Weight Training
(Beginning PE 181A, Intermediate PE 181B, Advanced PE 181 C)
Portland Community College
Rock Creek Campus

-Desire—Decision—Dedication—Discipline-

Instructor: Todd Hicks

Todd Hicks, M.S., CSCS (971) 722-7441, thicks @pcc.edu

Health & Physical Education Department
Portland Community College-Rock Creek
Bldg. 5 Room 105d
17705 NW Springville Road
Portland, OR 97229

Name:________________________

Class:_________________________
Dear students, faculty, and Staff

Here at Rock Creek, the Physical Education Department is committed to assisting you in developing a healthy lifestyle. However, your achievement of this goal largely depends on the level of commitment that each of you make in the classroom and in your own personal lives. Contained in this manual are all the tools necessary to assist you in your endeavors to living a healthy lifestyle. Follow this manual to the letter and we promise, you will experience positive changes in how you look and feel.

Our staff can’t emphasize enough how important it is that you take your training seriously. You have the opportunity to succeed. But your success depends on the level of commitment that each of you make to the class.

REPORT TO CLASS WITH A POSITIVE ATTITUDE!

Fit for Life,

Todd Hicks M.S., C.S.C.S.
Portland Community College (Rock Creek)
Health/Physical Education
Panther Power

No Excuses

Don’t make any for this class, because everyone has an excuse to not exercise. So basically the bottom line is just do it…..get it done!!!!

Hard Work Pays Off

The will to win is how you live your life. If you have that desire in you, then you will make the sacrifices. You will be totally committed to excellence. Everyday, on every lift, every run, everything you do you will ask yourself if this is helping me move toward reaching my goal. Write this goal down on paper. Hang it in your room, put in a special place, but bottom line—have a clear goal for yourself in this class. It can be related to strength, cardiovascular improvement, body weight, conditioning, nutrition, or anything that is going to motivate you to work hard this summer.

To be successful in fitness, commitment is key. Everyday, complete all the lifting, running, cardiovascular exercise, and nutrition goals asked of you. Winners do not choose to do just what they like to do, they attack it all. I encourage you to be this type of student. Be accountable, be dependable.

Establish an expectation for victory in your personal goals. Through hard work, the levels of expectations will rise during the time in this class.
<table>
<thead>
<tr>
<th>Index</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weightroom Etiquette</td>
<td>5</td>
</tr>
<tr>
<td>Purpose of Weight Training</td>
<td>6</td>
</tr>
<tr>
<td>Program Development</td>
<td>8</td>
</tr>
<tr>
<td>Anatomy</td>
<td>9</td>
</tr>
<tr>
<td>Program Orientation</td>
<td>10</td>
</tr>
<tr>
<td>Program Design</td>
<td>12</td>
</tr>
<tr>
<td>Frequently Asked Questions</td>
<td>17</td>
</tr>
<tr>
<td>Avoid Injuries</td>
<td>19</td>
</tr>
<tr>
<td>Safety Precaution</td>
<td>20</td>
</tr>
<tr>
<td>Glossary</td>
<td>21</td>
</tr>
<tr>
<td>Strength Training Percentages</td>
<td>27</td>
</tr>
<tr>
<td>Classroom Packet</td>
<td>28</td>
</tr>
</tbody>
</table>

(Nutrition, Skill Checklist, Assessment, Strength Training Orientation, Workout Cards, Anatomy, Flexibility, and Medical history)
Weight Room Etiquette

1. No gum or food.
2. No cell phones.
3. Share equipment (do not monopolize the equipment).
4. No horseplay in gym.
5. Use appropriate language.
6. Use a towel to wipe up equipment after use.
7. Trade sets-ask for a spot and be available for a spot.
8. Unload bars and equipment; don’t leave weights unattended.
9. Large athletes should return equipment to a “reachable” position for others.
10. Return pencils.

Program Emphasis

<table>
<thead>
<tr>
<th>Flexibility</th>
<th>Increased Range of Motion</th>
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<tbody>
<tr>
<td>Balance</td>
<td>Stability</td>
</tr>
<tr>
<td>Posture</td>
<td>Strength Endurance</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>Special Strength</td>
</tr>
<tr>
<td>Absolute Strength</td>
<td>Absolute Power</td>
</tr>
<tr>
<td>Increase bone density</td>
<td>Stamina</td>
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<tr>
<td>Will power</td>
<td>Work Capacity</td>
</tr>
<tr>
<td>Body Composition</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>
Overload Principle:

By Wayne L. Wescott, PhD

A muscle will do only that which is required of it. By progressively overloading muscles with more weight or repetitions than they are used to, they will adjust and improve.

12 Reasons Every Adult Should Strength Train

During the past few years, more and more studies have shown that sensible strength training produces many health and fitness benefits. Key researchers have provided a wealth of data on the positive physiological responses to basic programs of strength exercise. Consider these 12 reasons to strength train:

1. **Avoid Muscle Loss.** Adults who do not strength train lose between 5 and 7 pounds of muscle every decade (Forbes, 1976; Evans S. Rosenberg, 1972). Although endurance exercise improves our cardiovascular fitness, it does not prevent the loss of muscle tissue. Only strength exercise maintains our muscle mass and strength throughout our mid-life years.

2. **Avoid metabolic Rate Reduction.** Because muscle is very active tissue, muscle loss is accompanied by a reduction in our resting metabolism. Information from Keyes et al. (1973) and Evans and Rosenberg (1992) indicates that the average adult experiences a 2 to 5 percent reduction in metabolic rate every decade of life. Because regular strength exercise prevents muscle loss, it also prevents the accompanying decrease in resting metabolic rate.

3. **Increase Muscle Mass.** Because most adults do not perform strength exercises, they need to first replace the muscle tissue that has been lost through inactivity. Fortunately, research (Westcott 1995) shows that a standard strength-training program can increase muscle mass by about 3 pounds over an eight week training period. This is the typical training response for men and women who do 25 minutes of strength exercises three days a week.

4. **Increase Metabolic Rate.** Research reveals that adding 3 lbs. of muscle increases our resting metabolic rate by 7 percent, and our daily calorie requirements by 15 percent (Campbell et al., 1994). At rest, a pound of muscle requires 35 calories per day for tissue maintenance, and during exercise muscle energy utilization increases dramatically. Adults who replace muscle through sensible strength training exercises use more calories all day long, thereby reducing the likelihood of fat accumulation.

5. **Reduce Body Fat.** Campbell and his co-workers (1994) found that strength exercises produced 4 pounds of fat loss after three months of training, even though the subjects were eating 15 percent more calories a day. That is, a basic strength-training program resulted in 3 pounds more muscle, 4 pounds less fat, and 370 more calories per day food intake.

6. **Increase Bone Mineral Density.** The effects of progressive resistance exercise are similar for muscle tissue and bone tissue. The same training stimulus that increases muscle myoproteins also increases bone osteoproteins and mineral content. Menkes (1993) has demonstrated significant increases in the bone mineral density of the upper femur after four months of strength exercises.

7. **Improve Glucose Metabolism.** Hurley (1994) has reported a 23% increase in glucose uptake after four months of strength training. Because poor glucose metabolism is associated with adult onset diabetes, improved glucose metabolism is an important benefit of regular strength exercises.
8. **Increase Gastrointestinal Transit Time**. A study by Koffler (1992) showed a 56 percent increase in gastrointestinal transit time (transit time is faster) after three months of strength training. This is significant due to the fact that delayed gastrointestinal transit time is related to a higher risk of colon cancer.

