischium, and pubis bones.
   2. Femur
2. Bony Landmarks of the Hip Region (figure 4.1, page 109)
   1. Bony landmarks of ilium
3. Iliac crest
4. ASIS (anterior superior iliac spine)
5. PSIS (posterior superior iliac spine)
   1. Bony landmarks of ischium
6. Ischial tuberosity (sit bone)
   1. Bony landmark of pubis
7. Pubic symphysis (also a joint)
   1. Bony landmark of os coxae
8. Acetabulum
   1. Bony landmarks of femur (figure 4.2, page 110)
9. Head of femur
10. Greater trochanter
11. Femoral condyles

II. Joint Structure and Movements of the Pelvic Girdle

1. Pubic Symphysis (figure 4.1C, page 109)
   1. Articulating bones:
   2. Location:
   3. Type of joint:
2. Sacroiliac Joints (figure 4.1A, page 109)
   1. Articulating bones:
   2. Location:
   3. Type of joint:
3. Movements of the Pelvic Girdle
   1. Movements of the whole pelvis:

III. Joint Structure and Movements of the Hip

1. Hip Joint Classification and Movements
   1. Articulating bony landmarks:
   2. Technical name:
   3. Type of joint:
   4. Movements:  
      (Figure 4.3, page 112—Know the hip joint movements and be able to identify these movements on a similar figure or from movement descriptions that will be used for the test.)
2. Hip Joint Capsule and Key Ligaments
   1. Strong capsule (figure 4.4, page 112)
   2. Strong ligaments all limit:
3. Anterior ligaments, pubofemoral and especially iliofemoral, also limit:
4. Posterior ligament, ischiofemoral, limits:
5. Specialized Structures of the Hip Joint
   1. Acetabular labrum (figure 4.41, page 158)
6. Description:
7. Function:
   1. Bursae

IV. Description and Functions of Individual Hip Muscles

1. Anterior Muscles of the Hip (Common action is hip flexion.)
   1. Iliopsoas (figure 4.5, page 114)
2. Actions:
   1. Rectus femoris (figure 4.6, page 115)
3. Actions:
   1. Sartorius (figure 4.6, page 115)
4. Actions:
5. Posterior Muscles of Hip (Common action is hip extension except for DOR.)
   1. Gluteus maximus (figure 4.7, page 117)
6. Actions:
   1. Hamstrings (Common actions are hip extension and knee flexion; figure 4.8, page 118.)
7. Semitendinosus  
   Location:  
   Actions:
8. Semimembranosus  
   Location:  
   Actions:
9. Biceps femoris  
   Location:  
   Actions:
   1. Deep outward rotators (DOR; figure 4.9, page 119)
10. Location:
11. Actions:
12. Lateral Muscles of the Hip (Common action is hip abduction; also hip internal rotation.)
    1. Gluteus medius and gluteus minimus (figure 4.10, page 121)
13. Actions:
    1. Tensor fasciae latae (figure 4.6, page 115)
14. Actions:
15. Medial Muscles of the Hip (Common action is hip adduction; all except lower fibers of adductor magnus also assist with hip flexion in lower ranges. Lower fibers of adductor magnus assists with hip extension. The gracilis is the only one of these medial muscles to cross the knee and also has the action of knee flexion.)
    1. Adductor longus (figure 4.11, page 123)
    2. Adductor brevis
    3. Adductor magnus
    4. Gracilis (figure 4.12, page 124)
    5. Pectineus
16. Summary of Hip Muscle Locations and Actions
    1. Muscle names and actions—Know the names, general locations (i.e., anterior, posterior, lateral, or medial), and actions of the muscles in table 4.1, page 126.
    2. Muscle names and specific locations—Know the names and locations of the muscles shown in figure 4.13 (A only), page 127, and figure 4.14 (A only), page 128. Similar figures will be on the test, and you will be asked to identify muscles that have arrows pointing to them.

