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# JOOPERL

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# Active Movement Warm-Up Routines

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KIM FISCHER    JOY KIGER

*Warm-ups don't need to be the monotonous part of physical education.*

Physical education classes often begin with students shuffling in from class or the locker room and heading for their attendance spots. Students continue to chat with one another throughout the attendance process. Once attendance is taken, the students begin the class "warm-up," which typically consists of jogging one or two laps around the gym or doing 20 half-hearted jumping jacks, followed by a series of static stretches.

The foregoing scenario needs to be changed. To be adequately prepared for vigorous physical activity, students need a dynamic warm-up that activates and effectively prepares the muscles for what is to come and allows them to focus on the task at hand. Warm-ups that lead to socialization and daydreaming should be eliminated (Beith, 2009; Cornwell, Nelson, Heise, & Sidaway, 2001; Faigenbaum et al., 2009; Faigenbaum & McFarland, 2007; Kokkonen, Nelson, & Cornwell, 1998; Johnson, 2008; McNeal & Sands, 2003; Rebound Sports, 2005; Reed, Banks, & Brathwait, 2004; Shrier, 2004; Siatras, Papadopoulos, Mameletzi, Gerodimos, & Kellis, 2003; Thacker, Gilchrist, Stroup, & Kimsey, 2004; Van Zandt (2009); Young & Elliot, 2001; Youth Athlete, 2008).

This article describes a quick, total body warm-up that will have students of all ages (P-12) and ability levels ready for the activities of the day within three to eight minutes of entering the gymnasium. Active movement warm-up routines are a series of dynamic exercises that physical educators should already be familiar with. The suggested combinations and sequencing of exercises explained here will allow teachers to customize and individualize their class warm-ups to the lesson focus, while using a minimal amount of class time.

Active movement (AM) warm-up routines are divided into three specific parts: (1) AM warm-up exercises, (2) general preparation, and (3) energy system. The goal of an AM warm-up routine is to prepare the body physiologically for vigorous physical activity. This is accomplished by increasing the body's heart rate and respiratory rate, and by activating the neural pathways of the central nervous system that are associated with fast-twitch muscle fibers. These fibers are responsible for the fast movements that students exhibit when they are actively engaged in physical activity (Faigenbaum et al., 2009; Faigenbaum & McFarland, 2007; Rebound Sports, 2005; Rutledge & Faccioni, 2001; Shrier, 2004; Thacker et al., 2004; United States Tennis Association [USTA], 2004; Van Zandt, 2009).

*AM Warm-up Exercises.* These involve the process of lengthening and contracting the muscles with continuous muscular engagement throughout the entire movement. By actively engaging and strengthening the muscles throughout the range of motion, the body is able to stabilize all of the smaller muscles around the joints. The

Table 1. Example of AM Warm-Up Exercise Routine

Exercise*	Sets	Duration**	Recovery Time†
1. Body Weight Speed Squats	1	30 seconds	0
2. Frankenstein Walks	1	20 yards	0
3. Inch Worms	1	20 yards	0
4. Forward Lunge with Arm Pump	1	20 yards	60 seconds

\*All students begin with Body Weight Speed Squats (exercise #1). They perform the exercise for 30 seconds and only do 1 set. Beginners and/or less fit students may perform this exercise at a slower pace or for less time. As their fitness level increases, they work up to the recommended duration level, then add exercise #2 to exercise #1. Students progress to performing exercises #1, #2, and #3 together, then exercises #1 through #4. Exercises #1 through #4 can also be turned into a type of warm-up circuit.

\*\*All exercises have a recommended time, distance, or number of repetitions which may be modified to accommodate varying fitness levels. Traveling exercises can be done in personal space before repeating the exercise on the opposite side of the body or direction of travel. Also, when performing a traveling exercise in one's personal space, perform that particular exercise 8 to 10 times (you are replacing distance with repetitions).

†Amount of rest/recovery time students get between each exercise. 0 = no recovery time and students go directly into the next exercise. 60 = students rest for 60 seconds before continuing on to the next exercise.

number one goal of these exercises is to improve flexibility. Additional outcomes include improvement in the student's posture, a decreased likelihood of injury, and, most importantly, full activation of the muscles. An advantage of this part is that children as young as three are able to perform movements in a full range of motion. An example of an AM exercise routine appears in table 1.

