Quiz Policies

Eligibility
The NCSF online quizzes are open to any currently certified fitness professional, 18 years or older.

Deadlines
Course completion deadlines correspond with the NCSF Certified Professionals certification expiration date. Students can obtain their expiration dates by reviewing either their certification diploma or certification ID card.

Cancellation/Refund
All NCSF continued education course studies are non-refundable.

General Quiz Rules

- You may not have your quiz back after sending it in.
- Individuals can only take a specific quiz once for continued education units.
- Impersonation of another candidate will result in disqualification from the program without refund.

Disqualification
If disqualified for any of the above-mentioned reasons you may appeal the decision in writing within two weeks of the disqualification date.

Reporting Policy
You will receive your scores within 4 weeks following the quiz. If you do not receive the results after 4 weeks please contact the NCSF Certifying Agency.

Re-testing Procedure
Students who do not successfully pass an online quiz have the option of re-taking. The fees associated with this procedure total $15 (U.S) per request. There are no limits as to the number of times a student may re-test.

Special Needs
If special needs are required to take the quiz please contact the NCSF so that appropriate measures can be taken for your consideration.

Quiz Rules

What Do I Mail Back to the NCSF?
Students are required to submit the quiz answer form.

What do I Need to Score on the Quiz?
In order to gain the .5 NCSF continued education units students need to score 80% (8 out of 10) or greater on the CEU quiz.

Where Do I Mail My Quiz Answer Form?
You will mail your completed answer form to:

NCSF
Attn: Dept. of Continuing Education
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

How Many CEUs Will I Gain?
Professionals who successfully complete the any continuing education quiz will gain .5 NCSF CEUs per quiz.

How Much does each quiz cost?
Each quiz costs the student $15.00.

What Will I Receive When The Course Is Completed?
Students who successfully pass any of the NCSF online quizzes will receive their exam scores, and a confirmation letter.

How Many Times Can I Take The Quizzes For CEUs?
Individuals can take each NCSF quiz once for continuing education credits.

To Perform with Less Effort, Practice beyond Perfection

In the fitness industry the quest for caloric expenditure during exercise has reached a pinnacle as boot camps, industrial training, and pseudo-athlete conditioning have all become trendy and popular. However, if one is training to optimize safety and promote performance, an emphasis simply on caloric expenditure is counterintuitive. Strength and conditioning programs and skill-specific practices for athletes should be aimed at energy conservation so that adequate glucose is available to support the highest level of performance for the longest tolerable time. This requires proficiency in both the neuromuscular and metabolic systems. The improvements come from repeated rehearsal in the appropriate pathways in conjunction with the removal of resistance to the movement. While the prior suggests practicing the skill or task in the appropriate environment, the latter suggests foundational corrections for postural imbalances, improved stability, and improved range of motion at each joint.

A common error in training for performance enhancement is emphasizing the work rather than focusing on how the work is performed. At the University of Colorado Boulder researchers analyzed this concept to determine the relationship of motor pattern emphasis, mental focus, and efficiency. The study, led by CU-Boulder Assistant Professor Alaa Ahmed and funded by the National Institutes of Health (NIH), looked at how test subjects learned particular arm-reaching movements with and without resisted loads. As part of the study, test subjects had to exert more energy in some reaching movements via resistance applied by a robotic arm, making subjects exert force as they steered the cursor toward a designated target. According to Ahmed, “with repeated practice of moving the robotic arm against the force fields, the subjects learned the task by not only cutting down on errors, but effort as well.”

The test subjects performed a series of trials (totaling 700) with and without force and in sync with metronome pacing, which was used to signal the test subjects to move the robotic arm every two seconds toward the target during the trials. Each of the test subjects were concurrently measured for oxygen consumption and carbon dioxide production, to identify the metabolic demands of the trials. The research team also collected surface electromyographic data by placing electrodes on the six upper limb muscles used during reaching tasks to identify recruitment characteristics.

The results showed that even after a motor pattern was developed and muscle activity decreased for the same task, the overall energy costs to the test subjects continued to decrease. “By the end of the task, the net metabolic cost as measured by oxygen consumption and carbon dioxide exhalation had decreased by about 20 percent”, stated Ahmed. "The message from this study is that in order to perform with less effort, keep on practicing, even after it seems as if the task has been learned." An important component to the study is the fact that it reinforces the concept that mental focus is requisite to task performance, and repeated

exposure allows for finite adjustments and efficient management of the neuromuscular system. The study suggests that quality movements ultimately involve efficiency in both biomechanics and neural processing, or thinking. "We suspect that the decrease in metabolic cost may involve more efficient brain activity," Ahmed said. "The brain could be modulating subtle features of muscle activity, recruiting other muscles or reducing its own activity to make the movements more efficiently."

The emphasis on focused skillful actions promotes a reduced cost of movement and allows for improved performance at all levels. When energy-sparing occurs, the most common cost in human performance, carbohydrate diminution, can be better managed and more quality movement will result. In addition, the use of increased afferent data, such as targeting and other visual stimulus help enhance the brain interaction toward improved neuromuscular refinement. This is important for both personal training as well as sports performance as greater energy availability allows for longer periods of intense work. Personal trainers should have clients rehearse movements and continue to program activities for mastery of execution following the period of skill acquisition.

