

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.

Heart Rates for Energy Expenditure

Weight loss is difficult. Not in theory – eat less and move more – but in implementation. One of the major obstacles for most people is the lack of knowledge and/or confusion surrounding caloric intake and expenditure. Most people consume more calories than they realize and burn far less calories than they expect. Knowing what (# of calories) is actually in the foods they consume is one problem and knowing how calories are referenced is another. A breakfast muffin for instance may have 400-600 kcal. While the label says 200 kcals/serving, some overlook that the label also states there are two servings per muffin. At quick glance the calories and fat presented are only half of the actual value. A similar problem occurs in the gym. The Stairclimber shows 300 kcal after a 30 minute workout. In reality, the value is only correct if the individual maintained an upright posture, did not lean on the machine, and maintained proper pace and range on the

pedals; or more importantly sustained heart rates. Just like the serving and portion sizes matter in food, heart rate matters when performing continuous exercise aimed at achieving weight loss.

After 50% of VO_2 max, heart rates correlate increasingly well with VO_2 at the same intensity. The chart below demonstrates the relationship between the percentage of measured heart rate and percentage of VO_2 max. The percentage of heart rate max is always charted on cardio machines and the general recommendation is to train between 75-90% of HRmax, or 60-80% of VO_2 max, which is explained by the number correlations below. The reason this is relevant is caloric expenditure is tied to oxygen utilization. If you know a person's VO_2 you can also determine an actual caloric expenditure by minute based on heart rates.

Percentage of HRmax

66%
70%
74%
77%
81%
85%
88%
92%

Percentage VO_2 max

50%
55%
60%
65%
70%
75%
80%
85%

Many fitness professionals have realized by now that the Elliptical Trainer and other static modalities do not predict energy expenditure accurately and based on usage dynamics commonly over-predict the caloric expenditure – giving clients a false sense of accomplishment and frustration at the lack of results at the same time. To correct this issue the first step is identifying how many calories a person can actually expend. Walk and run tests can do this with acceptable accuracy and present viable

numbers to work with for weight loss. Below are two formulas for calculating the predicted VO_2 max and subsequent caloric expenditure potential. The one mile walk test best serves the less fit population, whereas the 1.5 mile run/jog test is designed for those in better shape. One caveat to both is the individual needs to perform at maximal effort and the distance must be accurate. Therefore, measuring the distance and practicing the test for pace is important for optimal validity.

One Mile Walk Test

$$VO_2\text{max (ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}) = 132.853 - 0.0769(\text{weight}) - 0.3877(\text{age}) + 6.315(\text{gender}) - 3.2649(\text{time}) - 0.1565(\text{HR})$$

- Weight is in pounds
- Age is in years
- Gender = 0 for females and 1 for males
- Time is in minutes and hundredths of minutes (ex. 13.51 = 13 minutes and 31 seconds) *divide 31 seconds by 60 seconds*
- Heart rate is in beats per minute at completion (use a 10 sec count x 6)

1.5 Mile Run Test

$$VO_2 = \text{horizontal velocity m} \cdot \text{min}^{-1} \times \frac{0.2 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}}{\text{m} \cdot \text{min}^{-1}} + 3.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$$

The formula is not as complicated as it appears. Assume a 35 year old female weighing 138 lbs. ran the 1.5 mile in 12:13 min. The first thing that must be calculated is the average horizontal running velocity of the subject in meters per minute. To do this you must convert the distance run into meters and divide it by the number of minutes it took to complete the run.

Example Meter Conversion

$$1.5 \text{ miles} = 2,413.8 \text{ meters}$$

2,413.8 must then be divided by the time it took to complete the run in minutes (use whole numbers)

Example ($m \cdot \text{min}^{-1}$) conversion

If it took 12:00 minutes to complete the run, then $2,413.8 \text{ m} / 12\text{min} = 201.15 \text{ m} \cdot \text{min}^{-1}$ (horizontal velocity)

If it took 12:13 to complete the run then the divisor would be 12.21 (12 +13/60))

Perform your conversion below:

$2,413.8 \text{ meters} \div 12.21 \text{ minutes} = 198 \text{ m} \cdot \text{min}^{-1}$ (horizontal velocity)

VO₂max conversion. The last calculation that must be performed is the one that will provide you with the subject's estimated VO₂max. Consider the above example:

$$\text{VO}_2 = \text{horizontal velocity } m \cdot \text{min}^{-1} \times \underline{0.2 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}} + 3.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$$

$$m \cdot \text{min}^{-1}$$

$$\text{VO}_2 = 198 \text{ m} \cdot \text{min}^{-1} \times \underline{0.2 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}} + 3.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$$

$$m \cdot \text{min}^{-1}$$

Less scientifically written as $(198 \times 0.2) + 3.5 = \text{VO}_2$

$$\text{VO}_2 \text{ max} = 43.1$$

Now at $43.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ the maximum oxygen use has been determined. A couple of multiplication equations later and the female's maximal oxygen consumption expressed in calories is 810 kcal/hour. So if she was able to train at 100% of her VO₂ she would be able to burn over 800 kcal/hour or 13.5 kcal/min (810 kcal ÷ 60 min). Some boot camps advertise that the class allows one to burn more than 1,000 kcal/hour - obviously an extreme exaggeration. So...assuming your client was going to train at a fitness level between 60-80% you can deduce the calories per minute accurately. Look at the example once again.