**General Preparation.** This second part of the overall AM routine involves periods of intense work followed by slightly easier work. Range of motion movements, along with intense, quick movements, are executed in a matter of seconds. Part 2 is meant to incorporate flexibility, mobility, stability, and quickness by performing four to seven exercises. The quality (form/technique) of movement is reinforced, not the quantity. An example of a general preparation exercise routine appears in table 2.

**Energy System.** This makes up the third part of the AM routine. It is a type of interval training that focuses on increasing the body's heart rate and enhancing the entire cardiovascular system while building endurance. The purpose of this part is to emphasize performance intensity by implementing a greater number of dynamic exercises for short bursts of time, as opposed to volume of performance (fewer dynamic exercises for longer periods of time). By incorporating this energy system routine into the AM series, the four major components of physical fitness (i.e., flexibility, muscular strength, muscular endurance, and cardiovascular endurance) can be targeted in just three to five minutes. An example of the energy system exercise routine appears in table 3.

### Why Adopt the Active Movement Approach

Active movement requires little or no equipment and very little time. Students can complete their individual warm-ups in a slightly extended personal space on a squad line, or the

warm-ups can be set up in a station format. The warm-up routine(s) selected for the day can be written on a white board or typed up on paper and posted at various spots in the gymnasium if using a station format. Once the students know what the various exercises are and how to do them correctly, they will be able to complete their respective warm-ups in the allotted time with minimal supervision. Different variations of the three specific parts of the AM warm-up are provided to fit any physical education class from preschool to 12th grade.

According to researchers (Faigenbaum et al., 2009; Faigenbaum & McFarland, 2007; Rutledge & Faccioni, 2001; Rebound Sports, 2005; Shrier, 2004; Thacker et al., 2004; USTA, 2004; Van Zandt, 2009), a dynamic or AM warm-up routine can do the following:

- Elevate the body's core temperature, which leads to efficient calorie burning and allows the muscles to work more efficiently.
- Get the heart and lungs ready for vigorous activity. An increase in heart rate and blood flow to skeletal tissues improves the efficiency of oxygen uptake and transport, carbon dioxide removal, and removal and breakdown of anaerobic byproducts (lactic acid), thereby allowing students to comfortably perform physical activity for a longer period of time at a higher intensity.
- Increase metabolic rate so oxygen is delivered to the working muscles more quickly.
- Increase the activation of the central nervous system, thereby increasing coordination, skill accuracy, and reaction time.
- Actively stretch the muscles, preparing them for forces experienced during participation in fitness, sport, and game activities. Faster and more forceful muscle contractions are produced due to the increase in muscle temperature.

**Table 2. Example of a General Preparation Exercise Routine**

Exercise	Sets*	Duration**	Recovery Time
1. Burpees	2	15-30 seconds	0
2. Backward Lunge with a Twist	2	15-30 seconds	0
3. Double-Leg Jumps with Jump Rope	2	15-30 seconds	0
4. Seal Jumps	2	15-30 seconds	60 seconds

\*Students perform 1 set of exercise #1 (Burpees) then perform 1 set of exercise #2 (Backward Lunges with a Twist), followed by #3 and #4. Students then repeat the entire 1-2-3-4 exercise sequence to complete the second set.

\*\*Depending on the fitness level of the entire class or specific individuals, students can perform the exercises for 15, 20, 25, or 30 seconds.

**Table 3. Example of the Energy System Exercise Routine**

Exercise	Sets	Duration	Recovery Time
1. Boxer Jumps (Jump Rope)	1	60 seconds	0
2. Left Leg and then Right Leg (Rope)	1	60 seconds	0
3. Right Leg and then Left Leg (Rope)	1	60 seconds	0
4. Sumo Squat to Stand (incorporate hamstring stretch)	1	45 seconds	0
5. Hot and Colds	1	45 seconds	0
6. Burpees	1	45 seconds	60 seconds

Note: Students will perform 1 set of each exercise in the order presented in the table. Variables in this phase can be made in the amount of time spent on each exercise and/or the recovery time between repetitions, depending on the fitness and ability level of the students.

