SPARTAN BASKETBALL

STRENGTH & CONDITIONING

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Sincerely,
Mike Vorkapich
Strength & Conditioning Coach for Basketball
Michigan State University

MICHIGAN STATE BASKETBALL

Seat Ht.		Date	11-May	18-May	1-Jun	8-Jun	15-Jun	22-Jun	29-Jun
		Rep Range	Weight x Reps	TRAIN LIKE NATIONAL CHAMPIONS!					
	MONDAY								
	Bench Press	8/6/4							
	Pulldowns	2x8-12							
	Plate Raises	20							
	Lateral Raises	20							
	Rear Delt	12MR							
	Seated Row	2x8-12							
	External Rotation	12MR							
	Squats	3x8							
	OR Leg Press	3x10							
	Leg Curls	2x8-12							
	Glute/Ham	15							
	Hip Flexion	10MR							
	Calf Raises	25							

ALWAYS INCLUDE CORE WORK BEFORE OR AFTER EVERY WORKOUT!

TRY TO KEEP YOUR HEART RATE UP BY MINIMIZING YOUR REST BETWEEN SETS - SUPERSET WHERE YOU CAN!

MICHIGAN STATE BASKETBALL

Seat Ht.		Date	13-May	20-May	27-May	3-Jun	10-Jun	17-Jun	24-Jun
		Rep Range	Weight x Reps	TRAIN LIKE NATIONAL CHAMPIONS!					
WEDNESDAY									
	DB Incline Bench	3x8							
	DB Rows	3x10							
	Lateral Raises	2x10							
	Push-Ups	2xMAX							
	Rear Delt	12MR							
	External Rotation	12MR							
	Leg Press	1x15-20							
	Wall Sit	MAX Time							
	Swiss Ball Leg Curls	20							
	Inner Thigh	15							

**ALWAYS INCLUDE CORE WORK BEFORE OR AFTER EVERY WORKOUT!*

**TRY TO KEEP YOUR HEART RATE UP BY MINIMIZING YOUR REST BETWEEN SETS - SUPERSET WHERE YOU CAN!*

MICHIGAN STATE BASKETBALL

Seat Ht.		Date	15-May	22-May	29-May	5-Jun	12-Jun	19-Jun	26-Jun
		Rep. Range	Weight x Reps	TRAIN LIKE NATIONAL CHAMPIONS!					
FRIDAY									
	Shoulder Press	3x8							
	Chin-Ups	3x10							
	Dips	2xMAX							
	Shrugs	3x10							
	Lunges	3x8							
	Leg Curls	2x8-12							
	Glute/Ham	15							
	Seated Calf Raise	20							
	Inner Thigh	15							

ALWAYS INCLUDE CORE WORK BEFORE OR AFTER EVERY WORKOUT!

TRY TO KEEP YOUR HEART RATE UP BY MINIMIZING YOUR REST BETWEEN SETS - SUPERSET WHERE YOU CAN!

MICHIGAN STATE WOMEN'S BASKETBALL
2009 STRENGTH AND CONDITIONING MANUAL

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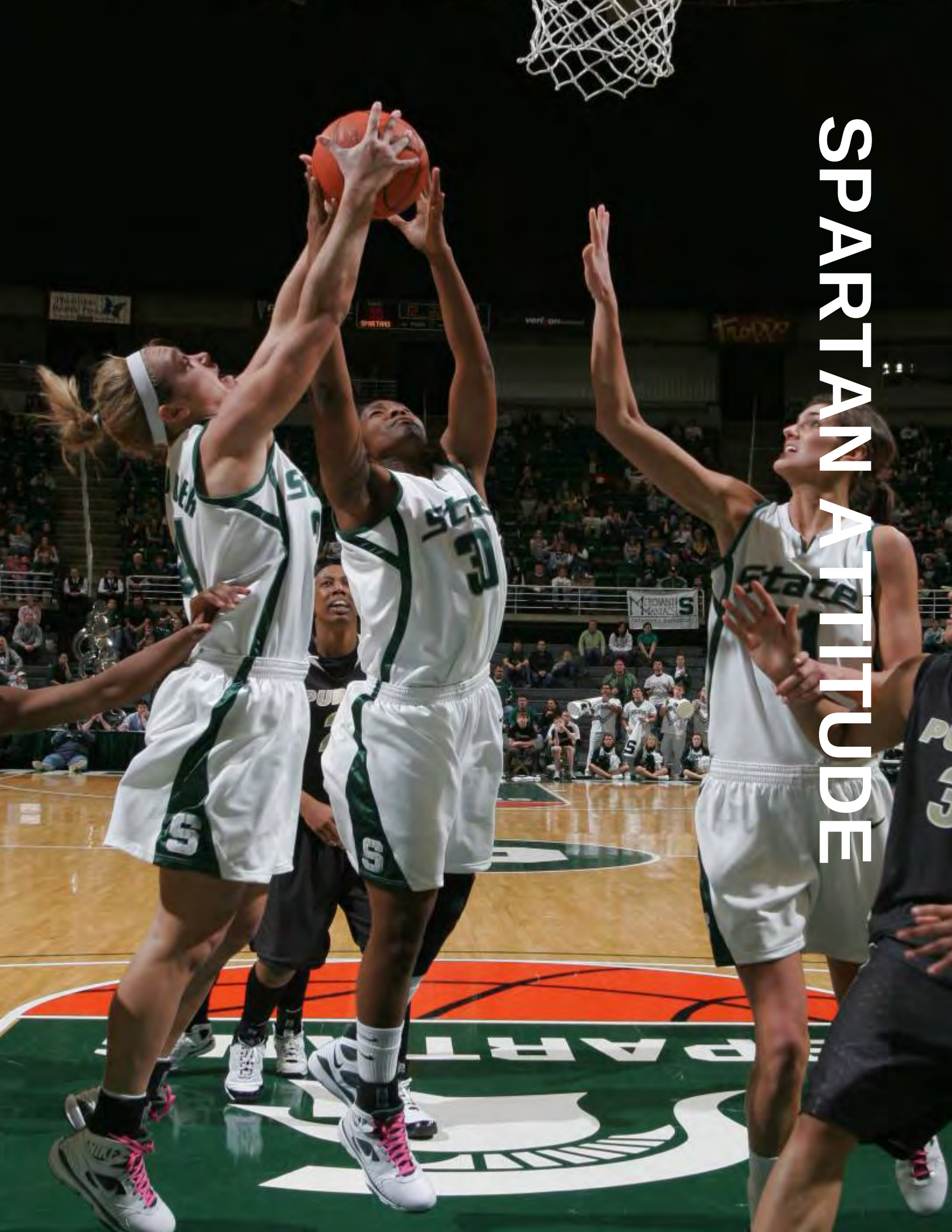
SPARTAN ATTITUDE

SPARTAN ATTITUDE

The **SPARTAN Way** is **INTENSITY**. It is maximum gains in the minimum amount of time. Our athletes “invest” their time in the weight room; they do not “spend” their time doing non-productive things. Everything we do is for a reason and a purpose. Consequently, our workouts are very intense, relatively brief, and never more than three times a week. **SPARTAN** athletes reach their potential for size and strength by the time they graduate.

Strength training for athletics is only valuable in the context of the sport. We are not a weight lifting team, nor are we marathon runners. Too much emphasis in one area of training will leave you deficient in other areas. Overall fitness, specific to the needs of the sport is our priority. There are several elements that make up your overall levels of fitness. They are:

1. Muscular Strength

2. Cardiovascular Fitness

3. Flexibility

4. Nutrition

5. Specificity of Skills

6. Rest and Recovery

Each area must be addressed individually to achieve overall fitness for the athlete. Intensity of effort is the key to proper training. It is the reason for strength and conditioning gains, not magical formulas, super hero routines, miracle supplements or 400lb. clubs.

INTENSITY INCLUDES:

1. **<u>Perfect</u> repetitions performed with maximum effort.**
2. **<u>Complete</u> concentration throughout a workout session.**
3. **<u>Continuous</u> effort, even when the body is in severe oxygen debt.**
4. **<u>Hard work</u>, as there is no greater reward than success through hard work.**

Our conditioning program is approached in the same fashion, with our goal to be in peak shape by the start of practice. We will follow a general conditioning calendar that starts with aerobic conditioning and becomes more sport specific as the season draws near. Read the sections on Flexibility, Nutrition and Rest and apply what is taught. The section on Skill Development is critical information on how to become a better player. It is must read material.

CONTROLLABLE FACTORS IN ATHLETIC CONDITIONING

1. **REST AND RECOVERY** - **Work hard**; but understand you must allow your body a rest and recovery period. We are asking you to lift on three non consecutive days; not four, five, or six days per week. On the three days you lift, we expect you to work **brutally hard**, and then allow your body the proper recovery and growth period. You will run at varying intensities and concentrate on different aspects of cardio-respiratory conditioning (aerobic and anaerobic).

2. **DIET** - This is extremely important and some suggestions are given in a separate section of this handout. Read the entire section; it will assist you in your daily nutritional planning.

3. **LIFE STYLE** - You can't train like an athlete and in the meantime live like a jerk if you want to be a champion. Drinking, drugs, late-night partying and other various forms of garbage will destroy you as both an athlete and a person.

4. **YOUR COMMITMENT TO CONSISTENT TRAINING HABITS!**

This program has been prepared to meet the following objectives:

1. To increase and maintain your functional range of motion (flexibility).

2. To increase and maintain your total body strength levels for improved performance and reduced likelihood of serious injury.

3. To increase your functional muscular mass which will enhance your ability for greater power output.

4. To keep your percentage of body fat at an acceptable and efficient level.

5. To improve your muscular endurance.

6. To improve your cardio-vascular/cardio-pulmonary efficiency.

7. To improve your quickness and speed.

8. To make you **MENTALLY** and **PHYSICALLY TOUGHER!**

9. **TO PREPARE YOU TO WIN!**

SUMMER CALENDAR

SUMMER CALENDAR

The following calendar provides a plan of attack for those players who are out of town for the summer. If you are playing pick-up during the summer adjust your agility/conditioning workouts accordingly. There is no better way to get in shape for basketball but to play basketball. The following explains the terminology found on the calendar. Read the following terms in order to understand the calendar set-up:

LIFT: Workout cards are provided for the lifting days on Monday, Wednesday and Friday.

AGILITY TRAINING: For a warm-up prior to strength training or skill workouts choose 2 drills to perform. Each drill is performed twice. See the Agility Chapter for the designated drills.

ASSIGNED CONDITIONING: For those who are not getting enough activity in (i.e. playing pick-up, individual workouts, etc.) read the Aerobic and Anaerobic Training Chapters prior to performing the summer conditioning program. Remember: Running is specific to basketball, but you may use different modes of training for variety (Stairmaster, treadmill, stationary bike, etc.). Use the designated time with your heart rate in the designated target heart rate zone (70%-85% of Maximum Heart Rate (MHR)). ***Use the assigned conditioning card to record your conditioning workouts.***

May 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
3	4 **FINAL EXAMS**	5 **FINAL EXAMS**	6 **FINAL EXAMS**	7 **FINAL EXAMS**	8 **FINAL EXAMS**	9
10	11 **LIFT & ASSIGNED CONDITIONING**	12 **ASSIGNED CONDITIONING**	13 **LIFT**	14 **ASSIGNED CONDITIONING**	15 **LIFT & ASSIGNED CONDITIONING**	16 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
17	18 **LIFT & ASSIGNED CONDITIONING** ***1st Session Classes Start***	19 **ASSIGNED CONDITIONING**	20 **LIFT**	21 **ASSIGNED CONDITIONING**	22 **LIFT & ASSIGNED CONDITIONING**	23 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
24	25 **MEMORIAL DAY**	26 **ASSIGNED CONDITIONING**	27 **LIFT**	28 **ASSIGNED CONDITIONING**	29 **LIFT & ASSIGNED CONDITIONING**	30 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***

- *** Check Chapter V Flexibility: Warm-up and flex before all workouts, cool-down and flex after all workouts**

June 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 **LIFT & ASSIGNED CONDITIONING**	2 **ASSIGNED CONDITIONING**	3 **LIFT**	4 **ASSIGNED CONDITIONING**	5 **LIFT & ASSIGNED CONDITIONING**	6 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
7	8 **LIFT & ASSIGNED CONDITIONING**	9 **ASSIGNED CONDITIONING**	10 **LIFT**	11 **ASSIGNED CONDITIONING**	12 **LIFT & ASSIGNED CONDITIONING**	13 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
14	15 **LIFT & ASSIGNED CONDITIONING**	16 **ASSIGNED CONDITIONING**	17 **LIFT**	18 **ASSIGNED CONDITIONING**	19 **LIFT & ASSIGNED CONDITIONING**	20 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
21	22 **LIFT & ASSIGNED CONDITIONING**	23 **ASSIGNED CONDITIONING**	24 **LIFT**	25 **ASSIGNED CONDITIONING**	26 **LIFT & ASSIGNED CONDITIONING**	27 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
28	29 **LIFT & ASSIGNED CONDITIONING**	30 **ASSIGNED CONDITIONING**				

- *** Check Chapter V Flexibility: Warm-up and flex before all workouts, cool-down and flex after all workouts**

July 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 **OFF**	2 ***1st Session Classes Ends*** **OFF**	3 **OFF**	4 **INDEPENDENCE DAY** **OFF**
5	6 **LIFT & ASSIGNED CONDITIONING** ***2nd Session Classes Start***	7 **ASSIGNED CONDITIONING**	8 **LIFT**	9 **ASSIGNED CONDITIONING**	10 **LIFT & ASSIGNED CONDITIONING**	11 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
12	13 **LIFT & ASSIGNED CONDITIONING**	14 **ASSIGNED CONDITIONING**	15 **LIFT**	**16** **ASSIGNED CONDITIONING**	17 **LIFT & ASSIGNED CONDITIONING**	18 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
19	20 **LIFT & ASSIGNED CONDITIONING**	21 **ASSIGNED CONDITIONING**	22 **LIFT**	23 **ASSIGNED CONDITIONING**	24 **LIFT & ASSIGNED CONDITIONING**	25 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
26	27 **LIFT & ASSIGNED CONDITIONING**	28 **ASSIGNED CONDITIONING**	29 **LIFT**	30 **ASSIGNED CONDITIONING**	31 **LIFT & ASSIGNED CONDITIONING**	**ASSIGNED CONDITIONING** ***(Sat OR Sun)***

- *** Check Chapter V Flexibility: Warm-up and flex before all workouts, cool-down and flex after all workouts**

August 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3 **LIFT & ASSIGNED CONDITIONING**	4 **ASSIGNED CONDITIONING**	5 **LIFT**	6 **ASSIGNED CONDITIONING**	7 **LIFT & ASSIGNED CONDITIONING**	8 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
9	10 **LIFT & ASSIGNED CONDITIONING**	11 **ASSIGNED CONDITIONING**	12 **LIFT**	13 **ASSIGNED CONDITIONING**	14 **LIFT & ASSIGNED CONDITIONING**	15 **ASSIGNED CONDITIONING** ***(Sat OR Sun)***
16	17 **LIFT & ASSIGNED CONDITIONING**	18 **ASSIGNED CONDITIONING**	19	20 ***2nd Session Classes End***	21	22
23	24	25	26	27	28	29
30	31	1	2 ***Fall 2009 Classes Begin***			

- *** Check Chapter V Flexibility: Warm-up and flex before all workouts, cool-down and flex after all workouts**

PRESEASON TESTING

PRESEASON TESTING

When you report in the fall, you will be responsible and accountable to perform the following tests:

1 Mile Run - *You will be required to run 1 mile in the time assigned to you by the coaching staff.*

3 Mile Run - *You will be required to run 3 miles in the time assigned to you by the coaching staff.*

20 – 20s - You will be required to run 20 suicides in 20 minutes, starting each at the top of the minute.

VO2 MAX Treadmill Test - *Note: Each stage is 3 minutes in length with a " seated" 90 second rest period between each stage.

STAGE	*SPEED*	*INCLINE*
#1	**6 mph**	**0°**
#2	**6 mph**	**5°**
#3	**7 mph**	**6°**
#4	**8 mph**	**7°**
#5	**9 mph**	**8°**
#6	**10 mph**	**9°**
#7	**11 mph**	**10°**

Vertical Jump - Using the Vertec, you will be required to perform a 2-foot (no-step) maximal jump.