V. Alignment and Common Deviations of the Hip Region

1. Standing Pelvic Alignment (figure 4.15, page 129)
2. Neutral position  
   Definition:
3. Anterior and posterior pelvic tilt
   1. Anterior pelvic tilt:
   2. Posterior pelvic tilt:
4. Lateral pelvic tilt
   1. Right lateral tilt:
   2. Left lateral tilt:
5. Pelvic rotation
6. Right pelvic rotation:
7. Left pelvic rotation:
8. Angle of Femoral Inclination  
   The angle between the neck and shaft of the femur as seen from the front, primarily in the frontal plane (figure 4.16, page 131).
   1. Coxa vara:
   2. Coxa valga:
9. Angle of Femoral Torsion  
   The angle of the neck of the femur relative to the shaft of the femur as seen from above, primarily in the transverse plane (figures 4.17 and 4.18, pages 131 and 132).
   1. Excessive femoral anteversion is often associated with:
   2. Femoral retroversion is often associated with:

VI. Pelvic and Hip Mechanics

1. Linked Movements of the Pelvis, Femur, and Lumbar Spine
   * 1. Closed-chain pelvic movements (figure 4.19, page 133)—When standing and maintaining the head upright, movements of the pelvis produce predictable movements of the pelvis and lumbar spine.
   1. An anterior pelvic tilt is associated with lumbar:  
      and hip:
   2. A posterior pelvic tilt is associated with lumbar:  
      and hip:
      1. Lumbar–pelvic rhythm (figure 4.20, page 134)
   3. Definition:
   4. Example of forward bending, or roll-down:
      1. Pelvic–femoral rhythm (figure 4.21, page 134)—At the end ranges of movement of the femur, predictable movements of the pelvis occur to favorably position the acetabulum for optimal range of motion. The predictable linking is as follows:
   5. Hip flexion:
   6. Hip extension:
   7. Hip abduction:
   8. Hip external rotation:
2. Pelvic Stabilization
   * 1. Abdominal–hamstring force couple (figure 4.22, page 135)  
        Definition:
     2. Back extensor–hip flexor force couple  
        Definition:
     3. Hip abductor mechanism and the Trendelenburg test (Tests and Measurements 4.2, page 136)  
        Definition:
3. Positive Trendelenburg sign:

VII. Muscular Analysis of Hip Movements  
(Know the *primary* muscles in table 4.2, page 137, be able to do a movement analysis for the side leg raise as shown in table 4.4, page 141, and be able to match the muscle group strengthened or stretched with a picture or the name of the exercises in tables 4.3 and 4.5, pages 139-140 and 145.)

1. Hip Flexion
2. Plane and axis:
3. Primary muscles:
4. Examples of movements involving the concentric use of the hip flexors
   1. Strength exercises:
   2. Dance:
5. Hip Extension
   * 1. Plane and axis:
     2. Primary muscles:
     3. Examples of movements involving the concentric use of the hip extensors
   1. Strength exercises:
   2. Dance:
6. Hip Abduction
   * 1. Plane and axis:
     2. Primary muscles:
     3. Examples of movements involving the concentric use of the hip abductors
   1. Strength exercises:
   2. Dance:
      1. Sample movement analysis for a side leg raise (table 4.4, page 141)
7. Hip Adduction
   * 1. Plane and axis:
     2. Primary muscles:
     3. Examples of movements involving the concentric use of the hip adductors
8. Strength exercises:
9. Dance:
10. Hip External Rotation
    * 1. Plane and axis:
      2. Primary muscles:
      3. Examples of movements involving the concentric use of the hip external rotators
11. Strength exercises:
12. Dance:
13. Hip Internal Rotation
    * 1. Plane and axis:
      2. Primary muscles:
      3. Examples of movements involving the concentric use of the hip internal rotators
14. Strength exercise:
15. Dance:
16. Analysis of Stretches for the Hip  
    (Table 4.5, page 145—Be able to match the muscle group stretched with a picture or the name of the exercises in this table.)
    * 1. Examples of hip stretches
17. Hip flexors:
18. Hip extensors:
19. Hip abductors:
20. Hip adductors:
21. Hip external rotators:
22. Hip internal rotators:

VIII. Key Considerations for the Hip in Whole-Body Movement

1. Compressive Loads on the Hip Joint—High compressive loads when weight bearing make the hip vulnerable to degenerative changes requiring total hip replacements or fractures associated with osteoporosis.