- Improve the elasticity of the muscles and increase the suppleness of connective tissue, which decreases soft-tissue injuries.

- Improve flexibility and joint range of motion.
- Develop proper movement patterns and enhance coordination needed for physical activity.
- Prepare the mind for the physical activity, sport practice, or game that lies ahead.
- Save valuable time and free up more minutes per day for in-class instruction and physical activity.

Physical educators want to enhance their students' motor skills; improve their sport skills performance; increase mobility, flexibility, and stability of the joints; engage the cardiovascular system at the same time the muscles and joints are being used; and prevent injuries during physical activity. With all of the benefits that AM provides, warming up in a physical education class can be challenging, fun, and effective. Students can increase their endurance and improve their overall sports performance.

Not all physical education classes need to have the same warm-up routine. When preparing for class, the goal for the day should be considered. Is it fitness-related or sport-related? Is the class focus on fundamental motor skills or higher-level skills like weight training, jogging, soccer, basketball, or soft-

ball? Does the planned class activity involve speed and power, agility, throwing, or kicking? How do the students feel?

Different warm-up routines can be designed for each class focus. Although a variety of warm-up exercises can be selected to prepare the body for specific types of activities, there will always be core exercises that should be done on a daily basis. Students also get bored if they perform the same warm-up routine day after day, which may result in lack of motivation or poor technique (Beith, 2009; Johnson, 2008; Van Zandt, 2009). An objective of AM is to keep the warm-up interesting, exciting, and challenging. Students can even take ownership of their warm-ups by designing creative routines themselves and sharing them with the class.

### Descriptions of AM Warm-up Exercises

The specific exercises listed in tables 1, 2, and 3 have been chosen from a variety of squats, jumping jacks, balance and jumping, and flexibility exercises. This section will describe potential AM warm-up exercises in greater detail, under each category of movement. The figures illustrate selected movements in the exercises, but they have been omitted for well-known exercises such as jumping jacks. These exercises can be mixed and matched to prevent boredom during the warm-up phase of class, as well as to challenge students physi-

ologically and psychologically. They can be performed one to five days per week, depending on the physical education class schedule, without harm to the students.

### **Squat Variations**

1. *Squat and Jump* (figure 1). Stand with feet hip-width apart, hands behind head. Bend at the hips (heels remain on the floor) and lower the torso while keeping the back straight. Explode in an upward jump, jumping as high as possible. Land with slightly bent knees, quickly reassuming the starting position for another repetition.

2. *Body Weight Speed Squats* (figure 2). Feet need to be hip-width apart with arms either on the hips or on the head. Pull the hips down until they are between the ankles. Repeat the exercise.

3. *Sumo Squats to Stand* (figure 3). Stand with feet wider than shoulder-width apart and toes at a 45-degree angle. Hands should be positioned behind the head. Bend at the hips until the thighs are parallel to the floor. Keep shoulders directly over the hips at all times as the heels remain on the floor. Do not lean forward. Repeat the exercise.

4. *Hot and Colds* (figures 4a and 4b). Stand with feet wider than shoulder-width apart, toes pointed forward, heels flat on the floor. Bend at the hips and knees to a 90-degree squat, keeping elbows bent in front of the body. Perform a small jump to bring the legs together and body into an upright position. Elbows remain in a bent position throughout the entire movement. Repeat the exercise ("hot" refers to the squat, "cold" refers to standing in upright position).

5. *Burpees (Squat Thrust)*. Begin by standing upright, arms at the side of the body. Bend first from the knees and then from the hips to drop hands to the floor. Balance body weight on the hands as legs are thrust back to a push-up position. Return legs to a full-squat position. Thrust the arms up as the legs extend to a full standing position. To make this more challenging, extend into a full jump, rather than standing upright. Repeat the exercise.

### **Jumping Jack Variations**

1. *Traditional Jumping Jacks*. Place the feet close together with arms resting at the sides of the body. Keep torso upright. Jump the legs open and lift the arms away from the body so the elbows bend at a 90-degree angle above the head. Repeat the movement.