Bench Press ***(See Exercise Description section)*** - Using 95lbs, you will be required to perform as many repetitions as possible.

Push-Ups - Using your bodyweight, you will be required to perform as many repetitions as possible.

Flexed Arm Hang – Using a supine grip, you must hold your chin above the chin-up bar for as long as possible.

Leg Press ***(See Exercise Description section)*** - Using 300lbs, you will be required to perform as many repetitions as possible on the Pendulum "Seated Squat" leg press.

Leg Extension - Using an individually assigned weight, you will be required to perform as many repetitions as possible.

Glute/Ham - Using your bodyweight, you will be required to perform as many repetitions as possible.

STRENGTH TRAINING

STRENGTH TRAINING PRINCIPLES

The five check points below are an outline of the philosophy of **HIGH INTENSITY TRAINING**. Maximum gains will not be obtained if these 5 check points are not observed.

1. Full range of motion exercises - raise and lower the weight through the muscles full range of motion.

2. Allow the muscles to raise the weight - eliminate all arching, bouncing, throwing, and jerking movements while raising the weight.

3. Emphasize the lowering of the weight:
   - A. Lower the weight in a controlled manner, thereby allowing the muscle to lower the weight - Do not drop the weight.
   - B. The muscle that is used to raise the weight is the same muscle used to ower the weight. Use 3-5 seconds as a guideline to lower the weight.
   - C. You can lower approximately 40% more weight than you can raise.
   - D. Allow 8 seconds to lower the weight during the negative-only exercise.

4. The point of momentary muscular fatigue has been reached when the athlete can no longer properly raise another good repetition. Each set must be performed with an **ALL-OUT EFFORT** to MMF.

5. Supervision - Athletes should be paired off so that every repetition of each exercise is supervised to guarantee proper execution. Responsibilities of the spotter include:
   - A. Prevent injury - No arching, bouncing, or jerking of the weights.
   - B. Record all pertinent workout data on a workout card.
   - C. Only record the good reps lifted - not the forced or negative reps.
   - D. Verbally encourage the lifter to exert an **ALL-OUT EFFORT** while utilizing the techniques mentioned above.
   - E. Make the workout as hard and intense as possible for the lifter.

THE REPETITION

Perhaps the hardest idea for most athletes to come to grips with is how simple exercise really is. Conflicting information, both commercial and personal, leave the players confused. The fact is results can come from any type of progressive exercise, which is good because it allows for differences in a coach's abilities and situations to produce at least some results. However, the potential to train people in different ways has athletes swimming through a sea of information based on anecdotal evidence, past experience, “research” publications, and the current program at “Big Time U.”

Players looking for the “answer” to their strength training problems need only look at the way they actually train. Do you work hard? Do you train consistently? Do you train during the season? Is the training closely supervised? Can you do basic exercises? Can you perform a repetition properly? Before one goes about evaluating programs, set and rep schemes, the “exercise of the month”, or the latest in Eastern Block training “secrets”, one should make sure that the fundamentals are being done properly. The most basic part of strength training is the properly performed repetition. It is also the most difficult to execute.

Uninformed strength training can be mysterious. There are many “experts” willing to sell their advice. “Magical formulas”, buzz words, organizations, and certification tests all serve to make proper exercise appear as something which only a few people know the secret. The purpose of this manual is to show you how simple, practical and effective training can be. You will learn what you need in order to organize and implement effective training, but there are many subtleties which are difficult to articulate and can only be learned by participating in and supervising workouts.

The fundamentals of exercise are such that you probably know more than you suspect. Too often we leave common sense to the experts. Consequently, many coaches and athletes do not understand what the immediate consequence of strength training should be. They spend time dreaming up complicated schemes and routines designed to develop nonexistent trainable muscular properties such as “basic strength”, “speed strength”, “endurance strength”, and “explosion.” Let's set the record straight once and for all. Despite all the theory, you cannot change the chemical composition of muscle fibers by changing sets, reps, and speed of exercise movement. It is important to understand that strength, power and short term muscular endurance are different expressions of the same thing and are not separable training entities. If you improve one, you improve all three.

The immediate purpose of strength training exercise is to fatigue the muscles. Think about this point for a moment. Now relate the implications to the way you train. A clear understanding of this point simplifies the evaluation of different exercises, equipment, and training schemes. The best methods produce the greatest amount of fatigue, in the shortest amount of time, and in the safest way possible.

The purpose of a properly performed repetition is to produce tension in the muscle, which repeated for a short period of time will fatigue the muscle. To do this in the most efficient way possible we need to be aware of five coaching points:

1. Minimize momentum.
2. Pause in the contracted position.
3. Emphasize the lowering phase.
4. Body position and leverage.
5. Constant tension.

1. Minimize Momentum.

If you move a weight too quickly, it will increase in speed to the point of actually traveling on its own. The increase in momentum will take tension off the muscle, making the exercise both easier and more dangerous, the two things one tries to avoid when training. Care must be taken to lift the weight slowly and under control. This does not mean that there will never be a time when you do not try to move the weight with as much effort as possible. As the exercise continues, the muscle gradually fatigues to the point that the force generating capabilities is not much greater than the weight it must overcome. At this point you can push, or "explode," with as much effort as possible, but the weight will move slowly because of muscle fatigue and ensuing decrease in strength. Therefore at the beginning of the set, you must hold back somewhat. As the set continues, the repetitions will be performed with increasing effort, until the end, when the effort is maximum and speed of movement is very slow or nonexistent. According to the size principle of muscle fiber recruitment, it is the "intent" to raise the weight fast that is the key to developing explosive power. Not that the weight itself actually moves fast. In fact, if the weight can be moved fast, it is not heavy enough to stimulate maximum strength and power gains. In practice, this means it should take at least one or two seconds to lift the weight. This will insure safety and minimize momentum. To lift the weight any faster would be throwing it, and throwing weights will not do much to increase strength.

2. Pause in the Position of Full Muscle Contraction.

Once raised, the weight should be paused momentarily at the highest point, or where the muscles are in the fully contracted position. This serves two purposes. First, it helps minimize momentum. Second, because you can hold more weight than you can lift, it demonstrates to the coach and the athlete that the weight was lifted and not thrown into position.

3. Emphasize the Lowering Phase of the Lift.

Lifting the weight is one half of the exercise. Lowering the weight is the second half. Because you can lower approximately 40% more than you can lift, you will use fewer muscle fibers in the lowering phase unless you: 1.) Allow more time to let the weight down or 2.) Add more weight during the lowering phase. A good rule is that it should take three to five seconds to lower the weight. Lowering the weight any faster would be dropping it, and just as throwing a weight up is an inefficient and dangerous way to train, dropping weights will do nothing to develop strength and muscle. Using the leg extension as an example, the

exercise should be started slowly and smoothly and raised at such a speed that the quadriceps are under tension throughout the full range of motion. At full extension, the athlete should pause for a second. If the weight stack floats, “recoils,” or travels on its own past the point of the momentary pause, then the weight was lifted too fast. After the pause in the contracted position, the trainee should slowly release the tension on the muscle until the weight begins to lower at a constant speed. If the weight begins to accelerate, that is, the speed begins to increase while being lowered, then the weight is being lowered too fast. When in doubt, lift and lower the weight slower, not faster.

4. Body Position and Leverage.

Body position and leverage are the next important points for safe and efficient exercising of the muscles. Leverage on most exercises can be improved to make the exercise easier. By arching the back, the bench press, seated press, arm curl and front raise exercises can be performed easier. You can even use more weight and appear to be stronger. Lifting more weight for the sake of lifting more weight, with no regard for how it is lifted, may be fine for the ego, but does not necessarily translate to stronger muscles. Remember, if the leverage is right, you can lift the world. We have a leg machine in our facility that is very leverage dependent. If the seat is adjusted two inches one way or the other, it may cause the athlete to be able to use +/- 50 pounds, and because of this we must be consistent with our seat positions. The same is true when the body is out of position while performing exercises. Since the goal of exercise is to fatigue the muscles, we should seek to make the exercise as hard as possible, which means you should use the leverage or body position which allows for the greatest range of motion, within reason of safety and comfort. Many athletes are unaware of their body when they lift. They squirm, twist, and use spastic motions while trying to obtain another rep. They adjust their body, seat height, or machine to give themselves better leverage. All of these adjustments serve to make the repetition easier.

5. Constant Tension.

The final coaching point is constant tension. This is a subtlety that separates skillful trainees from beginners. When performing exercise, the muscle should be forced to work through a full range of motion under a constant load. Too often trainees let their concentration slip as the exercise becomes uncomfortable and they seek relief by resting part way through the repetition or bouncing the plates off the weight stack. Recalling the leg extension example, when the unskilled trainee begins to lower the weight and the lever arm approaches the lower half of the range of motion, they will sometimes let the tension off the muscle and the weight will accelerate. Then, using this increased momentum, they will bounce the plates off the weight stack in order to get the exercise moving again. The trainee should lower the weight slowly and smoothly and then “turn around” the weight in the same fashion. Pumping up a tire is an excellent analogy to keeping constant tension on the muscle. If you where trying to inflate the tire - trying to increase the pressure or tension in the tire to a maximum level - while somebody else was letting a little air out as you worked the tire pump, what would your results be? So it is with training muscles. You may get the job done, but in a

much less efficient manner than doing it the right way. This does not mean that we never take the tension off the muscles we are working. It does mean that for as long as possible during a set we will keep constant tension on a muscle. When we cannot do any more perfect repetitions we may then have to take a few breaths in order to continue. In exercises that involve large muscle structures, such as a leg press, we may have to take several breaths. We will continue to record these reps, as long as the “pit stop” does not become excessive.

6. Rep replication.

When you begin an exercise the first rep you do is the most important. Your goal is to block out all distractions and perform the perfect rep. The weight should be raised smoothly, paused in the contracted position and lowered slowly to a full stretch. When you begin the second rep, it is now the most important and should be performed in the exact same manner as the first rep. Your goal is to replicate perfect repetitions. If we were to videotape a set of repetitions, we shouldn't be able to notice a difference in the reps when the tape is played back. Keep in mind that the purpose of a properly performed repetition is to eventually develop a level of strength we do not have. It is not to demonstrate a level of strength we wish we had. There are some exercises that have been touted as being great for training athletes that break all three rules of a properly performed repetition. These include power cleans, snatches, push presses and a host of other Olympic lift variations. These lifts rely on momentum, leverage, complicated technique, little tension on the involved muscles, no constant tension, and no negative or lowering portion of the exercise. Is this really a productive way to train? Decide for yourself. Most coaches are result oriented. Some believe the result of strength training should be to make the weights go up and down. Some believe the result should be an athlete who can bench press a certain amount of weight and who can have their name on a record board. But your muscles do not care if the weights go up or down, or even if there are any weights at all. All the muscle cares about is how hard it is being forced to work. The immediate result of properly performed exercise should be greatly fatigued muscles. It all starts with the properly performed repetition.

THE IMPORTANCE OF PROGRESSION

The most important component of successful training is an unremitting desire to progress. Athletes and coaches sometimes become frustrated by the lack of gains “their program” delivers. This leads to a search for magical solutions, food supplements, exercises and equipment. The “program” will be changed, perhaps changing exercises, sets, reps, percentages or speed of movement. After another period of unsatisfactory results, new gurus will be consulted and the program will change again. All the while, the answer to their problem is too simple to be seen. Athletes sometime seek the “secrets of strength” from the Biggest Guy in the Gym. Their conversation will go something like this:

small guy:	“I just can't seem to get my arms to grow.”
Biggest Guy in the Gym:	“What are you doing for your arms now?”
small guy:	“What you told me to do. Barbell curls - three sets of ten, cable curls - four sets of eight, triceps press downs - five sets of five.”
Biggest Guy in the Gym:	(Looking up, thinking real hard.) “Well, its obvious to me you need to be doing dumbbell curls for five sets of eight, preacher curls for 10 8 6 4 pyramid and lying triceps extensions super-setted with triceps push-downs.”
small guy:	(Humbled and grateful to be in the presence of a weight guru.) “Thanks for the advice, man. I can't wait to try my new program. I know this one will work.”

And the small guy is off on his new program, conveniently forgetting that it was the Biggest Guy in the Gym that gave him his first program that produced unsatisfactory result in the first place. And the Biggest Guy in the Gym, enjoying the role of mentor, forgetting his original advice, never tells his students to train harder on the program they have.

We have quit relying on hand-me-down information. Do you really think you can change the chemical composition of muscle fibers by changing sets, reps and speed of movement? Muscles are not that smart. They do not have “eyeballs” that allow them to “see” a “program” or if the resistance comes from a machine or barbell. Yet many people have devised very complicated ways to train that are hard to understand, that they probably don't understand, and we're sure the muscles don't understand. This has resulted in such things as pyramid up schemes, pyramid down schemes, power pairs, percentage training, five sets of five, and a favorite misguided approach - “periodization”. All these methods assume that there is a magical muscle making formula that you can just plug into and get results. Periodization takes the ridiculous to absurd by making the formula an almost epic-like journey that takes a person through distinct phases of “hypertrophy”, “basic strength”, “power” and “active rest”.

Reality is something different. The body changes by a force of will. Strength training, to be productive, must be difficult and progressive. But the progression

need not be difficult to understand. Each workout, on each exercise, **try to increase the weight or the repetitions.** This is called the double progressive method of overload and it is the most effective way to improve.

An athlete who could improve one repetition every workout would experience phenomenal gains. For example, let us say we are doing strict barbell curls in the 8 to 10 rep range on Monday, Wednesday, and Friday.

Week 1
Monday 60 lb. for 8 reps
Wednesday 60 lb. for 9 reps
Friday 60 lb. for 10 reps

Because we have reached 10 reps, it is time to go up a small amount

Week 2
Monday 65 lb. for 8 reps
Wednesday 65 lb. for 9 reps
Friday 65 lb. for 10 reps

Week 3
Monday 70 lb. for 8 reps
Wednesday 70 lb. for 9 reps
Friday 70 lb. for 10 reps

At first it does not seem like much is happening here, but let's take a closer look. If we are training three times a week, that is 156 workouts a year. If we are going up in weight 5 lbs. every 4 workouts...156 workouts per year/4 workouts = 39 increases 39 increases X 5 lbs. per increase = 195 lbs. per year! Not bad for arm curls!

Is this possible? We have never seen an athlete who could increase a repetition every workout, but there will be times that your progress will amaze both yourself and your coach. For the more experienced trainee it can be frustrating training for weeks to add only one rep. But even if you add only one rep every three weeks, that is still twenty-five pounds a year, which would translate into one hundred pounds over the course of your college career. A rep is a huge increment and needs to be broken down into an ...inch!

Make every inch of every repetition count. Don't cheat yourself by using momentum for one inch. Make progression the driving force in your workouts. Try to add one rep each time you train. Or try to add a half of a rep. Or six inches. Run a little longer. Sprint a step more. Improve one inch. Demand improvement from yourself each time you train. Refuse to replicate previous results.

In the short run you are trying to add reps. In the long run you are trying to add weight. Small increases over time will get you were you are trying to go, and when you can curl 150 pounds for ten strict reps, your arms will be as big and as

strong as they will ever be. Do not look for magic. Ultimately, you will determine your results, not the program, the coach, or the equipment. Look to yourself - your motivation and effort - for the answers.

INTENSITY and TIME

Below a certain level of intensity, strength training will do little for you. If you are capable of lifting two hundred pounds for eight reps, and you stop at seven, it should be obvious that the exercise was not as productive as it could be. The one thing that separates strength training exercise from other types of exercise, such as running or biking, is that it is much harder to do. The dramatic changes that occur in the body as a result of lifting weights are due to the intense nature of the exercise. There is simply no other way of working the muscles as hard with any other type of training. Beyond what is needed for daily tasks, the body does not want to put on a large degree of muscle. The tissue is metabolically costly, meaning that you have to feed it to keep it alive. And of all the things your body needs to do to survive, conserving energy is number one. It needs this energy to produce the heat that allows for daily living. In the Cave Man days, carrying an extra thirty pounds of muscle was of no advantage when the famine came! For this reason, to get stronger and more muscular, you had better give your body a real good reason to do so!