9. **Reduce Resting Blood Pressure**. Strength training alone has been shown to reduce resting blood pressure significantly (Harris & Holly, 1987). Our study (Westcott, 1995) has revealed that combining strength and aerobic exercise is an even more effective means of improving blood pressure readings. After two months of combined exercise, our program participants dropped their systolic blood pressure by 5 Hg and their diastolic blood pressure by 3 Hg.

10. **Improve Blood Lipid Levels**. Although the effect of strength training on blood lipid levels needs further research, at least two studies (Stone et al., 1982; Hurley et al., 1988) have revealed improved blood lipid profiles after several weeks of strength exercise. It is important to note that improvements in blood lipid levels are similar for both endurance and strength exercise (Hurley, 1994).

11. **Reduce Low Back Pain**. Years of research on strength training and back pain conducted at the University of Florida Medical School have shown that strong low-back muscles are less likely to be injured than weaker low-back muscles. A recent study by Risch (1993) found that low-back patients had significantly less back pain after 10 weeks of specific (full-range) strength exercise for the lumbar spine muscles. Because 80 percent of Americans experience low-back problems, it is advisable for all students to strengthen their low back problems, it is advisable for all adults to strengthen their low-back muscles properly.

12. **Reduce Arthritic Pain**. According to a recent edition of the Tufts University Diet and Nutritional letter (1994), sensible training eases the pain of osteoarthritis and rheumatoid arthritis. This is good news, because most men and women who suffer from arthritis pain need strength exercises to develop stronger muscles, bones, and connective tissue.
Introductions: Why design an Individualized Strength program?

The human body has over 430 skeletal muscles that move the bones. Strength training is one of the fastest and most effective ways to make strength improvements and noticeable differences in your body. The changes in muscles and body shape that follow a committed effort are one of the enjoyable consequences of strength training.

Why take an individualized approach to strength training? Can everyone fit into a size six pair of shoes? Each individual has a unique body to work with a different set of needs and goals than the person next to them. It would be foolish for everyone who takes up resistance training to follow a program that has been proven to be the “best one”. A strength program should be individually tailored to meet the goals, capabilities, and interests of each participant.

This manual can help you to identify your goals and provide you with some basic guidelines and options for your strength program. Muscle tissue grows stronger from repetitive stress that are placed on it. It is beneficial to stick with a set workout program for a time such as 10-12 weeks. Then experiment and make frequent adaptations. Learn the tools and methods to design and redesign your own program as your interests and needs change and your workouts become stale.

Know what your goals are as you design your program. There are endless variables and methods of training, each will influence the effects the program will have upon your body. Identify the:

- **Goals** you hope to achieve
- **Areas** you want to improve
- **Time** commitment you are willing to spend

Once you have identified the desired end goals, areas you want to train, and time commitment, you can begin to formulate a program tailored for you. This manual can help you to consider many of the training factors as you design a workout. Learn and practice the correct techniques of lifting and use caution on exercises that may be harmful to your back, knees, or ankles. And most importantly, **begin slowly**. Good luck and have fun as you design and carry out your program.

If you don’t know where you’re going, you may end up somewhere else.
Anatomy

Progressive Resistance Training

2 types – (our focus – isotonic)
   a) Isotonic - shortening of the muscles during maximal contraction.
   b) Isometric - stationary contraction of the muscles

Two components

Strength is the maximal amount of force you can produce in a single effort of a particular muscle or group of muscles.

Endurance is the number of repetitions one can perform at a sub-maximal level.

Progressive resistance training (PRT) is the type of physical activity performed with the intent of improving muscle fitness.

Types of Muscle Tissue

- Smooth – long spindle-shaped fibers that are involuntary and primarily in internal organs such as: the wall of the esophagus, stomach, intestines, and blood vessels.
- Cardiac – also involuntary and found only in the heart.
- Skeletal – primarily voluntary and used to move the skeletal system.

Types of Muscle Fiber

- Type I – Slow twitch, primarily aerobic (generally red in color).
- Type Ila – fast twitch, anaerobic/intermediate; studies show adaptable depending on training (controversial).
- Type Iib – fast twitch, anaerobic (white in color).

Progressive Resistance Training Principles

- Overload – challenging the muscles and systems more than they are accustom to.
- Progression – adding more stress as the body adapts to a load. Too much too fast can cause excessive muscle soreness or injury.
- Specificity – training to meet/achieve your specific goals.
- Rest / recovery – allowing adequate time for the muscles to recover, generally 48 – 72 hours.
- Diminishing return – more of the same amount produces less. Example; as fitness improves doubling your sets doesn’t mean you will double your results. Research shows most benefits are achieved in the first set with PRT.
# Workout Cycle

<table>
<thead>
<tr>
<th>Time</th>
<th>weight room setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>:00</td>
<td>Warm-up&lt;br&gt;-jogging, elliptical, treadmill, stationary bicycle etc.</td>
</tr>
<tr>
<td>:05</td>
<td>Technical Period&lt;br&gt;-core specifics, pushups and squatting (light activity)</td>
</tr>
<tr>
<td>:10</td>
<td>Flexibility&lt;br&gt;-full body routine, holding stretches 1-2 x for 30-60 seconds&lt;br&gt;-stretch to slight discomfort</td>
</tr>
<tr>
<td>:15</td>
<td>Developmental Period&lt;br&gt;-Main lifting sequence of strength training</td>
</tr>
<tr>
<td>:60</td>
<td>Cool Down&lt;br&gt;-Static stretching (see flexibility)</td>
</tr>
<tr>
<td>:65</td>
<td>Core&lt;br&gt;-lower abdominals, abdominals, obliques, erector spinae</td>
</tr>
</tbody>
</table>
Strength Training Orientation

Posture

1) Pinch the shoulder blades together.
2) Expand your chest.
3) Put on your “Superman Outfit”.

Fundamentals

1) Establish a motion rhythm (2/4 second count) when exercising.
   a. **Exertion phase** (2 second count)-lifting movements that involve pushing or pulling.
   b. **Resting phase** (4 second count)-return the lifting movement to its normal position. Fewer muscles are contracted in this phase.
2) Establishing a breathing rhythm.
   a. Exhale during the exertion phase.
   b. Inhale during the resting phase.
3) Locking the arms “out” will likely increase the risk of injury.
4) Perform the exercise at “Full Range of Motion” for the full length of muscular development.

Core exercises (**SJ**-Single Joint, **MJ**-Multiple Joint)

1) Abduction (SJ) 6) Compound Row (MJ) 11) Tricep Extension (SJ)
2) Adduction (SJ) 7) Shoulder Press (MJ) 12) Low Back (SJ)
3) Lat Pulldown (MJ) 8) Seated Leg Curl(SJ) 13) Pec Fly (SJ)
4) Leg Press (MJ) 9) Leg Extension (SJ)
5) Chest Press (MJ) 10) Arm Curl (SJ)

**Strength Formulas**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Intensity</th>
<th>Reps</th>
<th>Sets</th>
<th>Order</th>
<th>Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner/ Rehab/Older</td>
<td>&gt;50%</td>
<td>12-20</td>
<td>1-2</td>
<td>Alternate muscles</td>
<td>30-60 sec</td>
</tr>
<tr>
<td>Strength</td>
<td>&gt;85%</td>
<td>&gt;6-8</td>
<td>2-6</td>
<td>Vary</td>
<td>2-5 min</td>
</tr>
<tr>
<td>Tone/Endurance</td>
<td>&gt;67%</td>
<td>&gt;12</td>
<td>2-3</td>
<td>Alternate muscles</td>
<td>30-90 sec</td>
</tr>
<tr>
<td>Size</td>
<td>67-85%</td>
<td>6-12</td>
<td>3-6</td>
<td>Station training</td>
<td>30-90 sec</td>
</tr>
<tr>
<td>Power*/Sports</td>
<td>75-90%</td>
<td>1-5</td>
<td>3-5</td>
<td>Station Training</td>
<td>2-5 min</td>
</tr>
</tbody>
</table>
Considerations When Designing a Strength Program

Where do I start? How do I set up my program? Which program is suited to meet my individual needs? Consider the following below as you design your program.

