I. Bones and Bony Landmarks of the Spine

1. Regions of the Spine, or Vertebral Column (figure 3.1, page 59)
   1. Cervical (7 vertebrae)  
      Location:
   2. Thoracic (12 vertebrae)  
      Location:
   3. Lumbar (5 vertebrae)  
      Location:
   4. Sacral (5 vertebrae)—In adult sacral vertebrae are fused to form sacrum  
      Location:
   5. Coccygeal (4 vertebrae)—Three to five coccygeal vertebrae form coccyx  
      Location:
2. Structure of a Typical Vertebra  
   (Be able to describe and label the following components shown in figure 3.2, page 59.)
   1. Vertebral body (1)
   2. Vertebral arch (1)
   3. Vertebral foramen
   4. Vertebral notches
   5. Processes (7)
3. Spinous process (1)—
4. Transverse processes (2)—
5. Articular processes (4, 2 superior and 2 inferior)—

II. Joint Structure and Movements of the Vertebral Column

1. Joints Between the Vertebral Bodies
   1. Intervertebral disc (figure 3.3, page 60)
2. Type of joint:
3. Function:
4. Structure
5. Annulus fibrosus—
6. Nucleus pulposus—
   1. Associated ligaments that connect vertebrae and intervertebral discs (figure 3.4, page 60)
7. Anterior longitudinal ligament (figure 3.5, page 61)
8. Location:
9. Function:
10. Posterior longitudinal ligament (figure 3.6, page 61)
11. Location:
12. Function:
13. Joints Between the Vertebral Arches
14. Facet joints (figure 3.7, page 61)
15. Type of joint:
16. Function:
17. Many ligaments add additional stability
18. Specialized Vertebral Joints
19. Craniovertebral joints—Between the skull and the two upper vertebrae (figure 3.8, page 62)
20. Atlanto-occipital
21. Bones that make up the joint:
22. Movements:
23. Atlantoaxial
24. Bones that make up the joint:
25. Movements:
26. Between thoracic vertebrae and ribs (figure 3.9, page 63)
27. Costovertebral
28. Bone and bony landmark that make up the joint:
29. Costotransverse
30. Bone and bony landmark that make up the joint:
31. Movements:
32. Lumbosacral joint (figure 3.10, page 64)
33. Bones that make up the joint:
34. Function:
35. Lumbosacral angle:
36. Movements of the Vertebral Column
    1. Segmental movements—
    2. Movements of the spine—  
       (Figure 3.11, page 64—Learn these joint movements and be able to identify these movements on a similar figure or from the description of a movement.)
37. Spinal flexion-extension  
    Plane:  
    Axis:
38. Spinal right lateral flexion–left lateral flexion  
    Plane:  
    Axis:
39. Spinal right rotation—left rotation  
    Plane:  
    Axis:

III. Description and Functions of Individual Muscles of the Spine

1. Anterior Muscles of the Spine
   1. Abdominal muscles (Common action is spinal flexion except for transverse abdominis.)
2. Rectus abdominis (figure 3.12, page 65)
3. Location:
4. Actions:
5. External oblique abdominal (figure 3.13, page 66)
6. Location:
7. Actions:
8. Internal oblique abdominal (figure 3.14, page 67)
9. Location:
10. Actions:
11. Transverse abdominis (figure 3.15, page 68)
12. Location:
13. Actions:
    1. Iliopsoas (figure 3.16, page 69)
14. Location:
15. Actions:
16. Posterior Muscles of the Spine or Spinal Extensors (Common action is spinal extension.)
17. Erector spinae—Posterior trunk, most superficial location of spinal extensors (figure 3.17, page 70)
18. Columns of erector spinae
19. Spinalis  
    Location:
20. Longissimus  
    Location:
21. Iliocostalis  
    Location:
22. General function:
23. Actions:
24. Semispinalis (figure 3.18, page 71)
25. Location:
26. General function:
27. Actions:
28. Deep posterior spinal group (figure 3.19, page 72)
29. Location:
30. General function:
31. Actions:
32. Lateral Muscles of the Spine
33. Quadratus lumborum (figure 3.20, page 73)
34. Location:
35. Action:
36. Summary of Spinal Muscle Attachments and Actions
37. Muscle names and actions—Know the names, general locations (i.e., anterior, posterior, or lateral), and actions of the muscles in table 3.1, page 74.
38. Muscle names and specific location—Know the names and locations of the muscles shown in figure 3.21 (A only), page 75, and figure 3.22 (A only), page 76. For the posterior muscles in figure 3.22, it is only necessary to know the semispinalis in general (*not* the subdivisions such as thoracis), but know the erector spinae *and* its subdivisions: the spinalis, longissimus, and iliocostalis as identified in the bracket on the left side of the drawing (but *not* further subdivisions such as thoracis and cervicis). Similar figures will be on the test, and you will be asked to identify muscles that have arrows pointing to them.