You must place your muscles in a critical situation. The effort level must be maximum. Your brain will only recruit the minimum number of muscle fibers necessary to do the job. This is why you must do as many repetitions as possible. “As many as possible” is a confusing point for many young trainees. Some think that when the exercise is uncomfortable they have done as much as they can. Or they may think that when they have reached ten reps that is all they can do. Let's set the standard right now. When you think you have done as many as you can, imagine that your life depends on you getting one more rep. Literally believe that if you do not get one more, you're done for. If at this point you can't do another rep, try to get a half of a rep more. Then try to get a quarter of a rep. Try to move the weight one inch. When you cannot move the weight a fraction of an inch more, you have finished a proper set. You have successfully completed the exercise and you should feel proud of your effort. Don't make the mistake of thinking you can make up for this effort by doing more work at less intensity. Given enough time, almost any size muscle can do almost any amount of work. This is called labor and it has nothing to do with strength training.

As fatigue sets in on the court, you are gradually bringing more fibers into play. If your training consists of a few heavy reps or stopping your exercise short of fatigue, you'll eventually be using muscle fibers on the court that you didn't strengthen in the weight room. Suppose you have a stick of dynamite in front of you. If you took a hammer and lightly tapped it, nothing would happen. You could literally hit it forever without it exploding. But one strike with enough force behind it will set off a huge explosion. And so it is with your strength training. The amount of work you do has nothing to do with your strength development.

Muscle responds to tension over time. You can get stronger performing almost any number of reps. Performing only a few heavy reps is more dangerous, too time consuming, and not specific to the muscular needs of the athlete. The competitive weight lifter has needs specific to his sport, while the athlete has

needs specific to his. The longer the tension is applied to the muscles, the more fibers that can be activated. Research and our experience shows that the best results will come from training the muscle to fatigue within the anaerobic time frame of approximately 30 to 90 seconds. Assuming about five or six seconds to complete a rep, this would be a rep range of about five to twenty. Each individual responds to some rep ranges slightly better than others depending on such factors as neuromuscular efficiency, muscle fiber type, and lever length. We will usually use about eight to twelve, though this can change for individual needs and variety sake.

There has been much written about the “best” set and reps scheme without anybody really defining what is being talked about. When discussing the number of reps, we are really talking about the amount of time. If someone states that five sets of five is the best set and rep scheme, are they really saying that the best way to work the muscle is with two and half minutes of work broken up into five 30 second segments? When they then prescribe three sets of ten for another exercise, are they saying that this muscle needs three minutes of work broken up into 60 second segments? Why should it change for different exercises? What are we talking about here? The fact of the matter is that muscles don't count reps. The majority of the research has indicated that one to three all out sets are equally, effective.

There is no magical formulas in strength training. An athlete can spend 30 minutes in the weight room or three hours and accomplish the same thing. But as the intensity of the work increases, the amount of work must decrease disproportionately. For instance, if you were to walk at two miles per hour, you could continue that pace indefinitely. If you were to increase that to four mph, you would be able to keep at it for about eight to ten miles. Double that to eight mph and two miles would be about all you could stand. Increase the pace to 16 mph and 200 meters will have you wiped out.

Not only must the amount of work decrease when the intensity increases, the frequency of the workouts must decrease also. Make no mistake about it, if you train hard enough to induce the physiological change you are looking for, you will need to recover from it. Plain and simple, the only people who can lift every day are those that don't lift hard. While you may be able to do a walking and jogging program every day, just try a hard sprint workout every day and see how long you last. You must recover from hard exercise, which is the only kind of exercise that can make dramatic changes in your body. For this reason, we never train more than three days a week.

Strength training at **MICHIGAN STATE** is not a recreational activity and this is not intramural athletics. Consequently, the amount of time you take between exercises will affect how much weight you can lift. If one lifter decreases the amount of time it takes to do his workout, he will find that he can't use as much weight. And if another lifter increases the amount of time to do his workout, he will be able to lift more weight than if he takes less time. But if both lifters are increasing in strength, then it becomes completely relative. And when the slow

worker decreases his rest time, he will find that he can do less, much less, than the athlete who had conditioned himself to move quickly through the workout. Decreasing the amount of time it takes to complete a workout is an excellent way to increase the intensity of the workout. It is also a great way to develop “metabolic” conditioning that can be transferred to the court.

At **MICHIGAN STATE**, most sets are not terminated short of fatigue. Our workouts are brief by necessity. We ask too much of our athletes to have them do a lot of work. It is not that one to three sets per exercise and thirty to sixty minutes of lifting is the magical amount. It is all that can be tolerated. Inexperienced athletes who question the effectiveness of this have never experienced a properly supervised workout. We have supervised thousands of workouts of some of the toughest and strongest people around and we have never been asked to do three more sets of a leg press exercises. And we have never been asked if the workout could be repeated again. The name of the game is effort, and as a **SPARTAN** athlete you are expected to train as hard as possible.

SUPERVISION and MOTIVATION

Supervision and motivation will determine the results of the strength and conditioning program. The major advantage of the **SPARTAN** strength program is the ability to train our players on an individual basis. You will be supervised each and every workout by either a full-time strength coach, Graduate Assistant, or fellow player.

Proper supervision ensures that the athletes are following all of the checkpoints of a properly performed repetition, training at the appropriate intensity, making progressions in weight and/or reps as needed, and that they are not performing exercise haphazardly. Supervising or coaching an athlete in our strength training facility is a skill that requires experience, practice, a general knowledge of proper strength training principles, and enthusiasm. We will never merely move from exercise to exercise, staring at the clipboard as our partner performs her set. Each and every set should be a charged, exciting event to try to either increase the number of reps performed, increase the amount of weight used, or both. The following are guidelines to use when supervising an athlete through a set of an exercise:

l. “Coach” the athlete during her set. Make sure she is adhering to the checkpoints of a properly performed rep. If she is not, then the appropriate correction needs to take place.
2. Encourage the lifter when the exercise is being performed properly and discourage when done improperly.
3. Use verbal encouragement. Find what “buttons” to push on the lifter that causes her to train harder.
4. When assisting, help just enough to keep the weight moving but do not lift the weight for her. Let the athlete earn the rep but at the same time do not allow the athlete to struggle with the weight to the point where the bar is beginning to reverse its direction.
5. Do not touch or place your fingers on the bar while the weight is being raised and lowered. If the weight is moving, keep your hands off it.
6. Do not invade the lifter’s space. Stand away rather than in her face until it's necessary to step in and help.
7. Do not let the lifter “perform” for you. Force her to draw deeper into herself as the intensity of the exercise increases. Do not turn the lift into a dog and pony show.

Learning to become a competent strength training spotter gives you greater insight into your own strength training. Spotting is a self-educating experience by which you can grasp expectations, justify every repetition, and gain a more practical understanding of human physiology and psychology.

Competent supervision is a cultivated talent that evolves with practice and concentration. It is not simply assisting a partner. Even the highly motivated athlete benefits from an adept spotter. Spotting involves the investment of time, effort, and concentration into fellow team members. Learning how to spot will

improve the quality of work performed. Informed athletes will increase their confidence in the program, stimulate a greater enthusiasm for training, and augment the credibility of the routine.

Each spotter should have an unrelenting desire to make the lifter better. There is no accepting less than a maximum effort. Other points a spotter needs to know include:

1. Sense of time: The greater the duration of the workout the less intensity of effort. Spotters need to be aware of the total workout time.
2. Target reps and weights: The spotter tells the lifter what is needed in order to improve on previous efforts.
3. Seat settings: consistent seat changes will avoid inconsistent performances.
4. Proper breathing: lifters should never hold their breath while training. Do not be concerned when to breathe in or out. Be concerned with just breathing.
5. Expand the tolerance for physical discomfort.

Motivation is a true art form. Enthusiasm is contagious. Nobody wants to be around someone who acts tired, lethargic, listless and apathetic. The best way to motivate other people is to be motivated yourself. You should approach every workout, practice and meeting with enthusiasm. Anybody can yawn, close their eyes and think of a hundred reasons why they should be somewhere else. The surest way for a player to gain the respect of her teammates is to provide the excitement and encouragement that others can feed off of.

One of the best motivators of people is past success. This is one reason why we track our workouts carefully. Athletes who see improvements on an almost daily basis have a good reason to continue to train.

Credibility will also inspire your teammates and training partners. If you train hard, it is much easier to push the people you work with. Your credibility as a spotter and teammate is undermined if you do not train hard. As an athlete at **MICHIGAN STATE**, you will find that the best way to lead is by example. You will get the most work out of the people you supervise when they see you working.

External motivation in the **SPARTAN** weight room comes from many sources. We have great facilities and equipment, computer tracked workouts, and stereo. Our coaches and graduate assistants are as excited about each workout as the first one. You have teammates who train hard. All of these things help to make each workout as fun and productive as it can be. But external motivation can only sustain you for a while; ultimately, you will have to reach into yourself for the true motivation that will carry you through your athletic career and then through your life. Think about why you play. Think about what it means to be an athlete. You only have one college career. Refuse to be average. Understand that as a **SPARTAN** player you are with a special, select group of people. If it was easy, then everybody would be doing it. Do not play at training. Make the most of it.

RECORDING WORKOUT DATA

During each workout, you should record the amount of weight lifted and the number of repetitions performed for each exercise. This helps eliminate the duplication of a previous workout and provides incentive for improvement. During a workout you will perform many exercises at varying repetitions and workloads. It will be quite difficult to recall from one workout to another the specific accomplishments of prior training sessions. You should follow these guidelines when recording results on a workout card:

1. Only record the properly performed reps. Do not record the reps you thought you did, wish you did, or had help. If you complete six perfect reps and your spotter helps you do three more, record six reps on the workout card.
2. Follow the order that the exercises are listed on the card. Selecting exercises haphazardly will lead to non-reproducible results.
3. Do not select exercises that are not listed on the card and do not only perform your favorite exercises. Most athletes like to choose exercises that they are good at. Truthfully, you stand to gain the most by performing the exercises you like to do the least. There is no one exercise that our athletes perform that is more or less important than another. If you ask some of our players how much they bench press or squat don't be surprised if they tell you how strong their necks are or how much they can lift with their hamstrings.
4. Be aware of the number of repetitions that were previously performed on the exercise you are doing. If during the last workout you completed nine reps on the lateral raise, the goal is now ten. Always refer back to the card. See what the last effort was and attempt to better it.
5. Understand that certain factors will affect the strength level of an athlete such as injury, time of the year (pre-season, mid-season, late-season), recent sleeping habits, eating habits, stress level, and other environmental factors.

PROGRAM ORGANIZATION

Every time you train you are competitive. You are trying to improve. You are trying to do better than you have done in the previous workout. You are always trying to get those last, very intense reps. Basketball is a physical game. You hit people from every possible angle known to man. Therefore to properly prepare yourself for combat you must perform exercises designed to develop the five major segments of the body:

NECK	MID-SECTION	HIPS AND LEGS	TORSO	ARMS
Traps	Abdominal	Buttocks	Deltoids	Biceps
	Lower Back	Quadriceps	Lats.	Triceps
		Hamstrings	Pectorals	Hands
		AB/ADductors		Forearms
		Calves		

KEY POINTS

1. Record all your workouts. Your records should include the day, exercises, order of exercises performed, amount of weight, number of properly performed reps and tool used.
2. Use the heaviest possible weight for the particular number of reps required with the best possible form.
3. Skill work should be performed prior to heavy weight work.
4. Perform exercises by body segment. Once you begin Hips and Legs, perform all of the exercises for the Hips and Legs
5. SUPERVISION. A training partner provides encouragement and competition. A training partner can provide negative resistance once you can no longer raise the weight.

STRENGTH TRAINING WORKOUTS

Our system of strength training ensures all of the following important variables:

1. **COMPREHENSIVE TRAINING** - All of the major muscle groups will be worked on every training day.
2. **INTENSITY OF EFFORT** - Our guiding principle on just about everything we perform is as follows: “If you could have done another rep with proper form, you should have done it”.
3. **OVERLOAD** - This aspect of training is built-in to our system. We expect progress in the number of reps you are performing with a certain weight over a period of time. This applies to all of your exercises, not just the bench press and squat/leg press.

While structured, we do allow flexibility in the choice of exercises for a particular muscle group. For instance, we might ask you to choose two exercise from a list of movements for the upper back area and ask you to perform two sets of each with forced reps after the second set of each. Again, variety will make your workouts more challenging and enjoyable. Stick to the basics of comprehensive training, intense effort, progressive overload, and a three-day-a-week (non-consecutive) approach regarding frequency, and you will make excellent gains in size and strength.

POWER DEVELOPMENT: THE PROPER APPROACH

P O W E R ! Every competitive sport requires the ability to demonstrate power. Frequently referred to as "explosive" strength, power is critical to the performance of basketball skills and coaches are seeking new, innovative methods for improving it. Unfortunately, many so-called "power programs" are unsound due to a lack of understanding of this often times butchered term.

The power formula Power = (Force x Distance) / Time has been misinterpreted by some as meaning that you must "throw" a weight, or lift it "quickly" to develop power. In reality, the "quicker" a weight is able to be lifted signifies several important variables in strength and power development that are being negated:

1. The weight is too light for proper overload (you cannot lift a heavy weight fast).
2. The momentum involved is preventing the development of constant tension within the muscle groups being targeted.
3. Most of the muscle groups purported to be exercised in the majority of these "quick" lifts are being worked through a limited range of motion (e.g., the power clean).
4. The stresses being placed on joints and connective tissue far exceed the weight on the bar when you "throw" it up in the air and "jump" under it. Simply put, these movements are inherently **dangerous.**

How then do you increase one's ability for power output? You must work on three very distinct, very specific areas:

1. **Strength Training** ("Force" training) through high intensity (high tension) movements for all of the major muscle groups, you will be able to produce more force.
2. **Flexibility Training** (Range of Motion) - the distance component of the power formula as it relates to athletic performance can be improved through a proper, comprehensive flexibility program. Properly performed strength training movements can also improve flexibility.
3. **Skill-Specific Training** - you must practice the skills of your sport with the proper techniques and at the highest speed possible. In other words, quality practice (repetitions) of the tasks required of you will result in improvements in those areas.


FLEXIBILITY
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FLEXIBILITY TRAINING

Our flexibility training program is a planned, deliberate, and regular program of exercises that can progressively increase the usable range of motion of a joint. Flexibility exercises tend to increase the resting length of muscles, restore normal range of movement, encourage proper blood flow, and permit increase of power with strengthening exercises. Flexibility exercises are designed to stretch certain muscles and reduce the likelihood of injury to muscle tendon units. Make sure you maintain the stretch for 10-15 seconds – **avoiding bouncing.** Take about 10-15 minutes to do these flexibility exercises with total concentration. You should be in a relaxed state of mind at all times when you are stretching.

A common misconception about strength training is that it decreases flexibility; current research demonstrates that proper strength training does not decrease, and in some instances may actually improve flexibility.

REMEMBER THESE POINTS

- **WARM-UP BEFORE** stretching with 5 minutes of aerobic activity; **break a sweat!**
- Start slowly, work at your own pace.
- Stretching should be done daily; **before and after** conditioning activities.
- If you stretch, you will become flexible. (But any segment of the body may be tighter than another and may require more time and effort to obtain optimum flexibility.)
- You must concentrate on proper technique.
- Go to the point where you feel a slight stretch, hold that until the feeling changes. Then stretch a little further. Always feel light tension.
- Stretching also releases muscle tension, which will help you to relax mentally and physically. Learn how to hold positions in a relaxed state. If you cannot hold a position because the stretch is to great, ease up a bit.
- A cramp is not normal. Contact the training staff immediately if this occurs more than sporadically.
- Do not stretch so far that you experience joint pain.
- Partner stretching can be implemented on days when excessive tightness is evident; particularly for the hamstrings and low back.

SUMMER STRETCHING ROUTINE

1. Hip Flexor (L, R)

A. Stand upright with your legs staggered 2 feet apart.
B. Flex front knee, and roll back foot under so the top of the instep rests on the floor.
C. Step out 1 step with your front foot, to ensure proper knee over heel alignment.
D. Place your hand on your glute to ensure glute contraction.
E. Squeeze glute and abs as you slowly lean or push your down hip toward the floor.
F. Hold the stretch and relax.