1. **Goals.** Clearly define your goals, needs and the areas you wish to improve.

2. **Time Commitment.** Define your commitment of days per week and time per workout. A minimum of 2 days per week per area is recommended, although any regular time commitment is valuable. The more time you spend, the more areas you can satisfactorily train. Allow about 5 minutes for each lift you choose. 60 minutes, 3 times a week will adequately train your full body as a beginner.

3. **Number of Exercises.** Base the number of exercises on the time you have. Use your formula on the goal sheet to help you determine how many sets you can complete in your allotted time. Choose 8-14 exercises for a basic program that includes at least one exercise per body part.

4. **Exercise Selection.** Pick at least one or more exercises for each body part which you wish to improve. Choose exercises that you like and will do regularly. The greatest program is only great if it is executed regularly. Beginners may wish to start with the “Basic Circuit Weight Training” (page).

5. **Primary Area of Emphasis.** Choose from one or more of the following:

   - Beginner/Rehabilitation/Older Adult
   - Tone & Endurance
   - Size
   - Strength
   - Weight Loss
   - Power/Sports Training

6. **Number of Sets.** Beginners may respond quite well to single-set workouts (one time at each station) while an advanced lifter may need 3 or more sets to see improvements. One heavy set may be enough to maintain or improve slowly, but depending on rep speed, multiple sets may increase muscular strength more quickly.

7. **Number of repetitions.** The number of reps will vary depending on your goals. Use high reps (12-15+) and light weights during the first couple of weeks of any program. Those wishing for tone and endurance, those with injuries, and older and younger athletes can continue with high reps and light weights. Athletes who want to build strength or size should gradually drop the reps to 6-12 and use heavy weights.

8. **Load/Intensity of Weights.** “Break in” your muscles and accomplish tone and endurance with high reps and light weight (50-70% of your estimated max). For more strength and size, drop the reps and increase to heavy weights (75-90%). When you have a good base, the more you require of the muscle, the more it will perform for you. Promote power with lighter loads and a faster speed. Vary the intensity during different workouts and different cycles.
9. **Rest Intervals.** Generally, the heavier the loads lifted, the longer the rest periods needed between. This may vary based on workout intensity and goals. Typical rests between sets should be from 0 to 90 seconds. Use brief rests during endurance training (30 sec); about 1 minute rests for size; and longer rests between sets to recover from a power set (1-5 minutes). Experiment with different rest intervals as a way to change the intensity of the next set.

10. **Muscle Balance.** Strengthen both the primary muscle groups and the opposing muscle groups that support them. If you include an exercise for the quadriceps, you should also include an exercise for the hamstrings. Include all the major muscle groups of the body listed on page___________________

11. **Machines or Free Weights.** Begin with the machines if you have never lifted since, they are easier and safer. You may later choose free weights, which offer a lot more options and may be more fun. Both have pros and cons, and a good routine usually incorporates both.

12. **Sequence of Exercises.** Begin with large muscle groups (legs, chest, and back) and follow with the smaller groups (shoulders, arms, calves, neck, wrists). This helps to prevent exhaustion of the smaller muscles that are required for support while training the large groups. Vary the sequence to emphasize different areas.

13. **Safety.** Learn and utilize correct lifting techniques. Begin you strength-training program with light weights and high reps. A slight burning in the muscle during the set is normal. Stop if sharp or abnormal pain occurs in the muscles or joints. See the section on safety for more information.

14. **Specificity of Training.** Choose exercises that are specific for the muscles, speed, and movement patterns that you want to train. The muscles adapt to the demands placed on them. The more similar the training is to the desired sport or skill, the more likely it is to transfer.

15. **Exercise Grouping.** Vary the emphasis by changing how you group the exercises. Begin with circuit training, where you complete one set and then move through your whole program. For tone, definition, or high intensity training you may do “compound sets,” grouping 2-4 exercises for similar muscles. “Supersetting” is when you do a set for one area followed immediately by a set for the opposite muscle group. An athlete training for power or size may wish to “station train,” completing all set on one area before progressing.

16. **Single-Joint or Multi-Joint.** Multi-joint exercises (like bench press and squat) combine muscles and joints while single-joint exercises (like arm curls and triceps pushdown) isolate individual muscles you wish to concentrate on. Multi-joint exercises tend to improve more functional strength for sport or everyday life activities.

17. **Tempo.** Control the weights at a constant speed through the desired motion. The lifting tempo that provides optimal work to a muscle is approximately 2 seconds lifting time and 4 seconds during recovery phase (2:4). Vary your program with other tempos such as 1:4 and 4:4. Lighten the loads and increase the tempo if your goal is maximum power (needed in more sports).
18. **Warm-up and Stretching Exercises.** Includes 5-10 minutes of an active muscle/joint warm up to help prepare your body and prevent injuries. Begin the first set with light weights (approximately 40-50% of your max). The best time to increase flexibility with stretching may be between sets or **after** the workout when muscles are warm.

19. **Breathing.** Don’t hold your breath while lifting. Exhale during or at the end of the exertion and **inhale** during the recovery phase to get adequate oxygen to your muscles.

20. **Full Range Exercises.** Execute exercises through the full range of motion (full flexion to full extension) to promote continuous tension and muscle balance. A partial range may be used to avoid or rehabilitate an injury or to provide variation.

21. **Sufficient Rebuilding Time.** Allow approximately 48 to 72 hours on an area between workouts to allow for fiber rebuilding time. If you lift daily, alternate muscle groups. There is evidence that upper body muscles can recover more quickly from heavy-loading sessions than lower body muscles; and that single-joint exercises require less recovery time than multi-joint exercises. (NSCA 2000)

22. **When to Increase the Weights.** A person’s strength gains will plateau if the weight load remains the same. When your muscle can easily perform all the reps during all of the sets, increase the weight. The last few reps should be “forced reps” (ones which are difficult or require a spotter to complete).

23. **Spotters.** Spotters can give assistance with the weights and provide encouragement. They are especially important with free weights. Forced reps, maxing, negatives, or pyramids.

24. **Variation in Workout Week.** Help avoid boredom and plateaus by having a heavy day and a light day. You will put out more mentally and physically if you have only one heavy day per area each week. Focus on form, tempo, and short rests on light days.

25. **Cyclic Training.** To provide continued interest and gains during a long-term commitment of strength training, identify a cyclic training program. The year is divided into different cycles of training with a different emphasis during each training phase. For example: athletes plan an off-season cycle to concentrate on a strength program and then maintain strength through a easier mid-season cycle, putting more efforts into the sport itself.
# Strength Program Development

**Name____________________________**  
**Date____________________________**

**Core exercises (SJ-Single Joint, MJ-Multiple Joint)**

1) **Abduction (SJ)**  
2) **Adduction (SJ)**  
3) **Lat Pulldown (MJ)**  
4) **Leg Press (MJ)**  
5) **Chest Press (MJ)**  
6) **Compound Row (MJ)**  
7) **Shoulder Press (MJ)**  
8) **Seated Leg Curl(SJ)**  
9) **Leg Extension (SJ)**  
10) **Arm Curl (SJ)**  
11) **Tricep Extension (SJ)**  
12) **Low Back (SJ)**  
13) **Pec Fly (SJ)**