2. *Seal Jumps* (figures 5a and 5b). Place the feet a little wider than hip-width apart and raise both arms to shoulder height out to the sides of the body, palms anterior to the body. Bend the knees slightly. Perform a small jump to bring the legs together; the hands will come toward the front of the body and clap. Swing the arms back out with the legs to start another jump. Repeat the exercise.

3. *Tuck Jumps* (figures 6a and 6b). Place the feet in a narrow stance (2-3 inches apart). Bend the hips and knees in a quarter-squat position with the arms in a bent position in front of the body. Explode to an upward position, jumping as high as possible, grabbing the knees with the hands in a knee-chest tuck position. Land in the quarter-squat position and repeat the movement.

4. *Star Jumps* (figure 7). Place the feet in a narrow stance (2-3 inches apart). Bend the hips and knees in a quarter-squat position, along with the arms in a bent-arm position in front of the body. Perform an upward jump as the arms and legs shoot outward from the body. In the jump, the arms and legs resemble a star. Land back in the quarter-squat position and repeat the movement.

### **Balance and Jumping Variations**

1. *Single-Leg Hops*. Begin by balancing on one side of the body, keeping one foot on the ground and the other leg in a bent-knee position. Elbows should be bent at a 90-degree angle. Start by transferring the body weight to one tip toe and begin hopping. Explode upward and land on the same tip toe. The knee should remain bent. Repeat the exercise by using the other foot. To make the exercise more challenging, incorporate a jump rope.

2. *Single-Leg Lateral Ski Hops* (figure 8). Begin by balancing on one leg next to a marked line. The other leg is in a bent-knee position. Hop laterally to the other side of the line on the one leg. Repeat by jumping back and forth over the line, until repetitions or time is completed. Perform the same movement on the opposite leg. To make the exercise more challenging, incorporate a jump rope.

3. *High Knees* (figure 9). Start with the arms, legs, and hips slightly bent. Perform the high knee motion by lifting one knee up to hip height and pulling the toe up toward the shin. Move the arms to coordinate with the legs as if running. Move as quickly as possible while maintaining control. To make the exercise more challenging, incorporate a jump rope and lead with one leg and then switch to leading with the other leg.

4. *Single-Leg Tree Balance* (figure 10). Stand straight with the feet together. Shift the body weight onto the left foot, maintaining balance as the right foot is picked up. Bend the right leg, placing the sole of the right foot on the inside of the left thigh. Press the right foot into the left thigh while stretching upward. When balance is established, raise the arms above the head, shoulder-width apart and the palms facing toward each other. Keep shoulders down. (Note: If a student cannot place the foot on the inside of the thigh, it is okay to place the foot against the inside of the knee or lower leg). Repeat this pose on the other side of the body.

5. *Rope Skipping*. Begin with using one jump rope with a handle in each hand. Start by staying on the toes while jumping rope. When able, incorporate different rope skipping movements and variations such as left-leg and then right-leg leading skips, side-to-side jumps on both feet, high knee-lift single-leg hops, and double high-knee jumping. Another option would be to try different jumping movements across a tape or painted floor line.

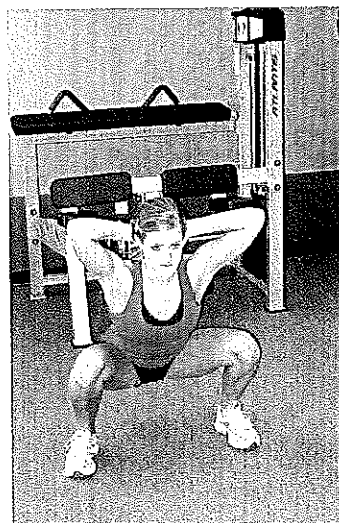
### **Flexibility Variations**

1. *Scorpion* (figures 11a and 11b). Lie prone (belly-down) on the floor with the arms and shoulders pinned in a "spread-em!" pose. Thrust the left toe towards the right hand by contracting the left buttock. Keep the right hip glued to the ground. Repeat the exercise by alternating the legs.