2. Standing Groin

A. Stand upright with your legs staggered 2 feet apart.
B. Turn your back foot 90 degrees outward.
C. Step out 1 step with your front foot, to ensure proper knee over heel alignment.
D. Place your hands on your hips.
E. Exhale, and slowly lunge forward, pressing down with your right hip.
F. Hold the stretch and relax.

3. Groin (Butterfly)

- **A.** Sit upright on the floor.
- **B.** Flex your knees and bring the heels and soles of your feet together as you pull them towards you.
- **C.** Place you elbows on the inside portion of both upper legs.
- **D.** Exhale, and slowly push your legs toward the floor.
- **E.** Hold the stretch and relax.

4. Cradle (L, R)

- **A.** Sit upright on the floor with your back flat as if against a wall.
- **B.** Flex one leg and slide the heel towards your inside.
- **C.** Grasp the ankle with one hand and hook the knee with the elbow of your opposite arm.
- **D.** Exhale, and slowly pull your foot towards the opposite shoulder.
- **E.** Hold the stretch and relax.

5. Lay It Back (L, R)

- **A.** Maintain same position as stretch above (Cradle, A, B, C)
- **B.** Roll your body backwards to allow your back to be flat on the floor.
- **C.** Exhale, and slowly pull your foot to the opposite shoulder while keeping your head, shoulders, and back flat on the floor.
- **D.** Hold the stretch and relax.

6. Extend and Pull (L, R)

A. Lie flat on your back with your knees flexed and your heels flat.
B. Inhale, and extend one leg upward.
C. Grasp calf of upward leg with both hands.
D. Exhale, and slowly pull the leg towards your head while keeping the leg straight.
E. Hold the stretch and relax.
***If you have a bad back, flex the extended leg and slowly lower it to the floor.

7. Spread It Wide (L, M, R)

A. Sit upright on the floor with both legs extended.
B. Spread your legs as wide as possible.
C. Exhale, and slowly rotate your trunk to extend your upper torso over one leg, while trying to grasp the heel with both hands. Concentrate on keeping both the lower back and legs extended.
D. Hold the stretch and relax.

8. Modified Hurdler (L, R)

A. Sit upright on the floor with both legs extended.
B. Flex one knee and slide your heel towards the opposite thigh.
C. Lower the outer side of your extended thigh and calf onto the floor.
D. Place your inside heel against the inner side of your opposite thigh so that a 90 degree angle is formed between your extended leg and your flexed leg.
E. Exhale, and slowly bend at the waist, keeping your extended leg straight, lower your extended upper torso over your extended leg.
F. Hold the stretch and relax.

9. Roll and Pull (L, R)

- **A.** Lie on your side.
- **B.** Flex one knee and bring your heel towards your buttocks.
- **C.** Rotate your same – side shoulder back and grasp your ankle.
- **D.** Exhale, and slowly pull your heel towards your buttocks without over compressing the knee.
- **E.** Hold the stretch and relax.

10. Feet Together

- **A.** Sit upright on the floor with both legs extended.
- **B.** Exhale, and slowly bend forward at the waist while keeping both legs straight and extend your upper back over your thighs. Stop when you feel excess tension.
- **C.** Hold the stretch and relax.

11. Spinal Twist (L, R)

- **A.** Sit upright on the floor with both legs extended and your hands behind your hips for support.
- **B.** Flex one leg and cross the foot over your extended leg.
- **C.** Place your foot on the outer side of your extended leg and slide your heel towards your buttocks.
- **D.** Place your opposite elbow on the outside of your flexed knee
- **E.** Exhale, and slowly look over your shoulder while turning your trunk and pushing back on your knee with your elbow.
- **F.** Hold the stretch and relax.

12. Saigon Squat

- **A.** Assume a squat position with your heels about 12 inches apart and your toes slightly turned out.
- **B.** Place your elbows on the inside portions of your upper legs.
- **C.** Exhale, and slowly push your legs outward with your elbows. Remembering to maintain a flat back, head and eyes up position with your feet flat on the floor to reduce back and knee strain.
- **D.** Hold the stretch and relax.

AEROBIC CONDITIONING

AEROBIC CONDITIONING

Distance training, better known as aerobic work, provides several benefits. It is intended to develop your cardio-respiratory system which will prepare you for the various types of running and agility drills you will be asked to perform throughout the summer. Through this preparation, you will develop an efficient heart and lung system which will increase your endurance and improve your recovery capabilities. Remember, you can not rush the physiology of the body - it must be done in a way that allows for gradual overload.

AEROBIC TRAINING

In order to condition the cardiovascular system aerobically, you must elevate your heart rate between 70% and 85% of your maximum heart rate. The formula used to determine your maximum heart rate is to subtract your age from 220. EXAMPLE: If you are 20 years old you subtract 20 from 220, which gives you a maximum heart rate of 200 beats per minute. Once you have found your maximum heart rate, your training zone ranges between 70% and 85% of 200. The following charts on the next few pages will help you find your aerobic training zones.

HOW TO DETERMINE YOUR PULSE

You need to learn to take your pulse under these conditions:

1. At rest when you first awaken in the morning, before rising or exercising.
2. After a specific period of exercise as recommended in your program.

Don't be concerned that your heart rate seems fast at one reading or slow at another; many factors (e.g. age, nervousness, sex, etc.) affect the heart rate under various circumstances. To get an accurate measurement for your physical fitness program, follow the simple steps below.

1. Experiment a bit and select the best body site to take your pulse. The best locations are typically at the wrist, just below the base of the thumb; at the neck, just over the collar line and to the right or left of the windpipe; and at the inside of the elbow, just above the skin crease.
2. When taking your pulse, simply count the number of beats for: 10 seconds, using a clock with a second hand for accuracy. Take this number and multiply it by six to get a per minute reading. When taking an exercise pulse it is imperative that you start the reading immediately after the exercise. The reason for this is that the heart rate rapidly slows after the stress of exercise; in fact, the faster it slows the more fit you are.

Age	Max. Heart Rate	85% M.H.R.	70% M.H.R.	Beats/10 seconds	Heart Rate
17	203	173	143	7	42
18	202	172	142	8	48
19	201	171	141	9	54
20	200	170	140	10	60
21	199	169	139	11	66
22	198	168	138	12	72
23	197	167	137	13	78
24	196	166	136	14	84
25	195	165	135	15	90

Physiological adaptations: As your body begins to adapt, you will discover that you must exercise harder and faster than before in order to keep your heart rate at the same level it was in your initial workouts. For instance, you may find that when you fist began to train that your heart rate held at 160 while running two miles in 16 minutes. Several weeks later, you may find that you are able to run at the same pace while keeping your heart rate at 150. You will then have to run faster to keep your heart rate in the training zone. After you finish exercising, your body and heart rate will begin to recover from exercise faster. As an example, two minutes after exercising with your heart rate at 150, you may find that you have recovered to 128. Several weeks later you may find that you can recover to 120 in two minutes after the same bout of exercise. Other aerobic system improvements include: increase in heart size, blood volume, stroke volume, cardiac output, respiratory function, heat tolerance, lactic acid metabolism, capacity to use fat as an energy source and ability to oxidize carbohydrates. In other words, getting in shape.

Cross training: As you may gave guessed, your heart and lungs do not know if they are having to work because you are running, swimming, biking, stairclimbing, or even lifting weights. You can take advantage of this to incorporate variety into your cardiovascular training and minimize the potential for overuse type injures. All you have to do is train with your heart rate in the prescribed range in a systematically progressive way, and you will cause adaptation to occur. There are specific peripheral changes that occur with each mode of training. Therefore, if you have to run in your sport, then the majority of your cardiovascular training should come form running. You may get in great shape using a Stairmaster, Treadmill, upper body ergometer, or stationary bike, but the only way to develop the skill of running is by running.

Aerobic intervals and fartlek training: You can increase the intensity of aerobic training by incorporating interval and fartlek workouts into the program. Interval training refers to workouts that combine high intensity work periods (work

interval) with rest interval. Fartlek training refers to a workout that you perform continuously without resting, but involves changes in speed or work rate.

When training above 85% of your max. heart rate, you may have to stop and rest periodically to allow some recovery. By manipulating the work and rest period, you can use interval training to set up a systematic and progressive method of overload. Since we are training primarily aerobically, we will pick distances that take approximately three to six minutes to cover. You will overload your system by reaching a heart rate of at least 90% of its maximum (>180 BPM) progression will come from increasing the work or work rate or by decreasing the rest interval each workout. The rest interval can be based on recovery to a certain heart rate (we will use 120 BPM) or a ratio of rest time to work time (for aerobic interval, usually ½:1 or 1:1). Because of the high intensity nature of the exercise, you should not perform it more than two times per week.

Fartlek training is a nice (but inexact) way to incorporate variety into your training while increasing the intensity. It combines elements of aerobic intervals and steady state training. Fore example, you could sprint the straights of the track and jog the curves while continuing for one to three miles. Another method would be to incorporate “pick ups” in your distance running. You can “pick up” the pace for one to three minutes and then decrease for a few minutes in order to recover. This can be repeated over the entire distance.

(In the interval programs below, you can use your recovery heart rate to determine your rest time. When your heart rate is down to 120 BPM, start the next interval. The rest interval will decrease as your condition improves.)

There is nothing magical about the program, just hard progressive work. Remember, there are those athletes that want to improve, and those who do improve every workout.

ASSIGNED CONDITIONING - MODALITY OPTIONS

Break up your ***60 minutes of assigned cardio each day*** by using different modalities including, but not limited to:

Running (treadmill/track)
Elliptical
Bike (stationary)
Starimaster
Slideboard
Upper body ergometer
Rowing machine
Swimming
etc.

CONDITIONING PROGRAM – SUMMER I (May 11-June 30)

(NOTE: Your total weekly minutes = 300)

(Make as many copies of this card as needed)

DATE	MODE	DISTANCE	TIME


ANAEROBIC CONDITIONING

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Your anaerobic condition is your ability to perform at a rate faster than can be met by the incoming oxygen. If you are in good condition and are exercising or playing below a certain level of intensity, your energy requirements can be met by your aerobic system. When you pick up the pace to defeat your opponent and your body cannot meet the immediate demands for more energy with the available oxygen, your body must get its energy from the anaerobic systems. At this point you are in “oxygen debt” which will be “paid back” later.

A little physiology: In order for movement to occur, your muscles require energy. This energy takes the form of chemical bonds in a molecule called ATP. Your body has three different ways it can generate ATP. The aerobic system produces ATP by burning sugar in the presence of oxygen (aerobically). This is the most efficient way to produce ATP and the method preferred by the body. It can be continued almost indefinitely. The lactic acid system provides ATP when you burn sugar without oxygen present (anaerobically). This method is used when you are playing at a rate faster than you can bring in and use oxygen. The lactic acid system produces less ATP than the aerobic system and causes the production of large amounts of lactic acid. Consequently, it can only be sustained for a few minutes. The phosphocreatine system also produces ATP in absence of oxygen. It acts as an ATP “reservoir” for the muscles. It is the primary source of ATP in all out efforts of less than a few seconds.

If all this seems a little confusing, just remember the following:

- Your body uses three different energy systems to replenish ATP.
- There is overlap among the three systems.
- Training your anaerobic system allows you to perform with great effort for short duration.
- Training your aerobic system allows you to perform tasks of long duration. It also allows you to recover quickly from anaerobic exercise.
- The energy systems must be trained near maximum for best results.

Physiological adaptations: As your conditioning level improves, you will find that you will have to work harder and faster to make progress. You may initially be able to run six 400 meter sprints in 85 to 88 seconds each. Several weeks later you may be able to run them in 81 to 84 seconds each. In addition, your recovery time will shorten as your ability to clear lactic acid improves. At the beginning of your anaerobic training program, you may need two and a half minutes between each 400 meter sprint, but several weeks later you may need only two minutes of rest. This is progressive and productive training. Other physiological adaptations include: increase in strength, resting levels of ATP, phosphocreatine, fee creatine and glycogen. Improvements also occur in anaerobic enzyme function, capacity for high levels of lactic acid, and pain tolerance.

Interval training: The demands of anaerobic conditioning are best met by interval training. Because of the high intensity nature of the exercise, it can only be continued for short periods of time that must be followed by intervals of rest. Interval training is a systematic manipulation of the work and rest intervals to ensure overload and progression. By writing programs using “sets” and “reps” or “repetitions” of sprints we can change the work load, work rate or rest period to achieve the desired results.

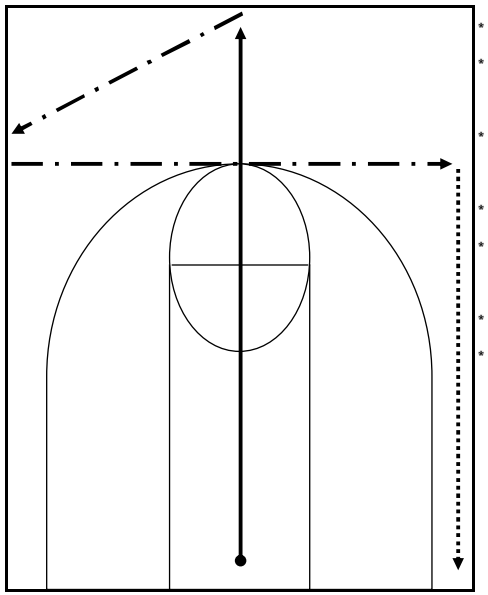
The rest interval is typically designated as a ratio of work time to rest time, because the longer the sprint, the longer it takes to recover. This ratio is typically 1:4 or 1:1. An athlete using a 1:2 ratio could do the following: run 400 meters in 80 seconds, rest 2:40, run 400 meters in 83 seconds, rest 2:46...etc. Or, run 200 meters in 37 seconds, rest 74 seconds. As conditioning level improves, rest periods can decrease. Another method would be to recover to a specific heart rate. As conditioning improves, the time to recover will decrease. We will use 120 BPM as our recovery heart rate. Finally, one could keep the recovery period the same and try to increase the speed at which the interval sprints are ran. An athlete training with 300 yard sprints could use 90 seconds as his constant rest between each sprint. One day he may average 49 seconds per sprint, and the next time average 48 seconds per sprint. Whatever method is used, it is best when training the lactic acid system to walk around during the rest interval, as it helps facilitate recovery. When training the ATP-PC system, it is best to just rest during the rest interval.

Specificity of conditioning: The best way to condition for your sport is to play your sport. The closer your conditioning comes to simulating the demands of the game, the greater the conditioning carryover to your sport will be. Therefore, basketball players must run. But just as we would not recommend that a basketball player play basketball year round to stay in shape, we would not recommend that an athlete perform sprints year round either. For this reason, parts of the year are designated as a time to train the “aerobic base,” allowing the athlete to get in shape without placing the physical and emotional stress of intense conditioning on the athlete year round. Furthermore, the various energy systems overlap considerably and compliment each other. Improving one will never hurt the other, and will probably help. *As the season comes closer to hand, the conditioning drills will become more specific in nature taking place on the court.*

ANEROBIC TRAINING is the most important phase of our conditioning program due to the fact that it develops the specific energy which the body depends on to execute the movements required repetitively of a basketball player. As with any other form of conditioning, you need to give the type of effort which is required to compete in this sport at a high level of efficiency. That is expected on each and every play from the tip of the ball. After all, that is what we are preparing you for!