**Strength Formulas:**

<table>
<thead>
<tr>
<th>Goal</th>
<th>% Max.</th>
<th>Reps</th>
<th>Sets</th>
<th>Order</th>
<th>Rest Interval</th>
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<tr>
<td>I. Beginner/ Rehab/ Older Adults</td>
<td>&gt;50 %</td>
<td>12-20</td>
<td>1-2</td>
<td>Alternate muscles</td>
<td>30-60 sec</td>
</tr>
<tr>
<td>II. Strength</td>
<td>&gt;85 %</td>
<td>&gt;6-8</td>
<td>2-6</td>
<td>Vary</td>
<td>2-5 min</td>
</tr>
<tr>
<td>III. Tone/Endurance</td>
<td>&gt;67 %</td>
<td>&gt;12</td>
<td>2-3</td>
<td>Alternate muscles</td>
<td>30-90 sec</td>
</tr>
<tr>
<td>IV. Size (Hypertrophy)</td>
<td>67-85 %</td>
<td>6-12</td>
<td>3-6</td>
<td>Station training</td>
<td>30-90 sec</td>
</tr>
<tr>
<td>V. Power*/Sports</td>
<td>75-90%</td>
<td>1-5</td>
<td>3-5</td>
<td>Station training</td>
<td>2-5 min</td>
</tr>
</tbody>
</table>

Areas Desired to develop strength by using the strength formula. Mark I-IV based on your own personal goals for each body area (muscle group) listed below:

- **Chest:**  
  - Pec Major (lower)  
  - Pec Minor (upper)  
  - Seratus Anterior (Outer)
- **Shoulders:**  
  - Anterior (front)  
  - Posterior (Rear)  
  - Rotator Cuff
- **Arms:**  
  - Biceps (front)  
  - Triceps (rear)  
  - Obliques
- **Abdominals:**  
  - Mid-section  
  - Lower-section  
  - Erector Spinae (lower)
- **Back:**  
  - Latissimus Dorsi (outer)  
  - Rhomboids (middle)  
  - Add/Abduction (in/outer thigh)
- **Legs:**  
  - Glutes  
  - Quads (front)  
  - Hamstrings (rear)  
  - Forearms  
  - Gastrocnemius (calves)
- **Accessories:**  
  - Neck  
  - Forearms  
  - Gastrocnemius (calves)

**Time Commitment:** (Circle)

<table>
<thead>
<tr>
<th>2 days per week</th>
<th>3 days per week</th>
<th>4 days per week</th>
<th>5 days per week</th>
<th>UB/LB Split</th>
<th>Push/Pull Split</th>
<th>Other:</th>
<th>Cardio Time:</th>
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<tbody>
<tr>
<td>20-60 minutes</td>
<td>20-60 minutes</td>
<td>60-80 minutes</td>
<td>60-80 minutes</td>
<td>Other:</td>
<td>Cardio Time:</td>
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Exercise Prescription Variables

(See glossary on definition)

**Exercise Selection Variables**

Mode
Multi/Single Joint
Uni/Isolateral

**Program Variables**

Isometric
Circuit Training
Compound Sets
Cross Training
Drop Sets
Magnificent 7
Bootcamp
P90X
Supreme 90 day System
BOSU Training
Negatives
Pre-exhaustion
Supersets
Tri-Sets (Giant Sets)
Station Training
Pyramid Training
Partial Reps
Forced Reps
Structural
Sparticus Training
Frequently asked Questions about Strength Training

1. How long will it take to see a difference in my muscles? Strength training provides a fantastic method of seeing a change in your body within a relatively short time. A person will see the weight load increase within just a few workouts. A noticeable change in tone may be felt in just two or three weeks.

2. Why does a muscle get stronger? Resistance training can improve muscle size, recruitment of fibers, bone growth and connective tissue growth. Hypertrophy of a muscle (increase in size) is primarily due to an increase in the size of muscle fibers, although some researchers believe that hyperplasia (more fibers due to splitting) may occur with high intensity training. (NSCA 200)

3. When is the best time to train? Individuals are different and each has their own goals and time preferences. Train at the time of day which best suits you and when you will be motivated to perform at your peak.

4. Why do I experience soreness after lifting weights? Delayed muscle soreness 1-3 days after a workout, is thought to be from microscopic tears in the muscle fibers and the accumulation of fluid to repair the muscles. Lactic acid in the muscle (a by-product of anaerobic exercise) is related to immediate fatigue, but probably not a factor in the delayed muscle soreness.

5. What is the cause of the “pumped-up” feeling after a heavy workout? The “pumped-up” feeling felt during and immediately after the workout is probably due to tissue edema, a fluid buildup in the muscles. It usually disappears within an hour following the workout.

6. How often should I train each area? Muscle tissue is built up by first tearing it down. Rest an area 1-3 days and allow the tissue to rebuild stronger than it was.

7. Is strength training a good way to lose weight? If your primary intent is to lose body weight, you will probably be disappointed. People may gain weight beginning a strength-training program, due to increase in muscle mass. Strength training can increase the body’s lean weight and thus increase the metabolism and caloric expenditure. It can firm up your muscles, make you feel “slimmer,” and even change your body shape. Steady, long duration aerobic exercise is more efficient at burning fat.

8. Is strength training alone enough for fitness? Although strength resistance is the most efficient to improve muscle strength, size, and power, it doesn’t improve an athlete’s maximal aerobic power, even when circuit training (NSCA Essentials, pg. 30, 2001). Aerobic exercise is the most efficient type of exercise to improve the heart and cardiovascular system, and provide favorable conditions for fat burning. A balanced conditioning program may include an aerobic exercise such as biking, walking, or jogging to compliment your strength workout.

9. Will aerobic exercise decrease my strength gains? Aerobic exercises, especially done for longer periods of time, are great for “fat burning” and improving cardiovascular fitness. But studies indicate that strength and power athletes who performed intense aerobic exercise along with resistance training actually comprised the benefits of the resistance training (NSCA Essentials, pg. 30, 2001).

10. Will weights cause me to lose flexibility? Prevent a loss of flexibility by giving equal time and energy to both the agonist and antagonist muscles involved in the movement, working the muscle through the full range of motion, and including stretching exercises between sets or during cool down.

11. Will women develop muscles as big as men’s? The hormone testosterone, is primarily responsible for muscle development, and is approximately 20 times higher in men than women (Cooper Institute 2001). Thus, women do not naturally have the capability to develop like men.
12. **How much do the free weights weigh?** The large 6' Olympic bars weight 45#. The e-z curl (bent) bar weighs 15#. The weight on the round plates is stamped on the metal (large plates are 45#).

13. **Will I need to ingest extra protein to build strength?** Protein makes up about 20% of the weight of skeletal muscles. The body requires protein for the development of muscle. The average adult needs about .8 grams of protein per kilogram of body weight per day (most Americans consume well over this RDA). Endurance and strength athletes need approximately 1-2 grams of protein per kilogram of body weight per day. Research does not support that an athlete needs supplements to gain muscle. The money and energy which many people use for protein supplements may be better spent on a well-balanced diet with adequate calories.

14. **Am I too old to lift weights?** Resistance training can increase strength and muscle mass, bone health, and prevent muscle atrophy at any age. Studies indicate that typical muscle mass decreases nearly 50% between the ages of 20 and 90. Muscle strength typically declines by approximately 15% each decade from age 60-70 and then 30% per decade thereafter. Older adults may wish to place an even greater emphasis on strength over cardiovascular training.

15. **Can I change fat into muscle by strength training?** Will my muscle change into fat if I stop lifting? No. There is no magical chemical process that will cause the tissues to change into one another. A person may stop training and simultaneously lose muscle and gain fat. Fat cells grow when there is a larger amount of calories consumed than that are burned. Muscle cells develop as a response to overload training and decrease with a lack of training. Muscle and fat are two different tissues.