Incorporating visible objects in movement is not a new concept, but does require a premeditated plan to promote the desired effect. When the observational component forces notable adjustments in the movement, the neural rehearsal may be disrupted. For example, if one places floor dots too far apart the effort to stabilize the body across greater distance may cause compensatory actions which corrupt the established motor pattern. Likewise, if too much stress is applied, the movement may be too much to manage proficiently, and while a visual target exists, the method to employ the target becomes sloppy. An example of how to use a target in performance would be foot boxing or cone barriers. When using a lunge rebound for instance a common problem is variation in the foot placement location. A foot box can be taped on the floor to identify the landing location for the step foot. This forces the body to comply with the defined range and promotes improved rehearsal as the distance is constant and body action must accommodate the environment. When performing power cleans a common error is hip abduction “jumping the feet outward” due to inefficient hip flexion relative to the load. A technique to promote vertical displacement is to place small cones on either side of the feet to force the landing in the correct location. The lifter becomes cognizant of the impediment and directs more focused effort to complying with technique related improvements rather than the common compensation error.

Consider the following techniques for employment for improved neural rehearsal in the daily program.

Foot boxing employs the concept of outlining a specific location for the foot to land or remain during the execution of an exercise. The boundaries should be within ½-1 inch of error depending on the need for flawlessness in the action. Too large a box and the allowance for

movement error can negatively affect efficiency. White athletic tape works very well for quick set-up and breakdown and leaves no visible marks.

Cone targets are ideal for reaching activities and for varying heights when employing footwork in the sagittal or frontal plane. Different sized cones can provide for variations in the ROM and difficulty. Cones may also be used as area limits for different agility drills.

Placement dots delineate the location for foot or hand contact. They can be used similarly to foot boxes but do not necessarily imply foot direction serving for an acceptable level of error. They can quickly be moved making for rapid adjustments and can also serve as ground targets for medicine ball throws and chops as well.

Wall marks may be large targets painted on a rebound surface for throws or smaller dots for touch locations when using suspension devices. They may also serve as a height mark for ROM adjustments for jumps and related activities.

Squares, rings, and hurdles are used for gross movement development and support increased or decreased movement range. Rings are commonly used in agility drills to create varying foot placement controls during high velocity acts. They can also be effectively used for bounds. Hurdles, much like cones, can create range variations in different movements. Overs and unders using high hurdles are effective in forcing increased joint angle changes and can create contrasts in stability.

Cone Drill Example; Courtesy of Power Systems

Agility Blocks Example; Courtesy of Power Systems

Regardless of the goal, training should emphatically focus on technique and exacting execution. Aside from the fact that it is the coach or trainer's ethical responsibility to ensure correct biomechanics, reduced resistance to movement through proficiency dramatically enhances the level of exercise tolerance. Utilizing brain stimulus along with neuromuscular rehearsal as mentioned above can dramatically improve performance when applied correctly and adds diversity to the exercise regimen. These tactics should be premeditated and thoughtfully positioned in an exercise bout to accommodate the overall intended stress.

Hurdle Drill Example; Courtesy of Power Systems

CEU Quiz

1. Skill-specific practices for athletes should focus on _____ so that adequate glucose is available to support the highest level of performance.

   A. flexibility
   B. power
   C. energy conservation
   D. energy depletion

2. According to the research published by Professor Alaa Ahmed from the University of Colorado Boulder, additional practice of an activity after a motor pattern has been developed _____.

   A. has a negligible effect on effort
   B. results in a 100% increase in force production
   C. results in a 20% additional decrease in net metabolic cost
   D. does not affect energy demands

3. The research study cited in the article suggests that quality movements involve efficiency in _____.

   A. biomechanics and neural processing
   B. thinking and speaking
   C. only biomechanics
   D. None of the above

4. The most common cost in human performance is _____.

   A. lipid utilization
   B. protein synthesis
   C. vitamin deficiency
   D. carbohydrate diminution

5. Which of the following is an example of the use of increased afferent data, which can enhance the brain interaction toward improved neuromuscular refinement?

   A. targeting
   B. visual cueing
   C. Both A & B are correct
   D. None of the above

6. The take away message for personal trainers from the research by Ahmed cited in the article is that _____.

A. once your client has learned a new movement pattern, it is time to move on to a new movement
B. every exercise session should be different so the client doesn't actually ever learn the movement
C. clients should continue rehearsing movements for mastery of execution even after the skill acquisition phase
D. skill acquisition is not that important to your client's overall success.

7. Which of the following is an example of target use to enhance performance and movement efficiency?

A. foot boxing
B. floor dots
C. cones barriers
D. All of the above

8. _____ are ideal for reaching activities in the frontal or sagittal planes.

A. dumbbells
B. kettlebells
C. cones
D. therabands

9. Outlining a specific location for the foot to land or remain during the execution of an exercise is known as _____.

A. cone targeting
B. foot boxing
C. wall marking
D. hurdles

10. Utilizing some type of brain stimulus along with neuromuscular rehearsal can _____.

A. decrease performance
B. improve performance
C. increase flexibility
D. decrease power output

Quiz Answer Form

FIRST NAME_____ **LAST NAME**_____ **M.I.**_____

TITLE_____

ADDRESS_____ **APT.**_____

ADDRESS _____

CITY_____ **STATE**_____ **ZIP**_____

COUNTRY_____ **POSTAL CODE**_____

CERTIFICATION NO. _____ **CERTIFICATION EXP.** ____/____/____

MEMBERSHIP NO. _____ **MEMBERSHIP EXP.** ____/____/____

Quiz Name	Member Price	Total
	$15	



☐ Discover ☐ Visa ☐ Mastercard ☐ Amex ☐ Check/Money Order

_____ _____ _____
Account No. Exp. Date Security Code

_____ _____
Signature Date

Quiz Answers

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

Fill in each blank with the correct choice on the answer sheet. To receive 0.5 CEUs, you must answer 8 of the 10 questions correctly.

Please mail this Quiz answer form along with the proper enclosed payment to:

NCSF
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

Questions? 800-772-NCSF