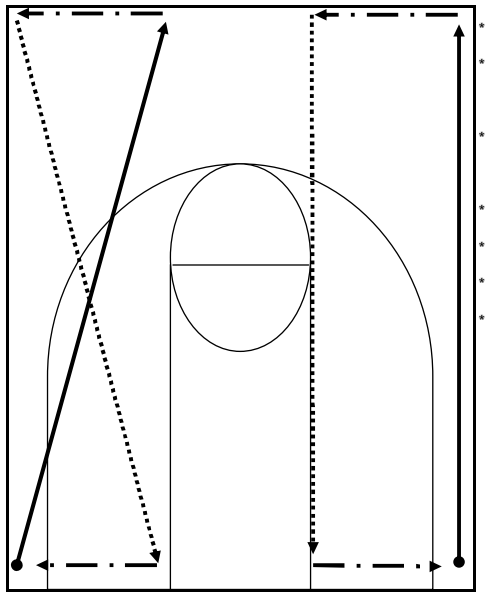

AGILITY & JUMP TRAINING

Figure Four



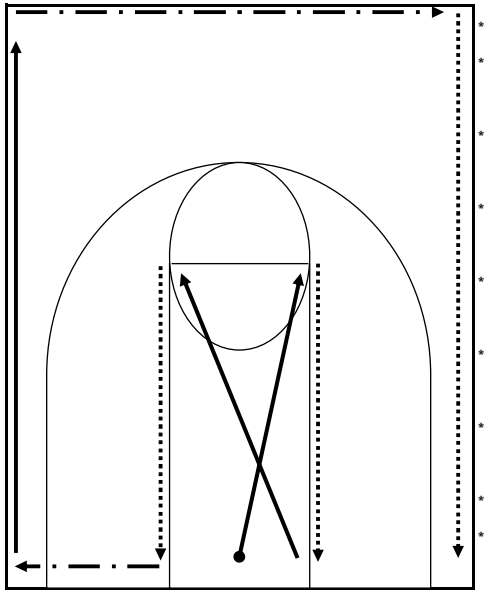
* Start at the baseline underneath the basket.
* Sprint to the half court line, jumpstop, and reverse pivot.
* Defensive slide at an angle to the where the coach's box would be.
* Touch the sideline with the outside hand.
* Reverse pivot, slide across the court to the other side.
* Backpedal to finish at the baseline.
* Perform 5 reps with 30 seconds rest between each.

Four Corners



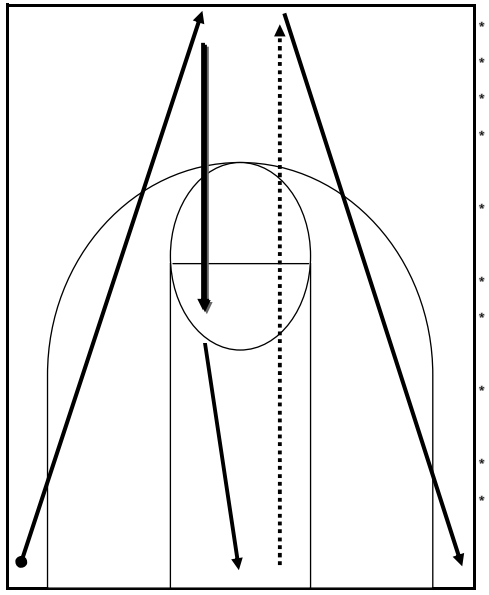
* Start at the baseline corner.
* Sprint to half court (this sprint can be either at an angle or straight up the side
* Defensive slide to the opposite sideline, (lane line extended).
* Backpedal to the lane line / baseline cor
* Defensive slide back to the start.
* Focus on hard, fundamental slides.
* Perform 5 reps with 30 seconds rest between reps.

Closeout & Contest

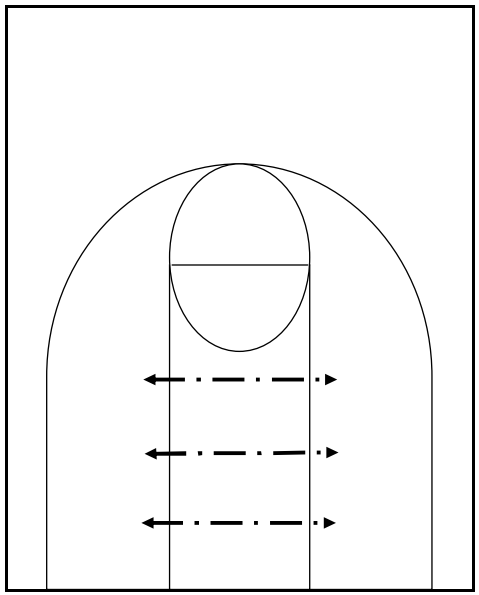


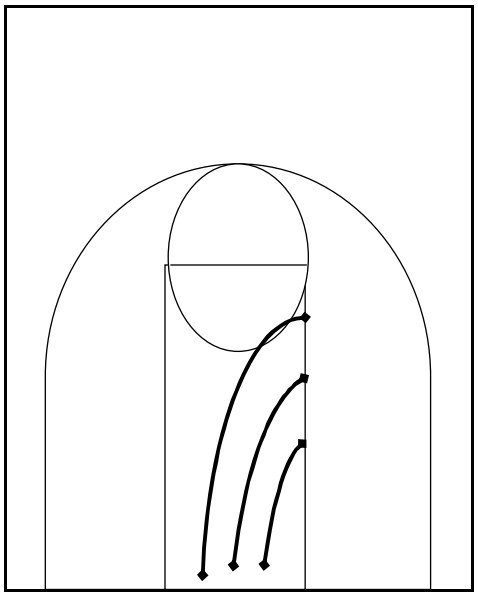
* Start at the baseline underneath the basket.
* Sprint to the elbow, closeout with proper hand and foot (force opponent to sideline).
* Defensive slide (w/ back to basket) down the lane line to the baseline.
* Sprint to the opposite elbow and closeout once again with the proper hand and foot.
* Defensive slide (w/ back to basket) down the lane line to the baseline.
* Defensive slide across the baseline to the same side sideline.
* Sprint to half court and slide across to the opposite sideline.
* Backpedal back to the baseline.
* Perform 5 reps with 1 minute rest in between.

Shoot and Sprint



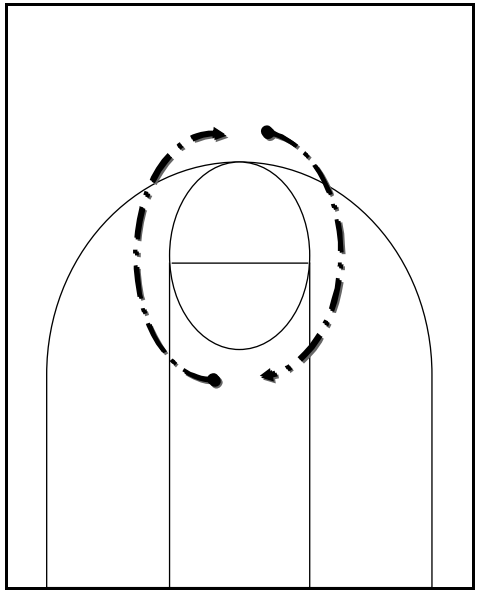
* Start at the baseline three point line.
* Simulate a fundamental jumpshot.
* Sprint to the half court line.
* Quickly change directions and sprint toward the basket.
* Simulate a pass reception as you approach the elbow.
* Attack the basket with a layup / dunk.
* After landing, quickly backpedal to halfcourt.
* Change directions and sprint to the baseline three point line.
* Simulate a fundamental jumpshot.
* Perform 5 reps with 1 minute rest betwee

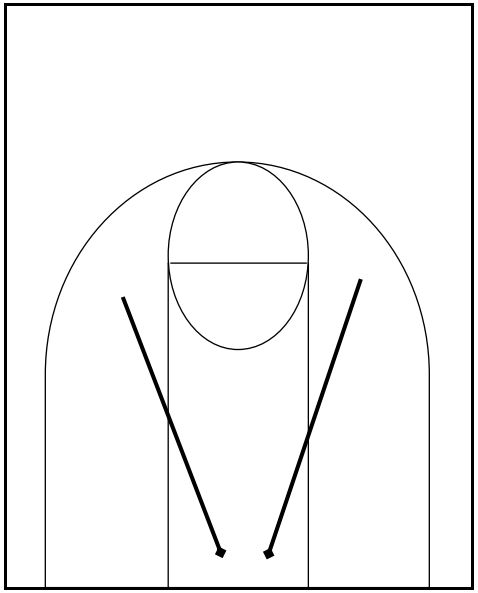




Lane Slides

* Line up on the lane line facing half court.
* Defensive slide back and forth across the lane 4 times, make sure both feet get outside the lane before changing directions.
* After the 4th slide, reverse pivot and sprint to the designated spot under the backboard.
* Complete 10 consecutive power jumps or simulated power dunks.
* Perform 5 reps with 1 minute rest between each.

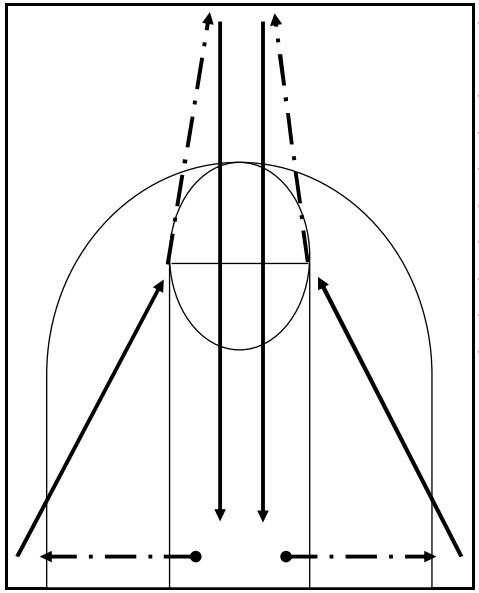




Circle Slides

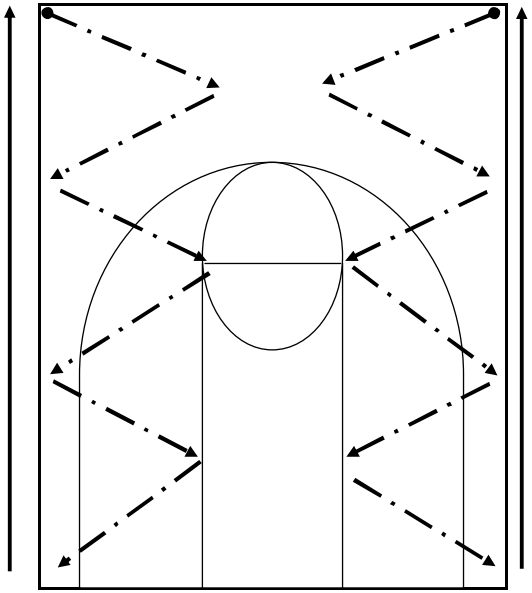
* Start at the foul line circle facing out.
* Defensive slide around the circle clockwise then counterclockwise.
* Cut / slash to the backboard and attack the glass by performing 5 power jumps.
* Perform 5 reps of the drill with 30 seconds rest between each rep.

D' Slides & Jumps



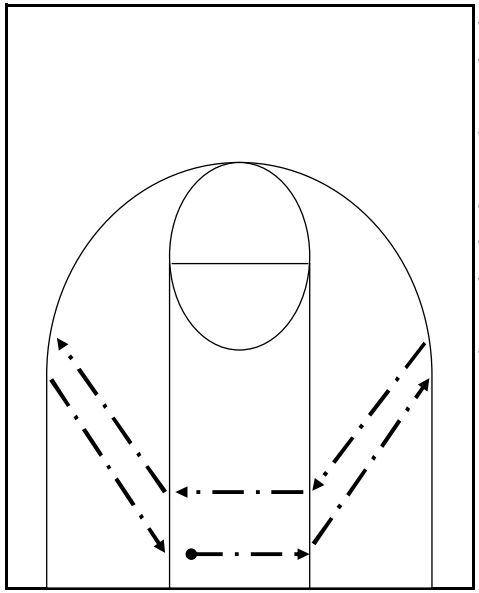
* Start at the baseline underneath the basket.
* Perform 5 power jumps.
* Defensive slide to the three point line.
* Sprint to the elbow.
* Defensive slide to half court.
* Sprint straight to the backboard.
* Perform 5 more hard power jumps.
* Repeat on the other side to complete 1 rep.
* Perform 5 reps with 1 minute rest between.

Competitive Slides



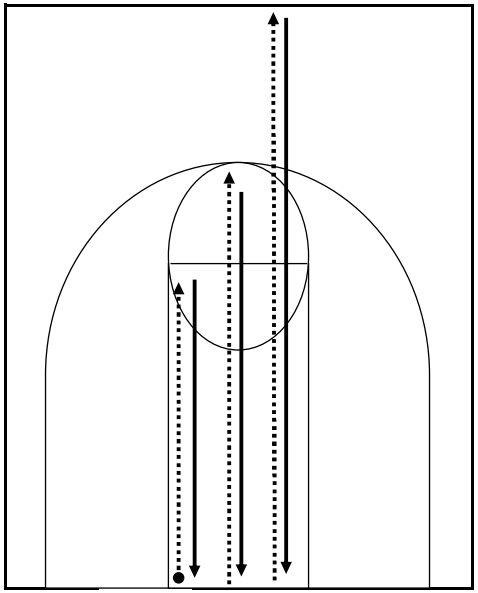
* Split into two groups.
* Start at the halfcourt sideline.
* Facing halfcourt, zig-zig defensive slide to the baseline.
* On each zig-zag slide, the outside foot must touch the sideline or the lane line (extended).
* When the baseline is reached, sprint back to the beginning.
* Focus on quick and explosive defensive slides.

Deny/Help



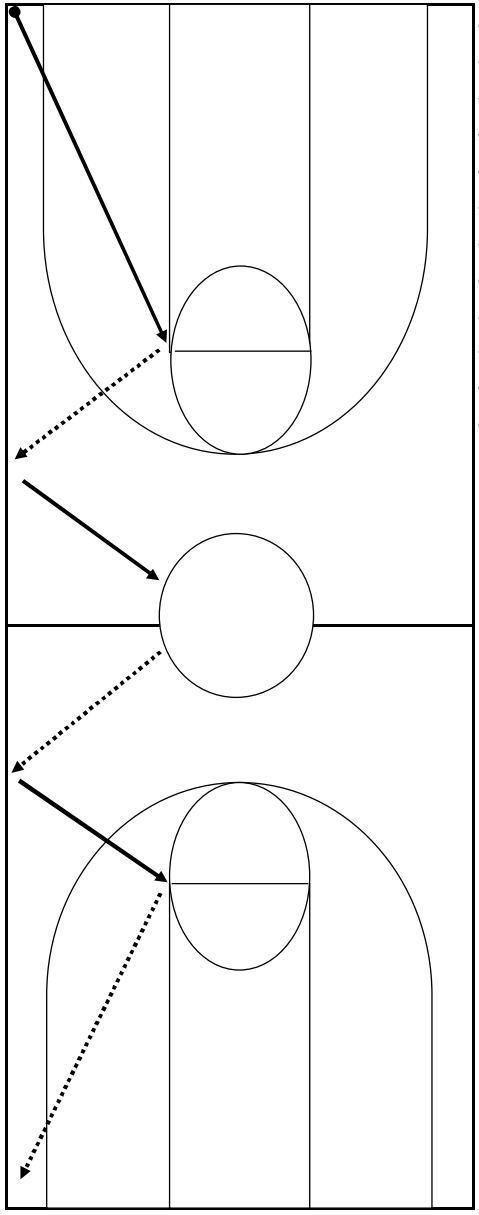
* Begin at the baseline underneath the basket.
* Take 2 explosive slide steps to the lane line, front pivot, and "deny" out to the wing.
* Stay in a stance and slide back to "help" in the lane.
* Reverse pivot and slide across the lane.
* Front pivot and "deny" to the opposite wing.
* Stay in a stance and slide back to "help" in the opposite side of the lane.
* Repeat the drill 5 times with 30 seconds rest between each rep.

Power Rebounds



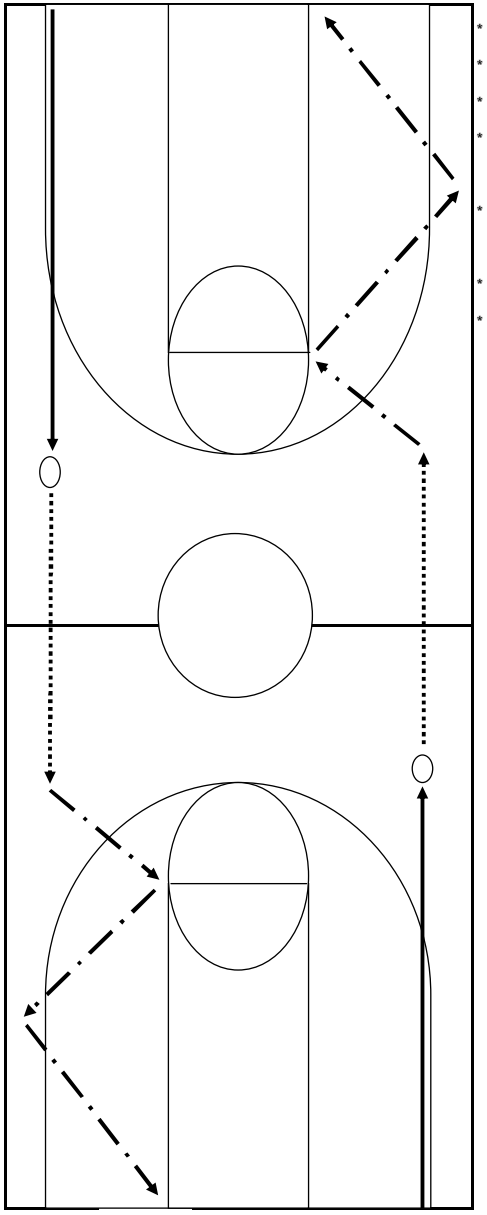
* Start at the baseline underneath the basket.
* Backpedal to the foul line.
* Sprint to the backboard and power jump.
* Backpedal to the three point line.
* Sprint to the backboard and power jump.
* Backpedal to half court.
* Sprint to the backboard and power jump.
* Rest 30 seconds between reps.
* Perform 5 repetitions.