16. **Can I lose fat around the abdomen by doing lots of sit-ups?** Spot reducing is impossible. Sit-ups can tone abdominal muscles, but most people will never see “washboard abs” because of the layer of fat on top of them. Exercise, especially aerobic, can burn fat from you whole body but not from one area.

17. **Will wearing a reducing suit or sweating in a sauna help me to lose fat?** No. Wearing heavy clothing will stimulate the overheating protective mechanism in your body and cause you to sweat. This does not aid in fat reduction, only in temporary water loss. Saunas, may promote relaxation after exercise and cause a water loss, but not a fat loss.

18. **Why can’t I develop like Joe Weider?** Tremendous individual differences in the adaptation of muscles to training may be due to genetic potential, variation in hormone levels, and different training techniques. There is not one training schedule that seems to work for several years developing and redeveloping their program. Don’t try to become Joe Weider in one short term. Find your own potential.

19. **How much hydration is required following a workout?** It is recommended that a person drink about one cup (8 ounces) for each 30 minutes of workout or at least 2 cups (one pint) of fluid for each pound lost in a workout. It is a valuable to hydrate prior to, during, and following a workout. Cold water empties more rapidly than warm water from the stomach into the body parts.

20. **What is the dropout rate for new exercise participants?** More than 50% of new exercise participants drop out of their program within the first six months. For this reason, it may be valuable to increase your support from a partner, a class, or regular analysis, and change of your workout.
Safety: How do I Avoid Injury

By—Beginning Strength Training, Chemeketa Community College, 2002

Many injuries occur during the beginning few weeks of training as a result of starting too aggressively or not learning correct lifting techniques. Even the lightest of light weights overload the muscles and may cause some soreness following the first workout. Add weights and sets slowly after the first few workouts and take at least two or three (or more) weeks to build into a program. Other injuries may be triggered from improper warm-up, lifting too much weight, or executing improper techniques.

Strength training is a safe sport when correct techniques and some general common sense guidelines are used. Define individual limitations and use the responses of the body as a guide to identify possible injuries. Listen to your body. If your back hurts while you lift, you may be doing the exercise improperly or there may be another way to do it to minimize the stress that you are placing on your back. If you begin your resistance program with a pre-existing injury (such as an unhealthy knee or back), employ extra safety precautions. Some of the same motions that can aggravate an injury, can strengthen the area if done in moderation so that the body can build up a tolerance.

No Pain; No Gain Theory

The “No pain; No gain” idea is both true and untrue. Strength gains occur following a progressive challenge or “overload to the muscle. Placing a load of weights on a muscle is not a pleasant feeling; some “pain or discomfort” is required to gain. A person may feel tired and possibly a bit shaky after a workout.

The more you require of a muscle, the more the muscle will perform. There is a difference, however, between the aching pain caused from forcing that muscle to perform at a high intensity and the sharp pain that the body uses to alert you of “too much.” Since it may be difficult for a beginner to know how much discomfort is safe, it is recommended that you begin your program with a conservative attitude. Satisfaction and stress reduction may be achieved from a “good hard workout,” but injury may come from an exaggerated workout. Different people perceive pain differently. Few individuals need to worry about pushing themselves to the point of injury; they usually stop before then. However, some athletes endure pain so well that they push themselves way beyond the safe pain limit. Learn to perceive your discomfort and experiment with an overload gradually.

Strength training is a safe sport when correct techniques and some general common sense guidelines are used. Define individual limitations and use the responses of the body as a guide to identify possible injuries. Listen to your body. If your back hurts while you lift, you may be doing the exercise improperly or there may be another way to do it to minimize the stress that you are placing on your back. If you begin your resistance program with a pre-existing injury (such as an unhealthy knee or back), employ extra safety precautions. Some of the same motions that can aggravate an injury can strengthen the area if done in moderation so that the body can build up a tolerance.
Basic Safety Precautions

1. Avoid training alone.
2. Familiarize yourself with the weights and learn correct lifting techniques.
3. Include a warm-up of 5-10 minutes of blood circulating exercises, stretching, and joint preparation. Cool down with aerobic activity and stretching to maintain flexibility.
4. Use a spotter when needed.
5. Begin program slowly. Take at least two weeks to build into any weight-training program. Perform higher reps (12-20) and lighter weights when you first begin, regardless of your goal.
6. Use synchronized breathing. Avoid holding your breath while lifting or hyperventilation before the lift. Exhale at the end of the exertion and inhale during recovery.
7. Control the weights. Make them perform the movement that you wish at a controlled speed through the full range of motion. Don’t create momentum with weights. Count approximately two seconds during the lift and four seconds during the recovery phase.
8. Balance your workout by including opposites. If you want an exercise for biceps, include one for triceps. A “pushing up” exercise for deltoids should be balanced with a “pulling down” exercise for the lats.
9. The overload that you place on muscles when strength training is not very forgiving. Respect weights and the strength that they can give you when used correctly.
10. Sharp pain is the body’s alarm system. Listen to it. A burning sensation in the muscle is normal when you overload it with weights; a sharp pain is not.
**Atrophy:** Decrease in size and functional ability of tissues or organs. If you work out for 10 years and get big, then you stop working out, your muscles will begin to shrink or atrophy.

**Circuit Training:** Circuit training is an excellent way to simultaneously improve mobility, strength and stamina. The circuit-training format utilizes a group of 6 to 14 strength exercises that are completed one exercise after another. Each exercise is performed for a specified number of repetitions or for a prescribed time period before moving on to the next exercise. The exercises within each circuit are separated by brief, timed rest intervals, and each circuit is separated by a longer rest period. The total number of circuits performed during a training session may vary from two to six depending on your training level (beginner, intermediate, or advanced), your period of training (preparation or competition) and your training objective.

**Compound Training:** Doing 2 exercises for the same muscle, one after the other, with minimal rest in between. Performing 3-4 exercises for the same muscle group is known as “Giant Sets” or “TriSets”.

**Creatine:** A chemical produced by the liver, pancreas, and kidneys and mostly stored in the skeletal muscle. Theory says that muscle fatigue is caused by creatine depletion within the muscles. So if you consume more creatine, your muscles will store more, leading to increased muscle size and larger energy reserves and strength. Creatine is an over the counter supplement that can be purchase pretty much anywhere.

**Cross - Training:** In cross-training, two or more types of exercise are performed in one workout or used alternately in successive workouts. A distance runner in training, for example, may also lift weights twice a week, perform daily stretching exercises, and do high-intensity bicycle sprints every Tuesday. This is believes to increase performance in all sports leading to a higher level of fitness.

**Diuretics:** Sometimes called "water pills," these are drugs and herbal preparations that remove excess water from a bodybuilder's system just prior to a show, thereby revealing greater muscular detail. Harsh chemical diuretics can be quite harmful to your health, particularly if they are used on a chronic basis. Two of the side effects of excessive chemical diuretic use are muscle cramps and heart arrhythmias (irregular heart beats).

**Drop Sets:** This is one of the more advanced bodybuilding techniques designed to increase the intensity of your workout. Basically to perform a drop set you do one set of a specified weight to failure, then with no rest, lower the weight and do another set to failure (single drop set), then with no rest, lower the weight and do another set to failure (double drop set), and so on.

**Failure:** The point in an exercise when you are so fatigued your working muscles can no longer complete an additional repetition of a movement with strict biomechanics (correct form).
**Fast – Twitch Muscle Fibers:** Muscle fibers that contract quickly and powerfully. They are utilized in anaerobic activities like sprinting and powerlifting. Fast – Twitch fibers are developed by heavy, low rep, explosive weight training. Everyone is born with different ratios of fast to slow twitch muscle fibers. It has been proven that working out does changes fiber behavior and helps grow new fibers.

