

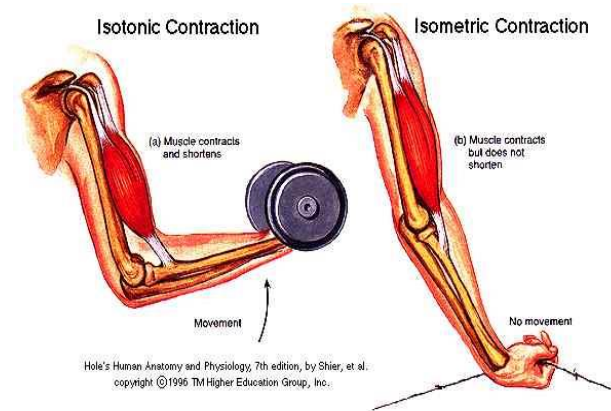
## MP 4 Fitness Unit: Concepts for Mastery



*What do you do to motivate yourself?*

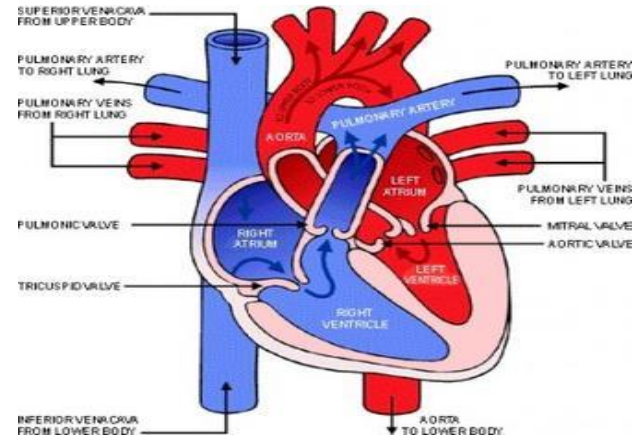
### 1. 5-Health Related Fitness Components (BCF-M&M)

- Body Composition
- Cardiorespiratory Endurance
- Flexibility
- Muscular Endurance
- Muscular Strength



## 2. Muscular Endurance

- You should understand that muscular endurance training DOES increase your STRENGTH.
  - i. Perform 12 or more repetitions using a lighter but highly challenging weight or resistance.
    1. People often use their own body weight or elastic bands as the resistance rather than iron weights.
  - ii. Perform at least 2 sets of the same exercise but rest between the sets.
    1. Did you know...some science suggests that you gain up to 70% of your benefits of exercise during your first set? Push yourself!
  - iii. For the novice-targeting muscular endurance training is a great way to practice your form yet still increase your strength.



### 3. Cardiorespiratory Endurance

- Describe the simple difference between the Cardiovascular System and Cardiorespiratory fitness (see diagram above).
- How do you palpate a pulse?
  - i. Preferably, use the pads of the pointer and middle fingers and gently press on one of two sites:
    1. Radial Pulse-press on the groove of the wrist. The spot is on the palm side and just below the base of the thumb.
    2. Carotid Pulse-press on the side of the neck. The spot is on the soft groove just lateral of the hard anterior tissue.
- What are the important pulse assessments that will help individuals improve their fitness plan?
  - i. MHR Maximum Heart Rate
  - ii. RHR Resting Heart Rate
    1. Heart rate Reserve
- What is the Karvonen Formula and why is it important?
  - i. Compare 65% of MHR to 65% of Heart Rate Reserve plus RHR (Karvonen Formula)  
<http://www.news-medical.net/health/Heart-Rate-Reserve.aspx>
  - ii. What can you tell about a person by knowing their Heart Rate Reserve?

You should be able to make detailed responses to the following prompts:

- Why would you organize the days of your WEEKLY exercise routine with methods such as Push v. Pull or Upper Body v. Lower Body?
- List at least five (5) important details to know about training for muscular endurance?
- Discuss the details of pulse assessments and the Karvonen Formula as it pertains to cardiorespiratory endurance.
- What safety rules and etiquette should you know about for the purposes of our class and at the “gym”?
  - You **DO** select and manipulate the seat adjustment, bar adjustment, weight or pin rather than asking your partner to do any of those tasks. Doing for yourself will reduce the risk for injury.
  - Do not rest on the exercise apparatus during rest or between sets. Move away from the machine allowing another person to complete his or her set. After your rest, then complete your second and subsequent sets.



By Dr Ananya Mandal, MD.

Heart rate reserve describes the difference between a measured heart rate or the predicted maximum heart rate and the resting heart rate in a person. It indicates the heart rate reserve cardiovascular fitness of a person.

### **How to calculate heart rate reserve**

The formula used to calculate the heart rate reserve is  $HRR = HR_{max} - HR_{rest}$ .

As the heart rate reserve increases the  $HR_{rest}$  has to drop. This is a beneficial parameter that is calculated by athletes to increase their performance.

### **Heart rate and oxygen consumption**

Heart rate has a relation with oxygen consumption especially when intensities rise to reach ranges between 50-90%  $VO_2$  max. Thus exercise intensity is the percentage of maximum heart rate (calculated using the formula  $220 - \text{age}$ ).

A 30 year old who has a maximum heart rate of 190bpm thus may train up to 75% of his intensity at 143bpm.

The earlier formula “ $220 - \text{age}$ ” makes no allowances for variations in resting heart rate among individuals.

The formula for heart rate reserve allows a better target heart rate to be determined for optimum training capacity based on both maximum and resting heart rate.

### **Calculating Target Heart Rate with Karvonen Formula**

$220 - \text{age} = \text{maximum heart rate}$

$\text{Maximum heart rate} - \text{resting heart rate} = \text{heart rate reserve}$

$(\text{Heart rate reserve} \times \text{training\%}) + \text{resting heart rate}$

## Comparing the two formulas

To compare the two formulas, an example of a 45 year old man who has a resting heart rate of 60 beats per minute and who wants to train at 70% maximum is assessed.

Target heart rate in this individual:-

$220 - 45 = 175$  beats per minute. This is the maximum heart rate.

According to Karvonen formula  $(115 \times 0.7) + 60 = 140.5$

Thus 140.5 beats per minute is the target heart rate using this method.

Using the traditional 220 age formula this same person would have a target heart rate of  $(220 - 45 \times 0.7)$  or 122.5

122.5 beats per minute is considerably lower than that estimated by the Karvonen formula.

*Reviewed by April Cashin-Garbutt, BA Hons (Cantab)*

## Sources

1. [www.mpc.edu/.../Heart%20Rate%20Reserve.pdf](http://www.mpc.edu/.../Heart%20Rate%20Reserve.pdf)
2. <http://www.rbht.nhs.uk/patients/condition/heart/>
3. [www.uhs.nhs.uk/.../Bradyarrhythmias-patientinformation.pdf](http://www.uhs.nhs.uk/.../Bradyarrhythmias-patientinformation.pdf)
4. [www.uhs.nhs.uk/.../Tachyarrhythmias-patientinformation.pdf](http://www.uhs.nhs.uk/.../Tachyarrhythmias-patientinformation.pdf)
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## Further Reading

[What is Heart Rate?](#)

## Heart Rate Reserve

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[Target Heart Rate](#)

[Heart Rate Abnormalities](#)

[Heart Rate Reserve](#)

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