Full Court Close Outs



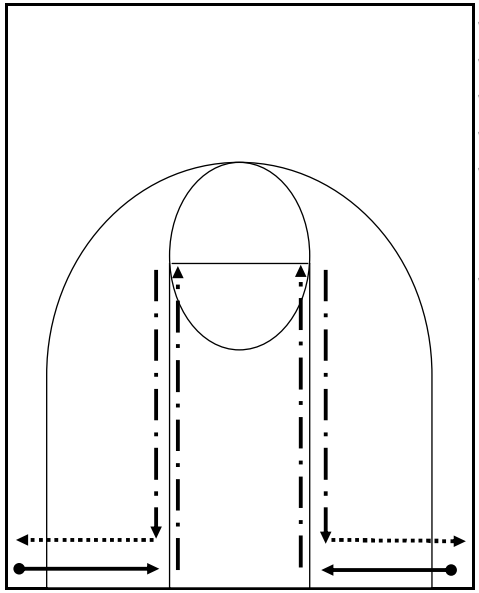
* Start at the baseline corner.
* Sprint to the elbow.
* Closeout / approach at the elbow.
* Backpedal at an angle to the sideline
* Sprint to the half court jump circle
* Closeout / approach at the jump circle
* Backpedal at an angle to the sideline.
* Sprint to the elbow.
* Closeout / approach at the elbow.
* Backpedal at an angle to the sideline.
* Repeat, going the opposite direction.
* Rest 1 minute and perform the next rep.

Transition 'D'



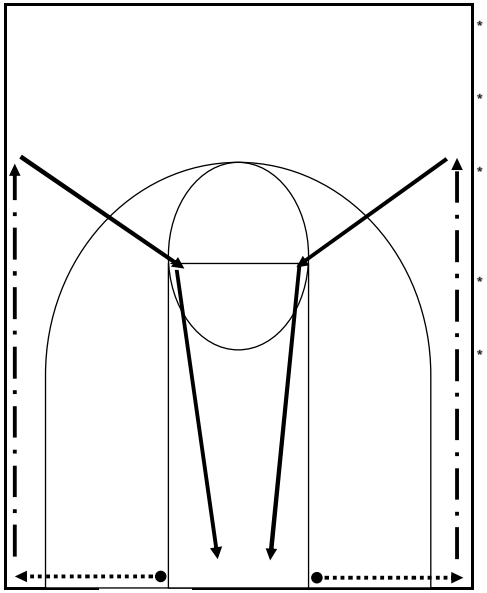
* Start at the baseline.
* Sprint to the area above the three point l
* While running, jumpstop and reverse pivo
* Backpedal to the area above the opposite three point line.
* Defensive slide to the elbow, coach's box and to where the lane line meets the base
* Repeat on the other side to complete 1 re
* Perform 5 reps with 1 minute rest betwee

L - Drill



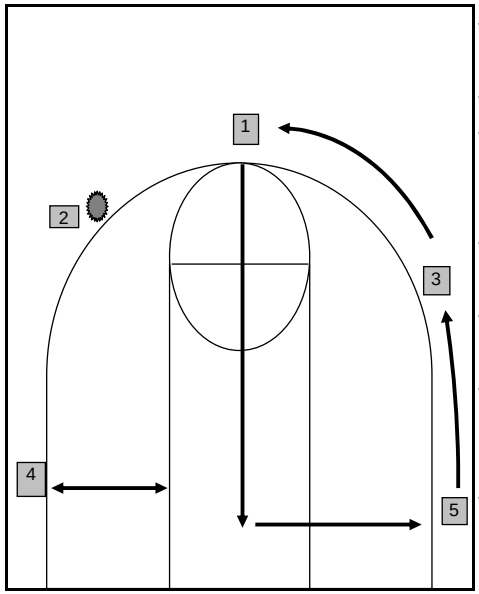
* Start in one of the baseline / sideline corners.
* Sprint to the lane line.
* Slide to the free throw line and back.
* Backpedal to the beginning of the drill.
* Perform 5 reps of the drill with 30 seconds rest between reps, before repeating in the opposite baseline / sideline corner.
* Focus on hard, fundamental slides and staying in great athletic basketball position.

Total Player Run



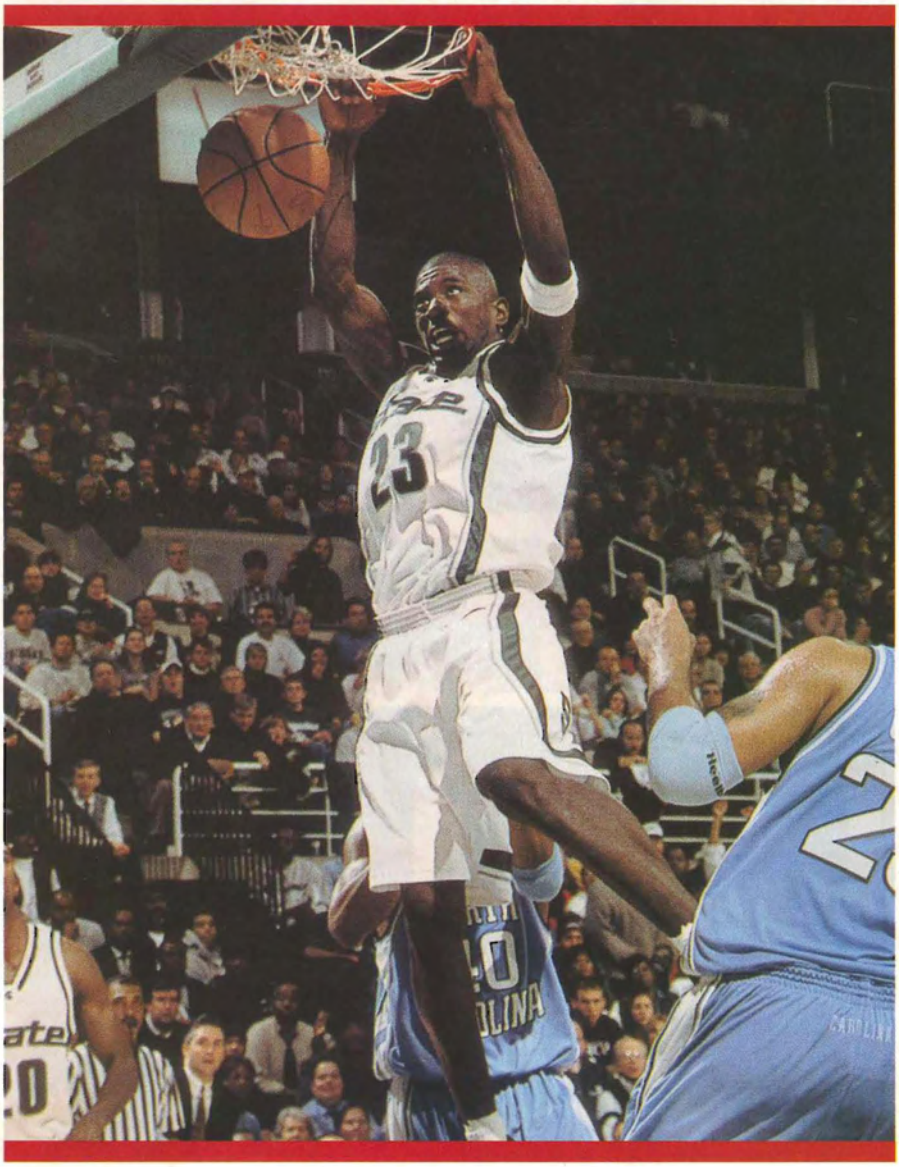
* Begin where the lane line meets the basel and backpedal to the sideline.
* Once at the sideline, slide to the top of t 3 point arc (extended).
* Sprint to the elbow, (receive a pass), cut slash to the basket and dunk, layup, or powerjump.
* Immediately go to the opposite side and perform the drill again.
* Perform 5 reps of the drill with 30 seco rest between reps.

Open Post (5 players)



* Five players will set up at five spots on the court: One at the point, two and three at the wings, four and five at the baselines
* Player 1 will simulate a pass to player 2 and cut to the basket
* Players 3 and 5 will rotate up one spot to fill the void left by player 1. Player 1 will fill the void left by player 5. Player 4 will backdoor
* Player 2 will then simulate a pass to player 3 and cut to the basket.
* Player 4 will rotate up and fill the void left by player two. player 2 will exit the lane and fill the void left by player 4.
* Continue this sequence of pass, cut, and fill. Passes can be made to any spot on the floor and the cut and fill sequence will remain consistent. Always fill opposite of the pass.
* Concentrate on hard fundamental cuts to the basket and to the ball. Make every movement sharp and game-like.

JUMP TRAINING FOR BASKETBALL



BY MIKE VORKAPICH
Assistant Strength/Conditioning Coach, Michigan State University

BASKETBALL COACHES are always coming to us with the question: "How do you improve a player's jumping ability?" Our response is simple: "We jump."

Sure, it's a little more complicated than that, but not by much. We believe in the specificity of training, which means that if you want to improve a skill, you will have to practice it faithfully and regularly.

We're not saying that there are no other exercises that can assist your jumping. Variety, innovation, and the concurrent implementation of adjunct activities can assist in the process. Strength training is, of course, another vital element of the program.

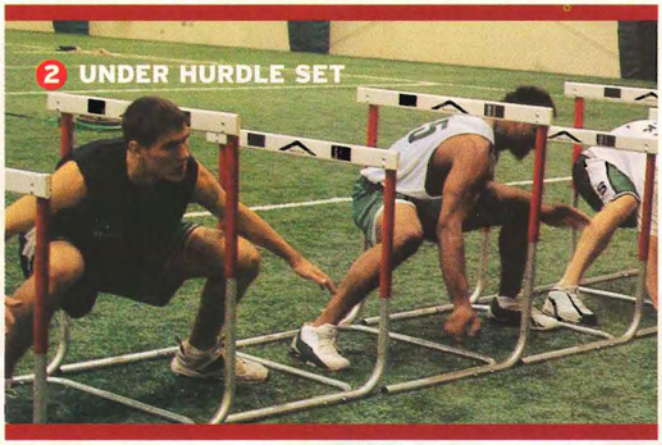
Let's take a step-by-step look at our jump training components.

Dynamic Warm-up/Flexibility

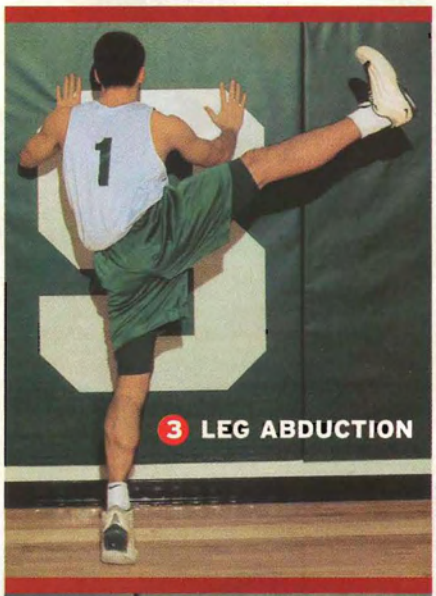
Our basketball teams always begin their workouts with a dynamic warm-up, including a hurdle series (stepping over and under track hurdles—Photos 1&2) and leg swings, which work the leg and hip muscles through a full range of motion.

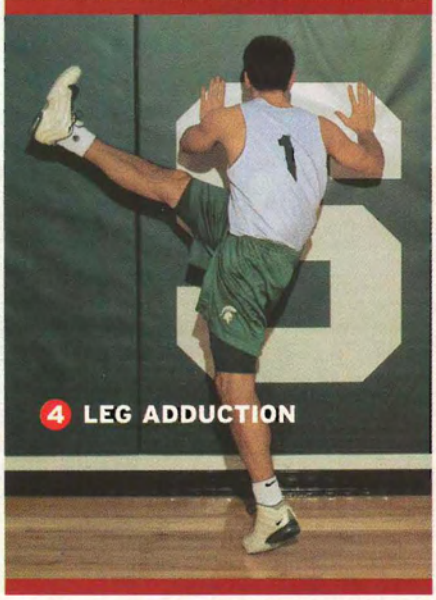
Two different leg swing drills are performed for about 15 seconds apiece:

The first drill is leg abduction/adduction. Stand about arm's length from a wall and place both hands on the wall about shoulder-width apart. Swing the right leg out and away to the side of the body (abduction—Photo 3) and back across the mid-line



MONDAY		WEDNESDAY		FRIDAY
PENDULUM SQUAT	1X10-15	ISO-LATERAL LEG PRESS	1X10-15	JUMP TRAINING
LEG CURLS	1X8-12	LUNGES	1X15EA	+ UPPER BODY
PENDULUM SQUAT	1X10-15	SINGLE LEG SQUATS	1X15EA	
GLUTE/HAM	1X20	OR WALL SIT	MAX TIME	
AVENGER LEG PRESS	1X10-15	GLUTE/HAM	1X20	
HIP ADDUCTION	1X10-15	HIP FLEXION	1X10-15	
SEATED CALF RAISES	1X25	STANDING CALF RAISES	1X100	
		ANKLE DORSI FLEXION	1X30	
+ UPPER BODY		+ UPPER BODY		





of the body (adduction—Photo 4).

Note: It is important to pivot on the ball of the left foot with each swing to obtain a smooth, full-range transition from abduction to adduction. Next, repeat the drill with the left leg.

The second drill is hip flexion/ extension. Start in the same position with both hands on the wall and balanced on the ball of the left foot. Lift the right knee up to chest (hip flexion—Photo 5) and then follow with a kick of the leg backwards (hip extension—Photo 6).

Note: Keep the leg bent at approximately 90 degrees for both flexion and extension.

Strength Training for the Lower Body

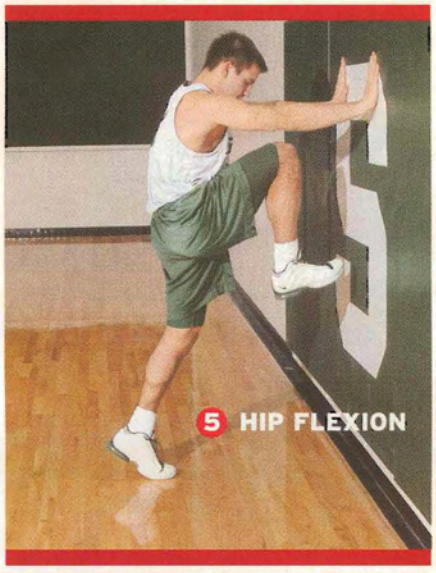
For the most part, our summer strength training is comprehensive. We do it three times per week on non-consecutive days (Monday, Wednesday & Friday). Our lower-body training regimen for basketball players is shown in the accompanying chart.

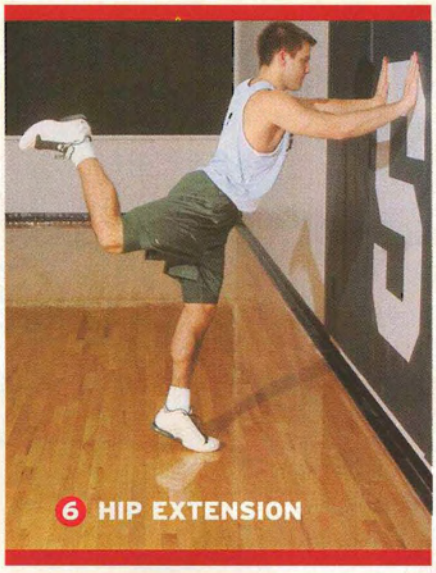
Note: We also work on our upper body on these days (see chart above).