**Forced Repetitions (partner-assisted actions)**-when the spotter serves to motivate the athlete in the completion of fixed repetitions.

**Free Weights:** Barbells, dumbbells and other exercise equipment not considered to be a machine. Free weights are the preferred choice of most body builders because they recruit more muscle fibers when exercising.

**Fructose:** The main type of sugar found in fruit. It's sweeter than sucrose (table sugar).

**Full Body Routines:** Working out your whole body in one workout is a decent plan. Generally, two full body workouts per week is a good frequency to start out with, and you might me able to get the job done with one. This type of routine generally has one exercise for each major body part, with less or no work for smaller body parts such as arms and calf’s. A full body workout is incredibly exhausting, and delivers a conditioning effect that other routines do not. A full body workout can also be very time effective- One full body session per week can give some decent muscle growth. Full body workouts tend to involve fewer sets per body part because of their difficulty.

**Hypertrophy:** A term denoting an increase in muscle mass and muscle strength. Hypertrophy is created by overloading muscles during body building workouts.

**Hypoglycemia:** Hypoglycemia is the medical term for low blood sugar. An average person has a sugar reading of 80 to 120 (measured in milligrams of sugar per deciliter of blood). Anytime a persons blood sugar level drops below that, they are considered hypoglycemic, or having low blood sugar. If the blood sugar level drops far enough, the person becomes unconscious, has seizures, or, if the episode lasts too long, can even die.

**Iso-lateral:** Movement occurring independently during a range of motion. Example-Dumbbell Chest Press (isolateral) vs. Barbell Chest Press (unilateral).

**Isolation Exercise:** In contrast to a basic exercise, an isolation exercise stresses a single muscle group or part of a single muscle in isolation from the rest of the body. These exercises are good for shaping and defining various muscle groups. For your thighs, squats would be a basic movement, and leg extensions would be an isolation exercise.

**Isometric Exercise:** Isometric exercise is practiced by pushing or pulling an immovable object like a wall or bar anchored to the floor. Research has shown that a muscle contraction during Isometric exercise produced more force then a contraction generated by lifting weights. Although research shows that Isometric exercise increases muscle tension significantly, it still
fails to change the length of the muscles. Today, it is primarily used for rehabilitation purposes. Click here to read full article.

**Isotonic Exercise:** Isotonic exercise is practiced by lifting weights. This type of training does in fact change the length of the muscle. As contrasted to isometric exercise, where maximum muscular contractions are possible throughout the exercise, in isotonic exercise resistance during the entire lift is not consistent. There is an easy part of the lift and a hard part of the lift. The hard part “sticking point” is the weakest spot in the range of motion where the weakest muscle or joint angles come into play. For example, when you are doing a barbell curl, when the bar is down by your waist, this would be the sticking point of the movement. As you bring the bar up, the resistance weakens as momentum takes over. So the resistance is different throughout the exercise.

**Lean Body Mass:** Everything left in the body when all of the body fat has been eliminated. This includes bones, organs, skin, nails, and all body tissues including muscle. About 50-60% of your lean body mass is water

**Mass:** The relative size of each muscle group, or of the entire physique.

**Mode:** Exercise selection. Dumbell (Db), Barbell (Bb), Cable Crossover (Cc), Bodyweight (Bw), Machine (M), etc.

**Muscle:** Tissue consisting of fibers organized into bands or bundles that contract to cause bodily movement. Muscle fibers run in the same direction as the action they perform.

**Multi-lateral:** Movements occurring together during a range of motion. Example-Barbell Chest Press (unilateral) vs. Dumbell Chest Press (isolateral).

**Multiple Joint:** An exercise that develops several primary muscle group around several joints.

**Muscle Spasm:** A sudden involuntary contraction of a muscle or muscle group.

**Negative Reps:** The downward movement in a repetition, also known as the eccentric contraction. An example would be having a spotter help you lift more weight than you can on the bench press, then you slowly lower the weight on your own. The lowering of the weight is the negative part of the exercise. Muscles can handle more weight load on the negative part of the exercises.

**Overload:** The amount of weight that you force a muscle to use that is over its normal strength capacity. Overloading a muscle creates hypertrophy (causes the muscle to grow).

**Overtraining:** A condition in which your body can no longer recover from your workouts, leading to losses in muscle size and strength. Things that lead to overtraining include training too frequently, spending too much time in the gym, doing too many sets, doing too many reps, not getting enough rest, improper nutrition.
**Partial Reps:** Train different parts of the full range of motion. This can strengthen the muscle in the “middle” phase. Example: 7-ups on arms or half to ¾ squats.

**Plyometric Exercise:** Where muscles are loaded suddenly and stretched, then quickly contracted to produce movement. Athletes who must jump do these. For example, jumping off a bench to the ground, and then quickly jumping back on the bench.

**Power:** Power is equal to speed + strength.

**PowerLifting:** A form of competitive weight lifting featuring 3 lifts: the squat, the bench press and the dead lift. In a Powerlifting competition, athletes are categorized by sex, age and bodyweight. Each competitor is allowed three attempts at each lift, the best lift in each discipline being added to their total. The lifter with the highest total is the winner. In cases where two or more lifters achieve the same total, the person with the lightest bodyweight wins.

**Power Training:** System of weight training using low repetitions, heavy weights.

**Pre Exhaustion:** There's an old saying that a chain is only as strong as its weakest link. That adage also applies to multi-joint movements. Indeed, multi-joint movements have a distinct disadvantage because they generally have a "weak link." When an athlete fatigues in an exercise it is because the smaller, weaker muscle becomes exhausted. This happens well before the larger and stronger muscle has received a sufficient workload. In an exercise like the lat pull-down, the biceps are the smaller muscle and, therefore, will fatigue long before the upper back. To solve this problem, we can utilize the Pre-Exhaustion Principle. The Pre-Exhaustion Principle employs what has been called a "double set": one single-joint movement followed quickly by a multi-joint movement. With the Pre-Exhaustion Principle, the idea is to "pre-exhaust" the muscles you are trying to work by first performing a single-joint exercise. In effect, this will bypass the weak link. The first exercise is followed quickly by a second exercise to bring into play other surrounding muscles which provide assistance to work the pre-fatigued muscle to a point beyond it's normal state of exhaustion. For instance, let's suppose that you want your athletes to exercise their upper backs using the Pre-Exhaustion Principle. The first thing they'd do is perform a single-joint exercise -- such as a barbell or a dumbbell pullover -- to pre-fatigue their upper backs. As soon as possible following the completion of that exercise, they'd perform a multi-joint movement -- like a lat pull-down or a seated row. That second set will employ their arms to assist their pre-fatigued upper backs to work to a degree of exhaustion that would normally be impossible. It should be noted that for maximum results, the second exercise should come as soon as possible following the completion of the first exercise. Too much time between the first and second exercises will allow the pre-fatigued muscle to gradually recover some of its original level of strength. If the muscle recovers too much, then you're back to where you started with the weak link still being the limiting factor.

**Pump:** A bodybuilding term meaning the muscles have been made larger by increasing blood supply to them through exercise. For example, when you do bench press, if you take off your
shirt and look in the mirror after a few sets you will notice your chest looks larger. The pump
does go away a few hours after your workout.

**Pyramid Training:** Begin with high reps and low weight for 12-15 reps. Rest briefly nd
perform another set with heavier weight and less reps. Add weights in small increments until
you “burn out” or can’t lift any more

**Quality Training:** A type of workout used just prior to a body building competition in which the
length of rest intervals between sets progressively decrease leading to an increase in overall
training intensity and a more defined physique. In addition, a low calorie diet is also followed to
reduce body fat.

**Repetition:** One complete movement of an exercise. For example, when you barbell bench
press, lowering the weight to your chest and then pressing it back up is considered 1 repetition.