She burns 810 kcal at 100%. Which means at 60% (810 x .6) she burns 486 kcal/hour or 8 kcal/minute. At 80% she would burn 648 kcal/hour or 10.8 kcal/minute. These numbers are much more reasonable when it comes to predicting exercise related weight loss and also helps explain why it takes so long. Based on these facts if she exercised aerobically for 20 minutes at 60% of her oxygen capacity she would burn only 160 kcals (20 min x 8 kcal) or at 80% she would jump to 216 kcals; hardly enough to burn off the muffin. In fact, she would actually need about 40-45 minutes to

burn off that breakfast muffin making it probably not worth the taste enjoyment.

Since not everyone is efficient with METs and not every machine has MET level buttons on

them, it makes more sense to use Heart Rates. But, if you do use METs it is as simple as multiplying the VO_2 max times your training percentage and dividing by 3.5.

Example $43.1 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} \times 60\% = 25.86 \div 3.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} = 7.3 \text{ METs}$

$43.1 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} \times 80\% = 34.48 \div 3.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1} = 9.85 \text{ METs}$

Utilizing the MET intensity button for better accuracy helps, but if you're more comfortable with Heart Rates use the Karvonen formula to establish the training zones as they correlate well with VO_2 and subsequently with the calories expended. Here we simply measure the female's resting heart rate. Let's say it is 65 beats/min. We then calculate the max heart rate $208 - (.7 \times \text{age})$ and since she is 35 we get 184 beats/min. Subtracting the resting from the maximal heart rate gives us the zone to work in called the heart rate reserve which should make sense since we cannot exceed max nor go below rest – so we train somewhere in the middle. When completing the calculation for the actual training zone, we'll need to add back in the resting heart rate to our calculated percentage of heart rate reserve. See example below:

$183 \text{ bpm max} - 65 \text{ bpm resting} = 122 \text{ HRR}$

$122 \text{ HRR} \times 60\% + 65 \text{ bpm} = 138 \text{ bpm}$

$122 \text{ HRR} \times 80\% + 65 \text{ bpm} = 162 \text{ bpm}$

Based on the correlations and assumptions above if the female client gets her heart rate to 138 beats/min or works at 7.3 METs she will burn approximately 8 kcal/minute and if she gets her heart rate up to 162 beats min or 9.85 METs she will burn about 10.8 calories/minute. These values can be determined for any percentage over 50% VO_2 max or 70% HRmax by simply swapping out the training intensity. The reason this is such an effective method to determine caloric expenditure is there is no way to cheat. Either you are using the oxygen as monitored by your heart rate or you are not. This forces people to be more accountable for their effort and clearly identifies when they are not doing enough to create a negative caloric balance.

Heart Rate for Energy Expenditure CEU Quiz

1. According to the article, one of the major obstacles for successful weight loss is _____.
 - a. a lack of knowledge and/or confusion about caloric intake and expenditure
 - b. the limited modes of aerobic activity available in most gyms
 - c. access to qualified professionals such as personal trainers
 - d. limited knowledge about oxygen uptake and heart rate related to caloric expenditure
2. The number of calories displayed on aerobic equipment during exercise is only accurate if _____.
 - a. the individual maintains an upright posture
 - b. the individual does not lean on the machine
 - c. the individual maintains the correct pace
 - d. all of the above are necessary for the calculated caloric expenditure to be correct
3. After ____ of VO_2 max, heart rates correlate increasingly well with VO_2 at the same intensity.
 - a. 10%
 - b. 25%
 - c. 40%
 - d. 50%
4. The general recommendation for aerobic activity aimed at fitness is to train between _____ of HRmax.
 - a. 40%-50%
 - b. 75%-90%
 - c. 25%-35%
 - d. 90%-100%
5. _____ of VO_2 max correlates with approximately 75%-90% of HRmax.
 - a. 35%-45%
 - b. 50%-55%
 - c. 60%-80%
 - d. 85%-95%

6. When calculating an estimated VO_2 max for a client, the one mile walk test best serves _____, while the 1.5 mile run/jog test is better suited for _____.
- the less fit population; more aerobically fit individuals
 - more aerobically fit individuals; the less fit population
 - bodybuilders; obese individuals
 - obese individuals; asthmatic clients
7. One of the key components that will increase accuracy and validity of the predictive value of VO_2 max when using either the 1.5 mile run/jog test or the one mile walk test is _____.
- max effort of the client
 - submaximal effort of the client
 - unfamiliarity with the test
 - a random distance
8. If utilizing the one mile walk test to estimate a client's VO_2 max, which of the following variables are considered in the formula?
- weight in pounds
 - age in years
 - gender
 - all of the above are necessary
9. As an example, if a client's calculated maximal caloric expenditure is 1,000 kcal/hour and they are recommended to exercise for 30 minutes at 60% of their maximum capacity, approximately how many calories will be expended?
- 1,000 calories
 - 600 calories
 - 300 calories
 - 180 calories
10. True or False? Utilizing heart rate and oxygen utilization to estimate caloric expenditure is more accurate than the information provided by most aerobic machines.
- True
 - False

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