After performing total body workouts in the weight room on Monday and Wednesday, we focus on just the upper body in the weight room on Friday, and then proceed to our jump training.

In addition to fostering the development of the vertical jump, jump training yields such benefits as muscle control and strength critical elements in reducing the risk of knee injury, especially for female athletes.

Note: For further information on a





comprehensive knee injury prevention program for female athletes, contact the Cincinnati Sportsmedicine and Orthopedic Center at (513) 559-2818, web-page: www.cincinnatisportsmed.com.

Pre-training Considerations

Although a program of this nature provides a nice alternative to the regular rigors of the weight room, jump training must be approached with caution and low-intensity drills that gradually progress to the more demanding drills.

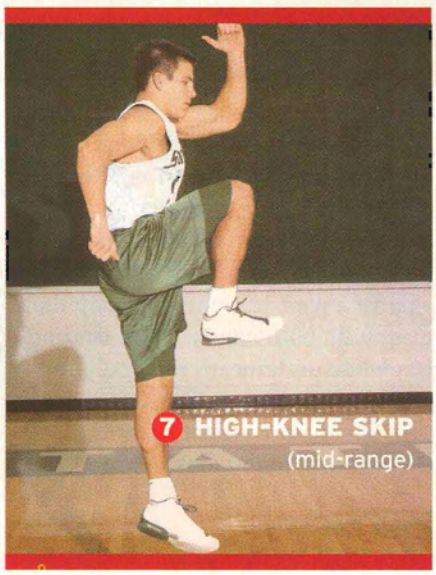
We recommend 4-6 weeks of intense, progressive strength training for the leg, hip, and low-back musculature before initiating the jump-training program. In addition, a physician should clear any athletes with chronic lumbar and orthopedic problems before partaking in such activities.

Surface considerations must always be taken into account in jump training. Softer surfaces are recommended, such as our sand pit and grass or Astro-Play practice fields. The sand pit provides a soft surface, but the texture makes it much harder for the leg and hip muscles to perform the given exercise. In inclement weather, we have the Astro-Play surface to fall back on.

Note: Because of weather conditions, we had to take the accompanying photos on a basketball court. We strongly recommend the use of a softer surface for jump training.

Volume and Progression

In our jump training, we count the number of "foot contacts" throughout the workout. We try to keep them between 70 and 90 early in the off-season. We add about 10 "foot contacts" per week and end the summer with 180-200 jumps.



Drills

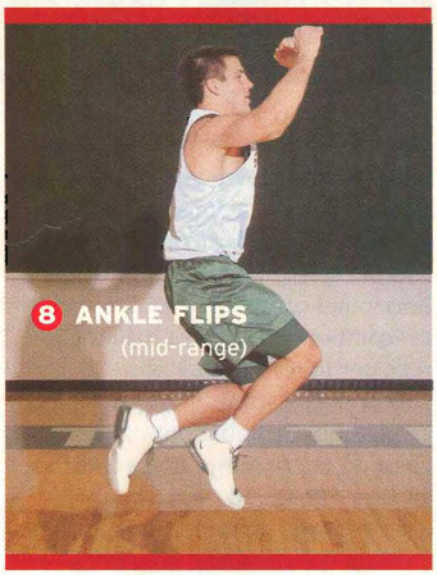
Our basketball teams perform the following drills of varying difficulty, with suggested volume in parentheses:

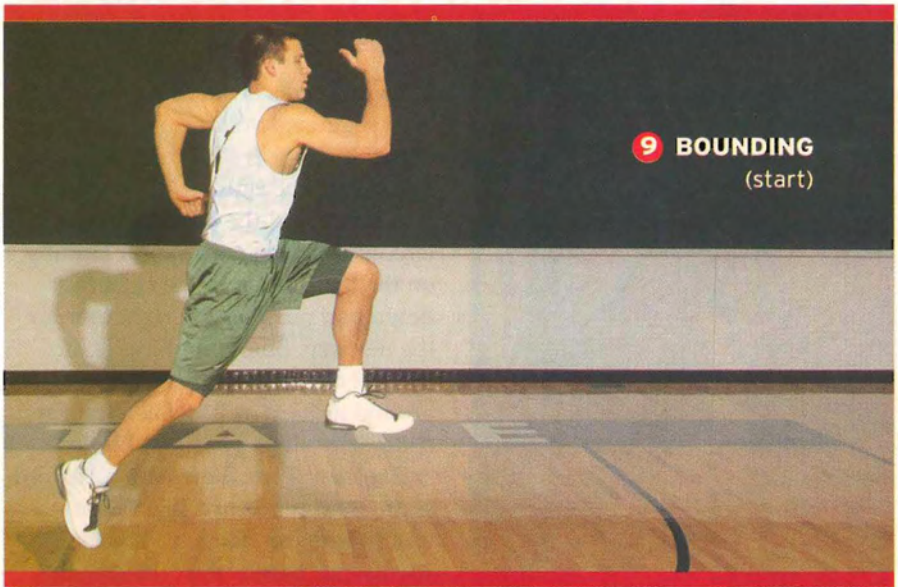
High Knee Skip. Push off the left foot and punch the right knee upward to 90 degrees and the left arm upward (elbows at 90 degrees). After landing on the left foot, snap the right foot down and push off the right foot for the next rep. Since emphasis is on vertical explosion, push off the ground as hard as possible. (Repeat drill for 10 skips per foot.) **Photo 7**

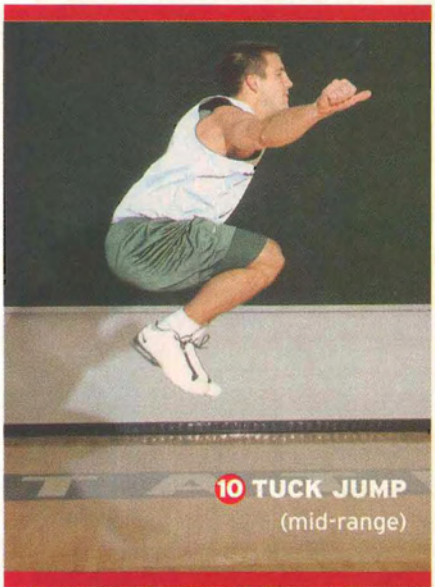
Single Leg Pops. Start with a 10-yard sprint, and perform a low "skimming" jump on one foot. The foot should just barely clear the ground, with emphasis on horizontal speed. (Repeat drill for 10 reps on each leg.)

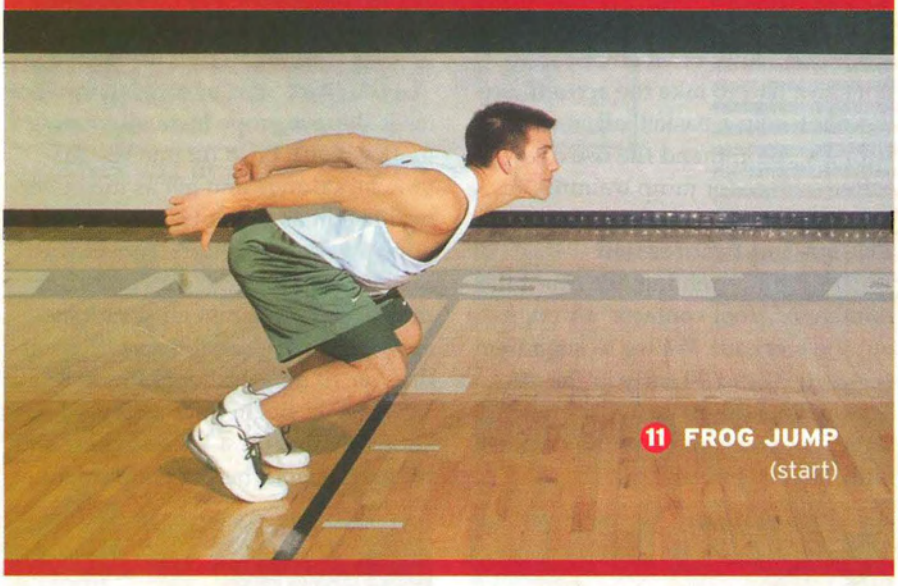
Ankle Flips. Start by jogging in place (as if skipping rope in an alternating foot fashion). Push off one leg, driving toes down, and get as much vertical height as possible. Land on the opposite foot and repeat movement. Remember, goal is to get vertical, so throw both arms into air simultaneously to gain upward thrust. (Repeat drill for 10 reps per foot.) **Photo 8**

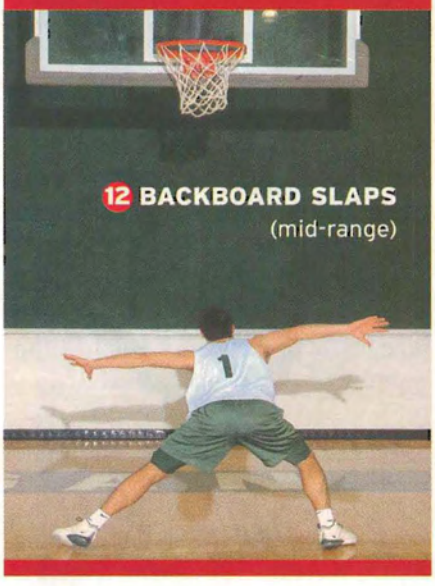
Bounding. Begin with a 10-yard sprint, then drive a knee to chest and try to gain both height and horizon-











tal distance with "hang time." Always land on leg you drove to the chest and use it as push-off leg. This drill is very similar to ankle flips except that you are combining the horizontal component with the vertical component. (Repeat drill for 10 reps per foot.) **Photo 9**

Tuck Jumps. Jump in place as high as possible, bringing both knees to chest on every jump. (Repeat drill for 20 reps.) **Photo 10**

Frog Jumps. Jump forward as far as you can (i.e. standing long jump) and cushion your landing by bending the knees and sinking the hips. (Repeat drill for 20 reps.) **Photo 11**

Backboard Slaps. Usually done on a basketball court, but can be performed against a wall. Jump up and slap the glass with both hands. Upon landing, step-slide underneath rim and jump up and slap glass again. Continue side-to-side movement upon landing. (Repeat drill for 10 reps.) **Photo 12**

Final Rep

Michigan State has led the Big Ten in rebounding for six straight years. This is primarily due to the aggressive manner with which Tom Izzo coaches his players to attack the boards and loose balls. Our jump training program has contributed, albeit as a distant third to toughness and tenacity, to this statistic. ■

SEND YOUR QUESTIONS TO:
Mike Vorkapich, Michigan State University, Duffy Daugherty Building, East Lansing, MI 48824
or via email at **vork@ath.msu.edu**

FOOT LADDER

**Courtesy of Heather Mason, University of Tennessee*

The ladder provides variety in training and is a good tool to develop balance & coordination, speed & foot quickness, as well as agility. The athlete should maintain an athletic position, bent knees, and focusing forward, never touching heels to the ground. Run through the ladder at maximum speed, maintaining control and avoid hitting the rungs. When moving laterally, keep shoulders square and focus forward.

FOOT QUICKNESS PATTERNS

1. **Run One Foot--** Run through the ladder, one foot in each square.

L	**R**	**L**	**R**	**L**	**R**	**L**	**R**	**L**

2. **Run Two Feet**-- Run through the ladder, two feet in each square. After one trip through, switch the lead foot.

L,R	**L,R**	**L,R**	**L,R**	**L,R**	**L,R**	**L,R**	**L,R**	**L,R**

3. **Slalom (run)--** Start on the right side of the ladder. Place left foot into square. Next, place right foot into the same square. Take left foot out of ladder and place on left side of ladder. Then, advance right foot into the second square and place left foot in that same square. Take right foot out of ladder and place on right side of ladder. Advance left foot in third square, etc. **Can be done backwards.**

	3L		**9L**		**15L**
1L,2R	**4R,5L**	**7L,8R**	**10R,11L**	**13L,14R**	**16R,17L**

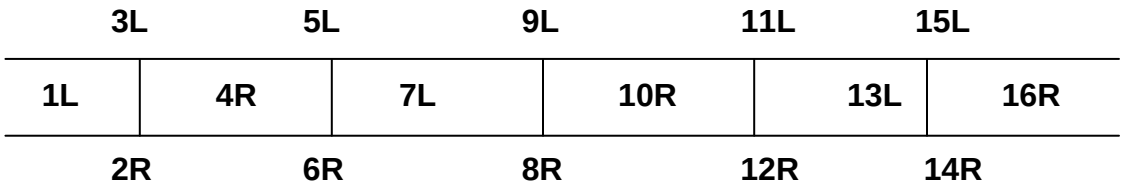
R **6R** **12R**

4. **Out-To-In (2 feet)--** Start with both feet straddling the ladder. Step left foot in first square, then step right foot in first square. Next step left foot out of ladder, then right foot out of the ladder, etc. Alternate lead foot next time through. **Can be done backwards.**

3L	**7L**	**11L**	**15L**	**19L**
1L,2R	**5L,6R**	**9L,10R**	**13L,14R**	**17L,18R**	**21L,22R**

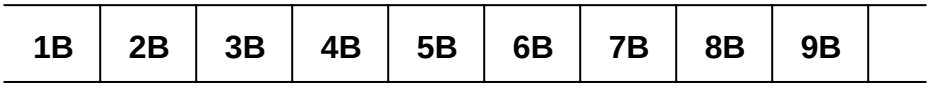
4R **8R** **12R** **16R** **20R**

5. **Out-To-In (1foot)--** Start with both feet straddling the ladder. Step left foot in first square, move right foot up the ladder to the next square but still on the side. Next move left outside the ladder by the second square, then step right foot in the second square. Advance the left foot up the ladder to the third square and move right foot outside the ladder by the third square. Then step left foot into the third square, etc.

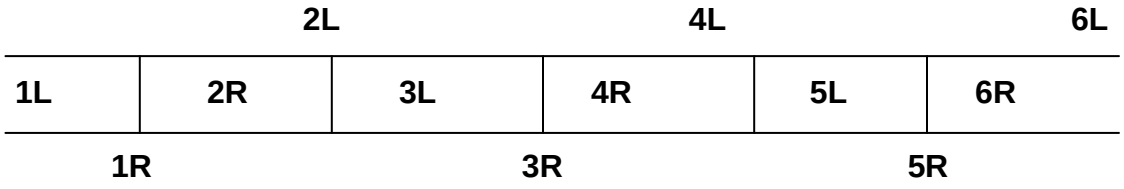


PLYOMETRICS (LEVEL 1)

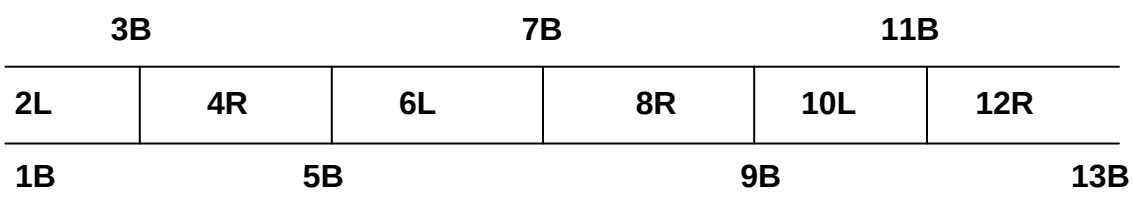
1. **Speed Hops--** Jump with both feet (B) low to the ground, explosive but not high. Stay on the balls of the feet, maintaining good balance and control.



2. **Ice Skater (one foot)-** Jump with both feet, advancing up the ladder, alternating feet in each square.



3. **Ice Skater (two feet)-** Start with both feet outside on the right of the ladder. Jump and land with left foot in first square. Next, jump and land with both feet on the left side of the ladder, then jump and land with right foot in second square. Keep alternating up the ladder—left, right.



LATERAL FOOT PATTERNS

1. **Side Run (two feet)--** If moving to the right, then lead with the right foot. Never cross-over. Alternate directions, so left foot leads also.

2L,1R	**4L,3R**	**6L,5R**	**8L,7R**	**10L,9R**	**12L,11R**

2. **In-In, Out-Out (2 in-2 out)--** If moving to the right, then lead with the right foot. Alternate lead foot (direction in which to move).