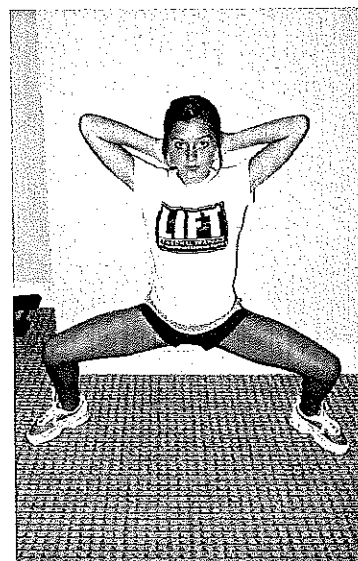
**Figure 1. Squat and Jump, Ending Movement**



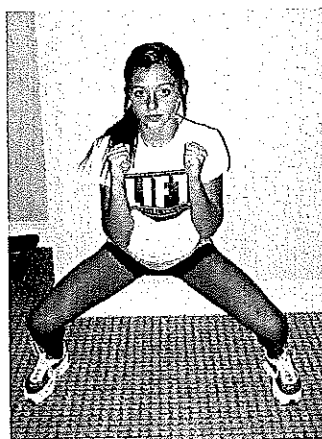
**Figure 2. Body Weight Speed Squats**



**Figure 3. Sumo Squats**



**Figure 4a. Hot and Colds, Start**



**Figure 4b. Hot and Colds, End**



**Figure 5a. Seal Jumps, Start**



**Figure 5b. Seal Jumps, Execution Movement**



**Figure 6a. Tuck Jumps, Start**



**Figure 6b. Tuck Jumps, Execution Movement**

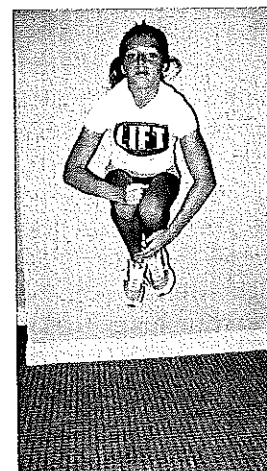




Figure 7. Star Jumps, Execution Movement



Figure 8. Single-Leg Lateral Ski Hops

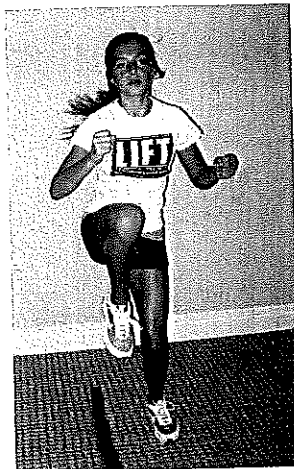


Figure 9. High Knees



Figure 10. Single-Leg Tree Balance

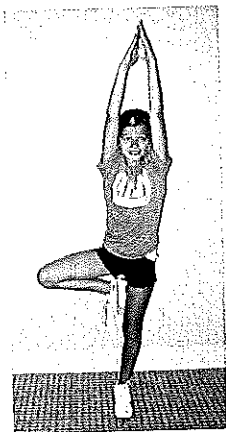


Figure 11a. Scorpion, Start



Figure 11b. Scorpion, Execution Movement



2. *Inch Worms* (figures 12a, 12b, 12c, and 12d). Stand up tall with the legs straight and hands next to body. Begin by drawing the belly button inward as the hands are lowered to touch the floor. Slowly walk out on the hands to form a pike position. Keep the legs straight. Do not bend the knees. Use short baby steps with the feet to inch the body up to a second pike position. Walk the hands out in front of the body again. Finish the movement by standing upright before going into the next repetition.

3. *Forward Lunge with Arm Pump* (figure 13). Stand with the feet together and back straight, keeping the elbows bent in a 90-degree angle. Step forward with one leg to lower the body weight while keeping the back straight. Make sure the opposite arm pumps forward with the opposite leg forward. Return to a standing position by bringing the rear leg forward. Repeat with opposite arm and opposite leg forward.

4. *Backward Lunge with a Twist* (figure 14). With the feet together, step back with the right leg into a lunge position. Arch the back slightly while twisting the torso over the left

leg and reaching the right hand toward the sky. When leaning back and rotating, contract the buttock of the back leg, then push back and out of that position into the alternating leg lunge and twist.