IX. Special Considerations for the Hip in Dance (Lab)

1. Roll-Down (figure 4.30, page 146)
2. Description:
3. Body weight placement—Staying forward with the weight centered just in front of the ankle joint on both the down and up phase.
4. Flat Back Positions (figure 4.31, page 146)
   * 1. Hip flexion is controlled primarily by:
     2. Flat back is maintained by:
     3. Risk is reduced by:
5. Turnout
   * 1. Determinants
   1. Bony factors  
      Description:
   2. Ligamental factors  
      Description:
   3. Muscular factors  
      Description:
   4. Adequate flexibility of:
   5. Adequate strength and optimal activation of:
      1. Measurement (Tests and Measurements 4.3, page 148)
      2. Improving turnout
6. Flexibility  
   Muscle group:  
   Stretches (figure 4.32, page 149):
7. Strength  
   Muscle group:  
   Strength exercises (figure 4.33, page 149):
8. Optimal muscle activation patterns:
9. Influence of turnout on muscle activation
10. Change of the line of pull of muscles
11. Greater use of the hip adductors and external rotators in closed kinematic chain movements to the side (close to frontal plane) such as a second-position plié (Concept Demonstration 4.1, page 151).
12. Greater use of the hip abductors and external rotators in open kinematic chain movements of the gesture leg to the side (close to the frontal plane) such as in a turned out extension to the side
13. Extensions to the Front
    * 1. Strength
14. Muscle group:
15. Exercises (figures 4.34 and 4.35, pages 150 and 152):
    * 1. Flexibility
16. Muscle group:
17. Exercise (table 4.5, B and C, page 145):
    * 1. Cues:
18. Emphasis on the iliopsoas—Concept Demonstration 4.2, page 153
19. Extensions to the Side
    * 1. Strength
20. Muscle group:
21. Exercises (figures 4.38A and 4.38C, page 155):
    * 1. Flexibility
22. Muscle groups:
23. Exercise (table 4.5F, page 145):
    * 1. Cues
24. Greater trochanter down toward sit bone (figure 4.37, page 154, Concept Demonstration 4.3, page 154)
25. Arabesque
    * 1. Strength
26. Muscle group:
27. Exercises (figure 4.40, page 157):
    * 1. Flexibility
28. Muscle group:
29. Exercise (table 4.5A, page 145):
    * 1. Cues
30. Use full hip rotation of femur at hip joint, emphasizing DOR.
31. Maximize full hip hyperextension.
32. Distribute spinal hyperextension.
33. Delay or limit spinal rotation and lateral tilt of pelvis.

X. Hip Injuries in Dancers

1. Prevention of Hip Injuries
   * 1. Balanced strengthening and stretching of hip muscles
     2. Adequate warm-up
2. Common Types of Hip Injuries in Dancers
   * 1. Acetabular labral tear (figure 4.41, page 158)
3. Structure:
4. Common symptoms:
   * 1. Hamstring muscle strain (figure 4.42, page 159)
5. Structure:
6. Common symptoms:
   * 1. Snapping hip syndrome—Internal snapping hip syndrome
7. Structure:
8. Common symptoms:
   * 1. Snapping hip syndrome—External snapping hip syndrome (figure 4.43, page 159)
9. Structure:
10. Common symptoms:
    * 1. Piriformis syndrome (figure 4.44, page 160)
11. Structure:
12. Common symptoms:
    * 1. Sacroiliac joint pain syndrome
13. Structure:
14. Common symptoms:
15. Rehabilitation of Pelvic and Hip Injuries
    * 1. Stretching to restore range of motion required by dance
      2. Hip muscle strengthening programs that progress to eccentric muscle training, functional exercises, and neuromuscular training
      3. Attention to underlying technique issues such as adequate strength and the use of the DOR