**Rep Out:** Repeat the same exercise over and over again until you can’t do anymore.

**Rest Interval:** The pause between sets of an exercise which allows muscle recovery.

**Rest Pause Training:** Training method where you do one difficult repetition, then place the
weight down, rest for 10 – 20 seconds, then do another rep, etc.

**Single-joint:** An exercise that develops one primary muscle group around a single joint.

**Set:** A set is a group of consecutive repetitions that are performed without resting. After the set,
a rest interval occurs before you begin another set.

**Slow Twitch Muscle Fibers:** Muscle fibers that contract slowly, weakly and continue for long
periods of time. These muscle fibers are more resistant to fatigue and are utilized in endurance
activities such as long-distance running, cycling or swimming. Everyone is born with different
ratios of fast to slow twitch muscle fibers. It has been proven that working out does changes fiber
behavior and helps grow new fibers.

**Smith Machine:** A machine at your gym that you use to workout. The bar is on tracks and has
hooks that you rotate to release and lock weights on pegs. You can use the machine for many
exercises. Many people use it for bench press and squats because you don’t always need a spotter
when you go heavy.

**Split Routine:** Split routines consist of working different body parts on different days of the
week. Common splits for beginners include an upper/lower body split, and a three-day a week
split. Split routines may not have the same overall conditioning effect as full body routines, but
in my opinion they allow greater concentration on individual exercises. In a full body routine the
last body part you train might not get as much stimulation as others, since you are dead tired at
that point. Split routines give you more leeway to train each body part with similar effort.
**Spotter:** A spotter is someone who assists in the execution of an exercise to help protect the athlete from an injury.

**Sticking Point:** Most difficult part in the movement of an exercise. For example, during a barbell curl, when the barbell is at the bottom, it is the hardest part of the exercise.

**Structural Exercises:** Focus on the core, multi-joint exercises that load the spine: The back squat, cleans, bench press, shoulder press, and deadlifts.

**Super Set:** A superset consists of performing two exercises in a row alternating upper-torso and lower-torso with no rest in between. For example, you would do a set of dumbbell flies, then immediately do a set of leg extensions. Super sets save time, increase intensity, and provide for a more aerobic type of weight training workout. However, super sets are not recommended if you are trying to build strength or power.

**Super Circuit:** Alternating 30 seconds of lifting at weight stations with 30 seconds of specific aerobic activities.

**Training to Failure:** Continuing a set until it is impossible to do any more repetitions without assistance.

**Uni-lateral:** Movement occurring with one bodily limb dependent on another bodily limb during a range of motion. Example-Barbell Chest Press (unilateral) vs. Dumbell Chest Press (isolateral).

**Volume Training:** Doing a very high number of sets for each body part when weight training. Lighter weights are used to perform more repetitions. This technique is better for shaping and toning muscles, rather than growing muscles.

**Warm-up:** The 10-15-minute session of light calisthenics, aerobic exercise, and stretching taken prior to handling heavy bodybuilding training movements. A good warm-up helps to prevent injuries and actually allows you to get more out of your training than if you went into a workout totally cold. Warming-up also helps clean toxins out of your muscles prior to the workout.
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<tr>
<td>Nuts, Seeds, Legumes</td>
<td>1/3 cup or 11/2 oz. nuts, 2 Tbsp or 1/2 oz seeds, 1/2 cup cooked dry beans or peas</td>
<td>Almonds, filberts, mixed nuts, peanuts, walnuts, sunflower seeds, kidney beans, lentils</td>
<td>Rich sources of energy, magnesium, potassium, protein, and fiber</td>
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<tr>
<td>Fat and Oils</td>
<td>tsp soft margarine, 1 Tbsp low-fat mayonnaise, 2 Tbsp light salad dressing, 1 tsp vegetable oil</td>
<td>Soft margarine, low-fat mayonnaise, light salad dressing, vegetable oil (such as olive, corn, canola, or safflower)</td>
<td>1&gt; unsaturated fat</td>
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<tr>
<td>Sweets</td>
<td>1 Tbsp sugar, 1 Tbsp jelly jam, 1/2 oz. jelly beans, 8 oz lemonade</td>
<td>Maple syrup, sugar, jelly, fruit-flavored gelatin, jelly beans, hard candy, fruit punch, sorbet</td>
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<td>A</td>
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<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
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</tbody>
</table>
1  | **Week 1** | 1 | 2 | 3 | 4 | 5 | 6 | T | 1 | 2 | 3 | 4 | 5 | 6 | T | 1 | 2 | 3 | 4 | 5 | 6 | T | 1 | 2 | 3 | 4 | 5 | 6 | T |
2  | Fruits     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
3  | Vegetables |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
4  | Meats & Leg|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
5  | Whole Grains|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
6  | Milk       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
7  | Oils       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
8  | Saturated Fat|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
9  | Sugar      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
10 | Water      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
11 | **Weight Training** |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
12 | **Cardiovascular** |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
13 |          | Total | Total | Total | Total |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
14 |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
15 | **Week 5** | 1 | 2 | 3 | 4 | 5 | 6 | T | 1 | 2 | 3 | 4 | 5 | 6 | T | 1 | 2 | 3 | 4 | 5 | 6 | T | 1 | 2 | 3 | 4 | 5 | 6 | T |
16 | Fruits     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
17 | Vegetables |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
18 | Meats & Leg|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
19 | Whole Grains|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
20 | Milk       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
21 | Oils       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
22 | Saturated Fat|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
23 | Sugar      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
24 | Water      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
25 | **Weight Training** |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
26 | **Cardiovascular** |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
27 |          | Total | Total | Total | Total |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
28 |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
29 | Score: | 60-63 Excellent | Recommended Caloric Intake | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar |
30 | 55-59 Very Good | Fruit | cups | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar |
31 | 50-54 Good | Vegetables | cups | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar |
32 |          | Whole Grains | servings | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar |
34 | **Weight Training- maximum of 3 days.** | Milk | cups | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar |
35 | **Cardiovascular-maximum of 5 days.** | Oil | tsp or 30%> unsaturated fat | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar | Sugar |
**Name______________________________**    **Skill Checklist**

*Student must understand the proper technique of performing weight exercises and identify the muscle groups being developed. Upon successful demonstration using **dumbbells (Db)**, **barbells (Bb)**, **smith machine (SM)**, **cable crossover (CC)**, and **exercise machine equipment (M)**, the skills checklist must be signed and dated by the instructor. Failure to successfully complete the skills checklist will result in one dropped letter grade.

**Due Date_______________**

<table>
<thead>
<tr>
<th>Multi-Joint Lower Torso Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uni-lateral</strong></td>
</tr>
<tr>
<td>Leg Press______  Barbell/Db Squat______</td>
</tr>
<tr>
<td>Wall Squat______</td>
</tr>
<tr>
<td><strong>Iso-lateral</strong></td>
</tr>
<tr>
<td>Split Squats______  Lunge(stationary/standing)______  Step-up______</td>
</tr>
<tr>
<td><strong>Adduction/Abduction</strong></td>
</tr>
<tr>
<td>Side Step-up______  Side Lunges______  Adduction______  Abduction______</td>
</tr>
</tbody>
</table>

**Muscle Groups**

<table>
<thead>
<tr>
<th>Multi-Joint Upper Torso Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Iso-lateral</strong></td>
</tr>
<tr>
<td>Db/M Bench Press______  Db/M Incline Press______  Db/M Shoulder Press______</td>
</tr>
<tr>
<td><strong>Uni-lateral</strong></td>
</tr>
<tr>
<td>Bb/M Bench Press______  Bb/M Incline Press______  Bb/M Shoulder Press______</td>
</tr>
</tbody>
</table>