5. *Frankenstein Walks* (figure 15). Begin with the feet together and arms extended in front of the body at shoulder height, palms down. Kick one leg in front of the body, keeping the toe flexed back toward the body. The heel of the foot on the floor remains in contact with the floor. Alternate legs, keeping the arms fully extended throughout the entire exercise.

### Sample Routines for Sport Specific Classes

Active movement exercises can be used not only as a general means of warming-up for physical education classes, but as a warm-up for sport-specific classes, sport practices, and games. Within three to eight minutes, participants can be physiologically prepared to engage in any sport or physical activity at full speed.



Figure 12a. Inch Worms, Execution Movement 1 & 5

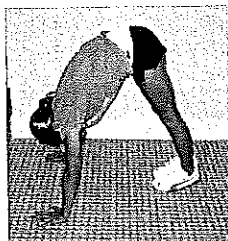


Figure 12b. Inch Worms, Execution Movement 2

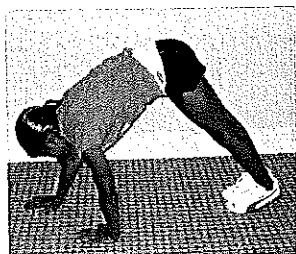


Figure 12c. Inch Worms, Execution Movement 3

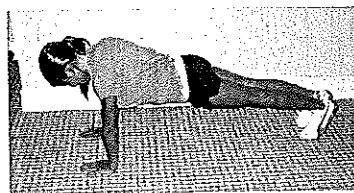


Figure 12d. Inch Worms, Execution Movement 4

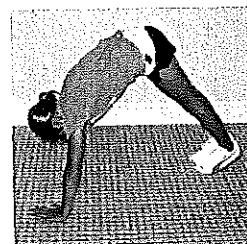


Figure 13. Forward Lunge with Arm Pump

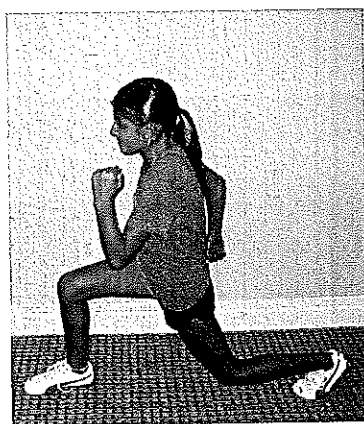


Figure 14. Backward Lunge with a Twist

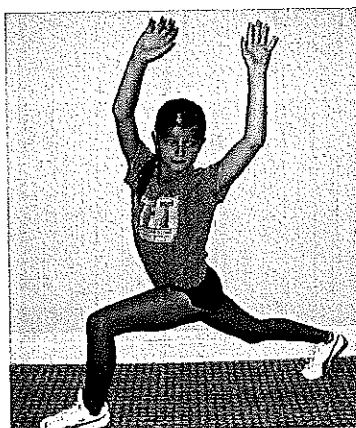
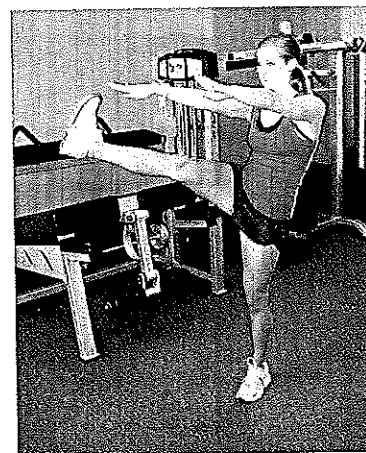


Figure 15. Frankenstein Walks



Examples of how a variety of AM exercises can be adopted and designed to prepare students for action in any type of kicking, throwing, and agility-related activity are provided next. Tables 4, 5, and 6 present sample AM warm-up routines for kicking sports, throwing sports, and agility sports, respectively. The routines are split into "A" 1-2-3-4 exercises and "B" 1-2-3-4 exercises. One set of the A1 exercise is to be performed first, followed by one set of A2. One set of A3 is next, followed by one set of the A4 exercise. Once the students have completed one set of all exercises listed in group "A," they move on to completing the progression of exercises in group "B." Students will do one set of B1 exercise, followed by one set each of B2, B3, and B4 exercises. Students will then repeat all "B" exercises to complete a second set.