IV. Ideal Spinal Alignment and Common Deviations (Lab)

1. Ideal Standing Postural Alignment (figure 3.23A, page 77)
   1. Plumb line
2. Definition:
3. Surface landmarks: Earlobe, middle of the tip of the shoulder, middle of the thorax, greater trochanter (projection on lateral femur), just in front of the middle of the knee, and just in front of the ankle (lateral malleolus)
   1. Normal curvatures of the adult spine
4. Number of curves:
5. Direction of curves:
   1. Pelvic alignment (in the sagittal plane)
6. Neutral pelvis  
   Definition:
7. Anterior pelvic tilt  
   Definition:
8. Posterior pelvic tilt  
   Definition:
9. Common Spinal Alignment Deviations  
   Common deviations that occur primarily in the sagittal plane include cervical lordosis, kyphosis, fatigue posture, lumbar lordosis, and flat back postures. An abnormal curve or curvatures occurring primarily in the frontal plane is termed scoliosis.
10. Lumbar lordosis or hyperlordosis (figure 3.23B, page 77)
11. Definition:
12. Correction (figure 3.24, page 79)
13. Strengthen:  
    Exercise example:
14. Stretch:  
    Exercise examples:
15. Cue:  
    Exercise examples to help develop skill:
16. Sample exercises for improvement  
    (Figure 3.25, page 79—Be able to select these exercises by name or picture from a larger group of exercises as appropriate for improving functional lumbar lordosis.)
17. Kyphosis (figure 3.23B, page 77)
18. Definition:
19. Correction
20. Strengthen:  
    Exercise example:
21. Stretch:  
    Exercise example:
22. Cue:
23. Sample exercises for improvement  
    (Figure 3.26, page 81—Be able to select these exercises by name or picture from a larger group of exercises as appropriate for improving kyphosis.)
24. Fatigue posture (figure 3.27, page 82)
25. Definition:
26. Correction
27. Strengthen:  
    Exercise examples:
28. Stretch:  
    Exercise example:
29. Cue:
30. Sample exercises for improvement  
    (Figure 3.28, page 82—Be able to select these exercises by name or picture from a larger group of exercises as appropriate for improving fatigue posture.)
31. Cervical lordosis and forward head (figure 3.29, page 84)
32. Definition:
33. Correction
34. Strengthen:  
    Exercise example:
35. Stretch:  
    Exercise example:
36. Cue:
37. Sample exercises for improvement  
    (Figure 3.29, page 84—Be able to select these exercises from a larger group of exercises as appropriate for improving forward head posture.)

5. Flat back (figure 3.23C, page 77)

1. Definition:
2. Correction
3. Strengthen:  
   Exercise examples:
4. Cue: Lift the low back extensors.
5. Sample exercises for improvement  
   (Figure 3.30, page 85—Be able to select these exercises from a larger group of exercises as appropriate for improving flat back posture.)

6. Scoliosis (figures 3.23D and 3.31, pages 77 and 86)

1. Definition:
2. Detection:

V. Spinal Mechanics

1. Abdominal Contraction for Spinal Protection (figure 3.32, page 87)
2. Intra-abdominal pressure (IAP) theory
3. Definition:
4. Shear reduction theory
5. Definition:
6. Thoracolumbar fascia tensioning theory
7. Definition:
8. Optimizing the potential protective effect of the abdominal muscles
9. Emphasize strengthening:
10. Activate:

VI. Muscular Analysis of Spinal Movements  
(Know the *primary* muscles in table 3.2, page 88, be able to do a movement analysis for the curl-up as shown in table 3.3, page 88, and be able to match the muscle group strengthened or stretched with a picture or the name of the exercises in tables 3.4 and 3.5, pages 91-92 and 95. Also, know the plane and axes for spinal movements, using chapter 1 for reference if needed.)

1. Spinal Flexion
2. Plane and axis:
3. Primary muscles:
4. Examples of movements involving concentric use of the spinal flexors
   1. Strength exercises:
   2. Dance:
5. Sample movement analysis for curl-up (table 3.3, page 88)
6. Spinal Extension
7. Plane and axis:
8. Primary muscles:
9. Examples of movements involving concentric use of the spinal extensors
   1. Strength exercises:
   2. Dance:
10. Sample movement analysis for prone spine arch and standing roll-down
11. Spinal Lateral Flexion
    1. Plane and axis:
    2. Primary muscles:
    3. Examples of movements involving concentric use of the spinal lateral flexors
    4. Strength exercises:
12. Dance:
    1. Sample movement analysis for a side-up
13. Spinal Rotation
    1. Plane and axis:
    2. Primary muscles:
    3. Examples of movements involving concentric use of the spinal rotators
    4. Strength exercise:
    5. Dance:
    6. Sample movement analysis for sitting spine twist; contrast it to the curl-up with rotation and prone arabesque
14. Analysis of Stretches for the Spine  
    (Table 3.5, page 95—Be able to match the muscle group stretched with a picture or the name of the exercises in this table.)
    1. Examples of spinal stretches
    2. Spinal flexors:
15. Spinal extensors:
16. Spinal lateral flexors:
17. Spinal rotators:

VII. Key Considerations for the Spine in Whole-Body Movement

1. Core Stability
2. Definition:
3. Strategies for development of core stability
   1. Exercises to improve:
   2. Training coordinated use of:

VIII. Special Considerations for the Spine in Dance

1. Spinal Alignment in Dance
   1. Core stability:
   2. Use of spinal extensors in low back with sitting:
2. Extreme Spinal Hyperextension
   1. Cocontraction of:
   2. Distribution of:
3. Spinal Forward Flexion
   1. Stress to:
   2. Reduce risk with:
4. Partnering (When choreography allows)
   1. Emphasize lifting with:
   2. Cocontract:
   3. Position:
   4. Facing:
   5. Supplemental:

IX. Spine Injuries in Dancers

1. Prevention of Back Injuries
2. Correct trunk:
3. Sound partnering technique
4. Development of adequate trunk:
5. Common Types of Low Back Injuries in Dancers
   1. Lumbosacral strain or sprain
   2. Structure:
   3. Common symptoms:
   4. Spondylolysis and spondylolisthesis (figure 3.42, page 101)
   5. Structure:
   6. Common symptom:
   7. Disc herniation (figure 3.43, page 102)
   8. Structure:
6. Common symptoms:
   1. Rehabilitation of low back injuries
   2. Common initial exercise approach:
7. Flexion exercises—
8. Extension exercises—
9. Stabilization exercises—