

## Vol 2, 2003 CEC ARTICLE

### *Weight Training Principles*

#### **Summary by D. Hoppens**

##### Objective

1. Increase knowledge, understanding, and application of weight training principles.  
Answer these ten (10) questions related to weight training.

1. When starting a weight training program, what would be a scientific way to determine how "heavy" of weights should be utilized in each lift?

The scientific method of determining how heavy a weight should be used is referred to as a 1 rep max. A 1 rep max at 75% would equal 75 lbs. The 1 rep max can vary between 60 – 75%. When the maximum amount of weight has been established, then it is necessary to be able to complete the sets. If a person is not able to complete the sets, the weight will need to be lowered. For beginners, is it recommended to start with three sets of eight repetitions, to ensure the lifter learns correct technique.

2. What number of reps and how much rest (in minutes &/or seconds) between sets would you recommend for developing?

##### **a. Raw strength?**

Number of reps for strength: 6-8

Number of sets for strength: 2-3

Amount of rest between sets: 1-2 minutes of rest between sets.

Muscular strength gains are more lasting than endurance gains. This is achieved by pushing your muscles to their maximum. The program needs to progressively increase in intensity for strength development, and muscle building. Longer rest periods may be needed when the weights are higher/heavier. It is important to stretch the muscle(s) that has/have been worked to maintain flexibility.

##### **b. Power?**

Number of reps for power: 3-5 (30-60% of 1RM)

Number of sets for power: 2-3

Amount of rest between sets: 2-3 minutes of rest between sets.

Power training utilizes fast contraction velocity. Emphases should be on multiple-joint exercises, especially those involving the total body. Power needs strength and speed.

##### **c. Mass?**

To gain mass, lift heavy weights, with low repetitions. Rest time would be 1-2 minutes between sets. The muscle gains in size (hypertrophy) depending on the muscle fiber type activated. Muscle fiber growth is due to one or more of the following:

Increased actin & myosin

Increased number and size of myofibrils per muscle fiber

Increased amount of connective tissue, tendons, and ligaments.

Increased enzymes and stored nutrients.

**d. Endurance?**

Number of reps for endurance: 10-12

Number of sets for endurance: 1-2

Amount of rest between sets: 2-3 minutes

To increase in muscle size and endurance, the Sports Coach recommends 12-20RM. To increase endurance, it is necessary to lift the weights with high repetitions. Muscular endurance is essentially transferred to muscular strength when utilizing a wave of progression. Muscular endurance to strength occurs with single set training, by progressively performing more repetitions until and upper range is reached.

3. If you have exercised the chest muscles on Monday, how long should you rest those muscles before you work them again?

If you are training for maximum strength, then the muscle group being worked can be trained every 24 hours because the energy system that is utilized is the ATP/CP system, and it is restorized completely within 24 hours.

If you are training for muscular endurance, then the muscle requires 48 hours of recovery, as it takes 48 hours to fully restore glycogen stores.

4. What are some training methods you would use to burn more calories and stay toned?

To burn more calories and stay toned, I would continue a progressive weight training program, increasing the weights as my muscles became accustomed and more efficient. Muscle mass increases calories expended.

I would also incorporate a variety of training, such as circuit training and aerobic exercise.

5. What weight training principles should be utilized for gaining strength?

Gaining strength can be achieved by doing exercises that involve more than one muscle per exercise, and more than one muscle per joint. Free weights are preferred in order to achieve these goals, as free weight principle lifts against gravity, and involves balance and joint stabilization. However, if a de-conditioned person is just starting a program, it may be beneficial to perform a majority of exercises on machines for safety. For the novice weight trainer, he/she seem to make progress not matter what they do, as they are starting from the very beginning. Eventually, even the most productive exercises lose their effectiveness over time.

6. What are some training methods you would use to gain mass?

In order to gain mass, I would lift as heavy of weight as possible (utilizing 75% of 1 rep max) and aiming for 6 repetitions. It is important to be able to control the weight even though extremely heavy.

7. What strategies would you use to prevent hitting a plateau in your strength gains and what would be your strategies after you

have discovered you are in a plateau?

To prevent a plateau or break out of a plateau, I would start on a list of strategies. First would be the SUPER set. The idea is to tire out a muscle group completely by doing two consecutive sets of different exercises without taking a rest between.

Once my body has adapted to this formula and has begun to plateau, I would progress to the GIANT sets. This principle is to string together three or more exercises without a rest. (a super-super set). Other strategies include the PYRAMIDS. For each set, you increase the weight and decrease the number of reps, completing four to five sets of an exercise. The idea is to work up slowly and max out the muscles involved. A reverse pyramid can also be performed. BREAKDOWNS are a cross between pyramids and giant sets. Lift a fairly heavy weight, and as soon as you've exhausted the working muscles, pick up a lighter weight and push for a few more reps. NEGATIVES focus on the "eccentric" phase of weight lifting. A spotter helps you lift the weight, and you're on your own getting it down again. SUPER-SLOW TRAINING is exercises done in a slow motion. Instead of the usual 3-6 seconds per rep, you take 15-30 seconds to complete each one. This removes momentum so you are relying on pure muscle power all the way through.

8. How should you group your lifts, or what lifts should you combine on the same day?

An example of the Weider 3 day workout is to work chest, shoulder, triceps, calves and abs on day one. Back, biceps, forearms, calves and abs on day two, thighs hamstrings and abs on day three; rest on day four. In this method, after one muscle group has been worked, it gets adequate rest while another muscle group is being worked and before it is time to rotate back through the sequence.

9. How long should you train using the same Cycle or work out?

I would use the same cycle for 4-6 weeks. This would allow adequate time for my body to adjust to the new cycle, and not enough time for it to hit another plateau.

10. Why do most trainers suggest starting a lifting program as one of the first steps in beginning a weight loss program?

Most trainers suggest a lifting program, as the average person gains one pound of body weight (fat) per year after the age of 25, and loses one third to one half pound of muscle. This loss of muscle lowers our resting metabolism rate, and we lose support for our skeletal system. Weight lifting can help to restore muscle which will increase the basal metabolic rate, due to or skeletal muscular system which burns the most calories at rest. More muscle tissue means higher metabolism. A progressive intensity program seems to be the key factor in strength development, and muscle building. Weight lifting activity can utilize calories for several hours after training and the restoration of muscle mass increases calories expended at any activity level.

CEC ARTICLE TEST QUESTIONS  
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1. Define a 1 rep max test.



10. If you are going to strength train 3 days in a row, rest for one and repeat, how would you break down the muscles worked on each day.

Day 1:

Day 2:

Day 3:

11. In cycling or periodization, what is the number of weeks to use the same workout regime?

12. List two reasons that trainers start programming for weight loss with a strength training program?

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