The total time needed for each sample warm-up will depend on the fitness level of the students. Unconditioned or overweight students may walk only 10 yards instead of the recommended 20 yards, do 4 repetitions instead of 8, or go for 20 seconds instead of 30. A physical educator may want to eliminate the time and distance factors altogether and have these students concentrate on repetitions only. Students' confidence level will increase as they get better and stronger at performing each exercise. Eventually, all students will be able to master the distance, repetitions, and times established for the sport-specific warm-ups provided.

## Summary

Active movement warm-up routines offer exciting, challenging, more engaging, and effective dimensions to physical education classes. The significance of this type of warm-up is that the active movements are progressive. All major muscles are engaged, minds are focused on the exercise(s) at hand, and the body is prepared physiologically and psychologically for any kind of vigorous physical activity. The time for static stretching is *after* physical activity, as it leads to more rapid recovery after class.

The sample AM warm-up routines provided can be included in any physical education class and can be mixed and matched to create fun and appropriate warm-ups for any physical activity. By carefully designing and implementing an AM warm-up routine in physical education classes, P-12 physical educators will see a marked improvement in their students' overall motor skill performance, confidence, and focus on the task at hand.

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**Table 4. Example of an AM Warm-Up Routine for Kicking Sports**

Exercise*	Sets	Duration**	Recovery Time
A1. Frankenstein Walks	1	20 yards	0
A2. Forward Lunge with Arm Pumps	1	20 yards	0
A3. Backward Lunge with a Twist	1	20 yards	0
A4. Scorpion (stationary)	1	8 reps each side	60 seconds
B1. High Knees	2	30 seconds	0
B2. Star Jumps	2	30 seconds	0
B3. Burpees	2	30 seconds	0
B4. Single-Leg Lateral Hops (R/L)	2	15/15 seconds	0

\*"A" exercises are performed as one group, and "B" exercises are performed as another group.

\*\*See notes on table 1.

**Table 5. Example of an AM Warm-Up Routine for Throwing Sports**

Exercise*	Sets	Duration**	Recovery Time
A1. Forward Lunge with Arm Pumps	2	10 reps	0
A2. Inch Worms	2	8 reps	0
A3. Backward Lunge with a Twist	2	10 reps	0
A4. Sumo Squat to Stand	2	10 reps	0
B1. Rope Skipping: Double High-Knee Jumps	1	45 seconds	0
B2. Body Weight Speed Squats	1	45 seconds	0
B3. Seal Jumps	1	45 seconds	0
B4. Star Jumps	1	45 seconds	0

\*See note on table 4.

\*\*See notes on table 1.

**Table 6. Example of an AM Warm-Up Routine for Agility Sports**

Exercise*	Sets	Duration**	Recovery Time (seconds)
A1. Jump Rope: Skipping	1	1 minute	0
A2. Hot and Colds	1	1 minute	0
A3. High Knees	1	1 minute	0
A4. Squat and Jump	1	1 minute	0
B1. Frankenstein Walks	1	10 yards	0
B2. Forward Lunge	1	10 yards	0
B3. Backward Lunge	1	10 yards	0
B4. Scorpion	1	8 total reps	0

\*See note on table 4.

\*\*See notes on table 1.

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faculty can do so. Formalize it as much as possible to replicate an actual interview experience, including requiring candidates to dress for the interview. Debriefing after the mock-interview experience is critical so candidates learn what to do (and not do) during the interview. This debriefing should include a commentary to assist them in making good decisions about apparel, jewelry, piercings, tattoos, and other related concerns. Additionally, providing candidates with a recording of the interview will be beneficial for completing their own self-analysis (including distracting mannerisms, body language, clarity, etc.).

In summary, a variety of techniques, strategies, guidelines, and resources were identified and discussed to assist teacher candidates in the job hunt, as they work toward attaining their first teaching position. It is hoped that teacher educators will share this and similar types of job-search information with their preservice teachers during the early portion of the student-teaching semester or sooner.

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