**Muscle Groups**

<table>
<thead>
<tr>
<th>Single Joint Torso Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper Torso</strong></td>
</tr>
<tr>
<td>Biceps:  Hammer, Preacher, Reverse Curls______</td>
</tr>
<tr>
<td>Triceps:  Regular Ext./Kickbacks/Reverse Extensions______</td>
</tr>
<tr>
<td>*accessories-overhead tricep extensions, french curls, etc.</td>
</tr>
<tr>
<td><strong>Lower Torso-(iso, uni)</strong></td>
</tr>
<tr>
<td>Leg Extension (variation)______  Leg Curl (variation)______</td>
</tr>
<tr>
<td>Hip Flexors______  Glute Raise______  Seated, Standing Toe Raise (variation)______</td>
</tr>
</tbody>
</table>

**Muscle Groups**

<table>
<thead>
<tr>
<th>Mid-Torso Exercises (posterior muscles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.  Lat Pulldown/Pullup______  Pullover______</td>
</tr>
<tr>
<td>2.  Reverse Fly______  Row______</td>
</tr>
<tr>
<td>3.  Back Extension______  Lower Back Raises______  Goodmornings______  Straight Legged Deadlift/Roman Deadlift______</td>
</tr>
</tbody>
</table>

**Muscle Groups**

<table>
<thead>
<tr>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bench Dip/Standard Dips______  Chest Fly______  (CC, M, Db) Pullover______</td>
</tr>
</tbody>
</table>

**Muscle Groups**
## Fitness Assessment

**Measurements:**

<table>
<thead>
<tr>
<th>Date #1</th>
<th>Age</th>
<th>Flexibility</th>
<th>RHR</th>
<th>Strength Test</th>
<th>Body Weight</th>
<th>Body Fat%</th>
<th>BF%-M/F</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM</td>
<td></td>
<td></td>
<td>BPM</td>
<td>LBS/REPS</td>
<td>LBS</td>
<td>%</td>
<td>Tricep/</td>
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<tr>
<td>Date #2</td>
<td></td>
<td></td>
<td>BPM</td>
<td>LBS/REPS</td>
<td>LBS</td>
<td>%</td>
<td>Thigh/</td>
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<tr>
<td>(+/-)</td>
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<td></td>
<td>BPM</td>
<td>LBS/REPS</td>
<td>LBS</td>
<td>%</td>
<td>Chest/</td>
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</table>

### Body Composition Equation:

1. \((\text{Body Weight} \, \text{lbs.}) \times (\% \text{Bodyfat}) = \text{lbs.} \text{ of Bodyfat}\)
2. \((\text{Body Weight} \, \text{lbs.}) - (\text{Total Body weight} \, \text{lbs.}) = \text{lbs.} \text{ of Lean Body Weight}\)
3. \((\text{Body Weight} \, \text{lbs.}) \times (\% \text{ desired Bodyfat}) = \text{lbs.} \text{ of desired Bodyfat}\)
4. \((\text{Desired Bodyfat} \, \text{lbs.}) + (\text{Lean Body Weight} \, \text{lbs.}) = \text{Desired Body Weight}\)

---

**Final Analysis Review:**

________________________________________________________________________

________________________________________________________________________
Strength Training Orientation Handout

Name: ______________________________

Posture: 
1) Multi-joint-
2) Single-joint-
3) Uni-lateral-

Fundamentals: 
1) Iso-lateral-
2) Modes-
3) Free-weights-
4) Machines-

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Muscle Groups</th>
<th>Jointed Exercise</th>
<th>Technique</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abduction</td>
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<tr>
<td>Adduction</td>
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<tr>
<td>Lat Pulldown</td>
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<td>Leg Press</td>
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<td>Seated Leg Curl</td>
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<td>Pec Fly</td>
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</tbody>
</table>
A- Latissimus Dorsi
B- Gluteus Maximus
C- Erector Spinae
J- Rhomboideus
K- Deltoid
L- Biceps

G- Triceps
H- Hamstrings
I- Gastrocnemius
J-
K- 
L- Pectoralis Major

M- Serratus
N- External Oblique
O- Rectus Abdominis
P- Quadriceps
Q-
General Information

Age ______  Height ______  Weight ______  Are you currently trying to _____ gain or _____ lose weight?

Medical Conditions

Check “yes” of “no” for any of the following that apply to you, add any other conditions that might affect your ability to exercise safely. If you check one of the following, please consult your physician and you trainer.

1. Is there a history of heart disease or other cardiovascular problems in your family?  Yes _____  No _____
2. Is there a history of cancer problems in your family?  Yes _____  No _____
3. Is there a history of heart attacks in our family?  Yes _____  No _____
4. Is there a history of stroke in your family?  Yes _____  No _____
5. Is there a history of diabetes in your family?  Yes _____  No _____
6. Do you currently have any allergies?  Yes _____  No _____
7. Do you currently have any Asthma?  Yes _____  No _____
8. Do you currently have any other injuries or joint problems?  Yes _____  No _____

Explain:______________________________________________________________________________________

<table>
<thead>
<tr>
<th>Abductor Stretch (Inner Thigh)</th>
<th>Soleus &amp; Gastrocnemius Stretch (Calf)</th>
<th>Spine Flexion (Back)</th>
<th>Bicep Stretch (Rear Upper Arm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Abductor Stretch" /></td>
<td><img src="image" alt="Soleus &amp; Gastrocnemius Stretch" /></td>
<td><img src="image" alt="Spine Flexion" /></td>
<td><img src="image" alt="Bicep Stretch" /></td>
</tr>
<tr>
<td>Put bottom of feet together, lean forward pressing on legs gently with elbows.</td>
<td>Lean against wall or pole, keep back heel on floor with leg extended.</td>
<td>Curve spine toward ceiling.</td>
<td>Bend arm behind head, gently pull elbow toward head.</td>
</tr>
<tr>
<td>Gluteal Stretch (Lower Back)</td>
<td>Quadriceps Stretch (Front Thigh)</td>
<td>Abdominal Stretch &amp; Spine Extension</td>
<td>Deltoid Stretch (Shoulder)</td>
</tr>
<tr>
<td><img src="image" alt="Gluteal Stretch" /></td>
<td><img src="image" alt="Quadriceps Stretch" /></td>
<td><img src="image" alt="Abdominal Stretch" /></td>
<td><img src="image" alt="Deltoid Stretch" /></td>
</tr>
<tr>
<td>Gently pull knee to chest, keep back flat and lower leg straight.</td>
<td>Keep body straight. Gently pull heel toward gluteal.</td>
<td>Lift chest toward wall and pull forward with elbows.</td>
<td>Hold bar or wall. Bend at waist. Keep back flat and knees slightly bent.</td>
</tr>
<tr>
<td>Gluteal Stretch (Rear Hip)</td>
<td>Hip Flexor (Groin)</td>
<td>Cervical Flexion (Neck)</td>
<td>Lumbar Stretch (Lower Back)</td>
</tr>
<tr>
<td><img src="image" alt="Gluteal Stretch" /></td>
<td><img src="image" alt="Hip Flexor" /></td>
<td><img src="image" alt="Cervical Flexion" /></td>
<td><img src="image" alt="Lumbar Stretch" /></td>
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<tr>
<td>Hamstring Stretch (Back of Leg)</td>
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<td>Stretch Should be Done:</td>
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<td><img src="image" alt="Hamstring Stretch" /></td>
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<td>- Slow and controlled (no ballistic bounding)</td>
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<td>Sit with one leg bent in toward center of body. Lean forward over straight leg.</td>
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<td>- Hold for a minimum of 15 seconds on each stretch</td>
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<td>- Repeat each stretch 2-2 times</td>
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