2L,1R	**6L,5R**	**10L,9R**	**14L,13R**	**18L,17R**	**22L,21R**
4L,3R	**8L,7R**	**12L,11R**	**16L,15R**	**20L,19R**	**24L,23R**

3. **In, Out-Out (1 in,2 out)--** Advance up the ladder by alternating feet in each square.

1R	**4L**	**7R**	**10L**	**13R**	**16L**
2L,3R	**6L,5R**	**8L,9R**	**12L,11R**	**14L,15R**	**18L,17R**

4. **In-In, Out (2 in, 1 out)--** Moving laterally, lead with the right foot. Step with the left foot in the same square, then step out of the square with the right foot. Advance the left foot in the second square, then step the right foot into the second square. Next step the left foot out. Advance the right foot into the third square, etc. **Whichever foot goes into the square first, is the foot to come out of the square.

2L,1R	**4L,5R**	**8L,7R**	**10L,11R**	**14L,13R**	**17L,16R**
R	**6L**	**9R**	**12L**	**15R**	**18L**

5. **Lateral Cross-overs (left and right)—**When moving to the right, the right foot leads and stays in the ladder (shuffle). The left foot is not moving laterally like the right foot. The left foot is moving forward and backward. Start out saying to yourself, “Right over, Left up, Right over, Left back, Right over, Left up,etc.”

	2L		**6L**		**10L**		**14L**
1R	**3R**	**5R**	**7R**	**9R**	**11R**	**13R**	**15R**
	4L		**8L**		**12L**		


SKILL DEVELOPMENT

SPECIFICITY OF SKILL

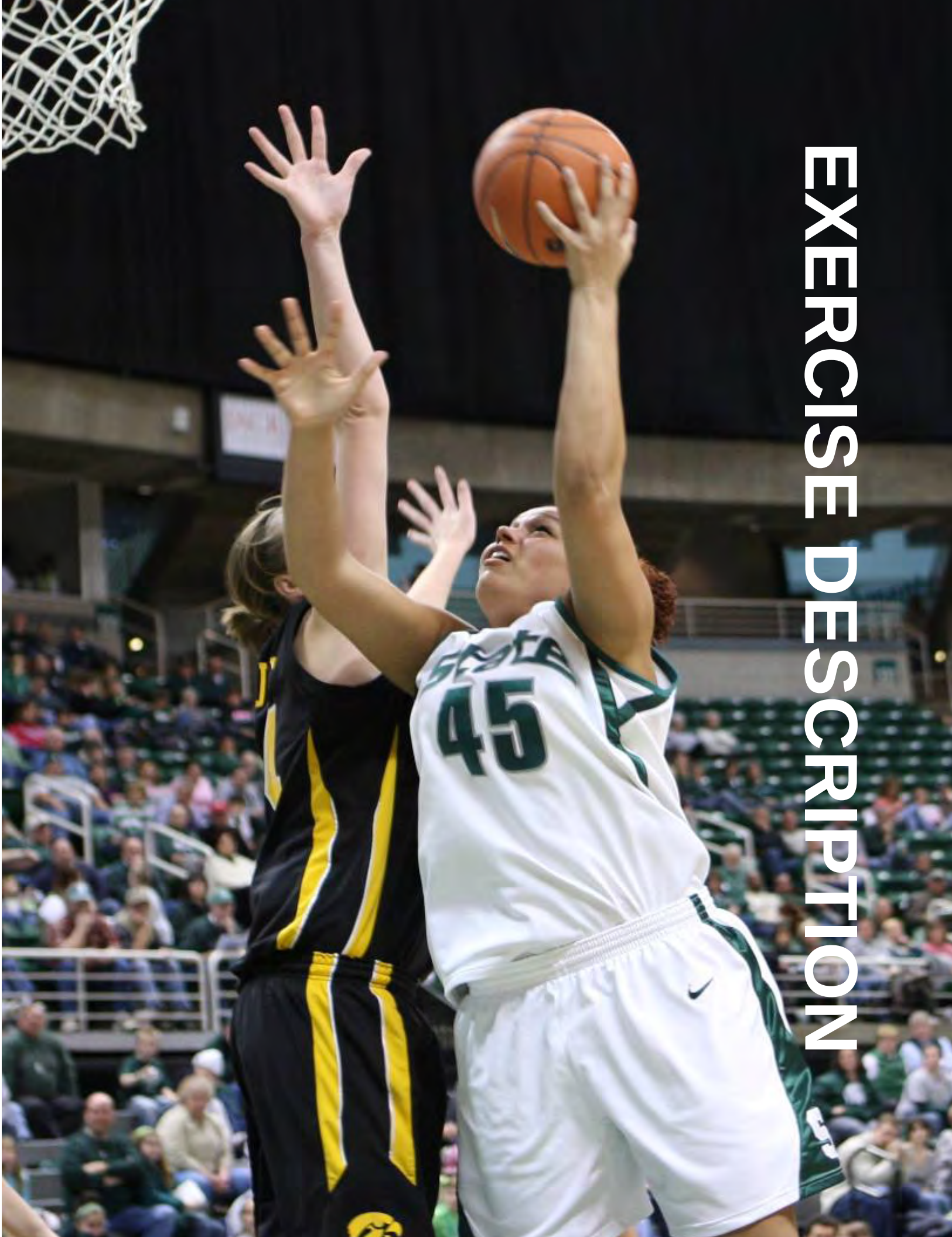
Skill and exercise are two separate qualities. Each must be developed separately. To improve a skill you must practice that specific skill. The motor learning experts now inform us that it's impossible to recreate the neuromuscular pattern used to perform a skill unless that specific skill is performed. As soon as you add resistance to a skill, it becomes a new exercise or a new skill. If you play golf regularly and borrow a friend's driver, you realize how the slightest change can affect skill.

Motor skills can be classified as either “Open” or “Closed”. Athletic skills can be placed on a continuum having what are called “open” and “closed” categories. Open skills involve actions which take place in a temporarily and/or spatially changing environment. The initiation of an open skill can be a visual cue (e.g., the tip of ball), an auditory cue (e.g., an other player call out a play), or some other external stimulus. Open skills are usually “forced-paced” in nature, due to the fact that the performer is required to respond to numerous types of feedback and must do so at times when he is “on the run”.

“Closed” skills, on the other hand, usually take place in a stable, predictable environment. Closed skills also have clearly defined beginning and ending points, with feedback playing a minor role on the skill initiated. Bowling, golf, archery, and any type of weightlifting (including competitive weight lifting) are examples of closed skill activities. The execution of these skills is usually “self-paced” in that the performer initiates the movement when he is ready to do so. As you will see, it is important to distinguish between “open” and “closed” skills when designing training programs to teach these skills since skills are specific in nature.

The experts state that there are three types of skill transfer: positive, neutral, and negative. Positive transfer results from the practice of the specific skill. Whatever the skill, you must practice that specific skill to get better at it. Neutral transfer results in no transfer, good or bad, but it won't hinder your skill either. Negative transfer can occur if you perform an exercise or skill similar to, but not identical to, the skill itself. It can actually adversely affect your skill level itself. It's impossible to improve the skills you use to play the game without practicing those specific skills. For this reason we don't try to imitate movements you perform on the field with exercises in the weight room. We don't advocate any of the other wacko ideas we've all had.

Realize that skills are learned and they are rapidly forgotten. They must be performed regularly to be maintained. Why execute skills in the off-season that aren’t performed regularly during the season if they are not designed to help you play the game? It's really simple when you rely on the facts. Strengthen your muscles in the weight room, condition the cardiorespiratory and muscular system, and practice the specific skills you use to play the game.



EXERCISE DESCRIPTION

HIPS, LEGS, and LOWER BACK

BACK SQUAT

Starting Position: Stand with the feet parallel and about shoulder width apart. The bar is placed across the shoulder and behind the neck. The hands grasp the bar during the exercise in order to balance and control the weight.

Movement: Lower the buttocks until the thigh is parallel to the floor, pause and return to the starting position. Do not allow the shoulders to drop forward. Remain in a position with the shoulders back and chest up throughout the movement. Pick a spot to look at that will help keep the head up.

Value: Develops quads, gluteus maximus and spinal erectors.

LEG PRESS – Hammer Strength

Starting Position: Adjust the seat so that the legs are in a parallel squat position (knees flexed to 90°). Hold the handles or the seat at the side of the body.

Movement: Extend the legs with out hyperextending at the knees. Do not lift the buttocks from the seat.

Value: Develops quadriceps and gluteus maximus.

Precaution: Be sure seat is safely locked in place.

LEG EXTENSIONS

Starting Position: Seated with the knees flexed.

Movement: Extend the knees through a full range of motion. Pause at the top of the range and return to starting position.

Value: Develops the quadriceps.

LEG CURLS

Starting Position: Lie face down with legs straight.

Movement: Flex the knees while keeping the hips down. Be sure to go the full range of motion on each repetition.

Value: Develops the hamstrings.

CALF RAISES

Starting Position: Place the weight across the back of the shoulders. Stand erect with the balls of the feet on a board 2-4 inches in height.

Movement: Rise up on the toes as high as possible and resume to the starting position. The drop of the heel should result in a stretching of the calf muscles.

Value: Develops the gastrocnemius muscle.

BACK EXTENSIONS

Starting Position: Secure the feet and support the hips so that the upper body hangs over the support. A regular bench can be used with a partner sitting on the back of the legs. The hands should be clasped behind the head.

Movement: From the down position, extend the head, arms and shoulders toward the ceiling. Raise the torso parallel to the floor. Return in a controlled manner to the starting position.

Value: Develops the spinal erectors.

Precautions: Do not hyperextend during this exercise.

ABDOMINALS

SIT-UP

Starting Position: Lay on the back with the knees flexed. The arms should be crossed over your chest.

Movement: Start by flexing the chin to the chest, curl the upper body and contract your abdominals until your shoulder blades are off the ground. Pause, remaining under control and return to the starting position.

Value: Develops the abdominal.

Precautions: Always have the knees bent. Avoid doing this exercise with the legs straight.

Variation: For increased strength development it may be necessary to do this exercise with the increased resistance. Place a weight over the chest by grasping the weight with your hands.

SIDE CRUNCH

Starting Position: Athlete lies on her side with waist at the end of a padded bench. A partner stabilizes the lower body by holding down the ankles.

Movement: With the hands behind the head the athlete lowers the body and proceeds to lift the body upward in a sideways fashion. The action can be thought of as lifting the elbow upward without rotating the body upward or downward during the sit-up motion.

Value: Develops the obliques.

CHEST

BENCH PRESS

Starting Position: Lie flat on the bench with knees bent and the feet flat on the floor. Keep the buttocks and shoulder blades in contact with the bench. The bar is held in the arms extended position. Find a grip that is comfortable. It should not be too wide. A good rule is to grip the bar 6-8 inches wider than the width of the shoulders.

Movement: The bar should start above the shoulders and be lowered to the letters on your shirt (chest). Do not bounce the bar and return it to the starting position. The motion upward should give the sensation of pushing back toward the shoulders and not toward the waist. Do not arch the back. Stay in a stable position.

Value: Develops the pectoral muscles, anterior deltoid, and the triceps.

Variation: Exercise can also be done with dumbbells. Variation can be added with a change is grip width (closer or wider).

INCLINE BENCH PRESS

Starting Position: Lie flat on the incline bench with the feet flat on the floor. Head, chest and buttocks should remain in contact with the bench. The grip should be 6-8 inches wider than the width of the shoulder.

Movement: The weight is lowered to the chest about 2 inches above the nipple line. Do not place the bar too close to the neck. This will hand cuff the movement. The bar should take a path from the chest to back over the shoulders.

Value: Develops pectorals, anterior deltoid and tricep.

Variation: Exercise can also be done with dumbbells.

FLYS

Starting Position: This exercise can be done on the regular or incline bench. Assume the same position on the bench. Start from a position with the arms over the chest and slightly bent at the elbow. The palms should be facing each other.

Movement: Lower the weights to below the level of the chest and return to the starting position.

Value: Develops outer chest.

DIPS

Starting Position: Support the body with the arms extended between two bars. The legs can hang straight or be crossed.

Movement: Lower the body by bending the elbows until the upper chest and shoulder areas reach the bar.

Value: Develops outer lower chest and tricep.

UPPER BACK

PULLDOWNS

Starting Position: Use a shoulder-width overhand grip. The body is in a kneeling or seated position. The arms should be extended.

Movement: Pull the bar down behind the neck until it touches the back of the shoulders. It may be helpful to have someone hold down on the shoulders or have the knees under a bar to prevent being lifted off the ground.

Value: Develops the latissimus dorsi.

Variation: Exercise can also be done by pulling the bar down towards the chest (i.e., in front). Variation in grip styles is another (i.e., wide to close, overhand to underhand grips).

BENT OVER ROW

Starting Position: Bend at the waist with the knees slightly flexed. The head should be up and the back slightly above parallel. The hands should be in an overhand grip about shoulder width apart. The arms should be straight when lifting the weight from the floor.

Movement: Pull the bar up into the waist by bending and leading with the elbows.

Value: Develops the latissimus dorsi.

Variation: Exercise can also be done with dumbbells or pulley cables.

SHOULDERS

MILITARY PRESS

Starting Position: Stand erect and take a shoulder width grip with the hands turned away (pronated grip). The bar should be at shoulder width.

Movement: Press the weight above the head in a position that is over the mid-line of the shoulders and hips. Do not arch the back or use the legs. This is not an exercise that is a power type lift. The head should remain in a neutral position and the bar should pass in front of the nose. Return to the starting position.

Value: Develops the anterior deltoid and medial deltoid.

Variation: Exercise can be done either standing or seated and with a barbell or dumbbells.

LATERAL RAISES

Starting Position: Standing erect, place the arms at the sides of the body with a pronated grip.

Movement: With the elbows slightly bent, raise the weights from the sides to about shoulder level. Palms should be turned toward the floor. Return to the starting position.

Value: Isolates on the medial deltoid.

FRONT RAISES

Starting Position: Standing erect with a pronated grip, place the dumbbells in front of the body touching the thighs.

Movement: With the elbows slightly bent, raise the weights to shoulder height and return to the starting position.

Value: Isolates on the anterior deltoid.

BENT OVER RAISES (REAR DELT)

Starting Position: Flex at the knees with the knees slightly bent and the back just above parallel with the floor. Keep the head up. The arms are hanging in front with the dumbbells turned toward each other.

Movement: Raise the weights to the side with the palms turned toward the floor. Return to the starting position.

Value: Isolates on the posterior deltoid.

UPRIGHT ROW

Starting Position: Stand erect with the arms extended downward. Grasp the bar with an overhand grip (the palms facing the body) with the hands spaced 6 inches apart.

Movement: The bar is kept close to the body. Raise the bar until it touches the chin. The elbows should lead the movement and be above the level of the hands.

Value: Develops the anterior deltoid and the trapezius muscles of the upper back and neck region.

SHOULDER SHRUG

Starting Position: Use an overhand grip with the hands approximately shoulders width apart and the bar hanging at arms length. Stand erect with the head in a neutral position.

Movement: Shrug the shoulders to the ears, pause and rotate backward to the starting position.

Value: Develops the trapezius muscles.

TRICEPS

TRICEP EXTENSION

Starting Position: Lie flat on the bench with knees bent and the feet flat on the floor. Keep the buttocks and the shoulder blades in contact with the bench. The weight is held with the arms extended over the chest.

Movement: While keeping the upper arm stationary, lower the weight in an arc until it ouches the forehead. The weight is then pressed upward until the elbows lock at the starting position.

Value: Develops tricep.

Precautions: Do not allow the elbows to flare out. Raise and lower weight in a slow manner to prevent hitting the fore head with the weight.

BENCH DIP

Starting Position: Place two benches or chains about four feet apart. Be sure they are stable. Place the heels on one and the arms in an extended position on the other.

Movement: Lower the body under control until the upper arm is parallel with the floor, then return to the starting position. To increase the intensity place a dumbbell or weight in the lap.

Value: Develops tricep.

BICEPS

BICEP CURL

Starting Position: Stand erect with the feet about shoulder width apart, knees slightly bent. Grasp the bar with an underhand grip. Keep the hands about the width of the shoulders and rest the bar across the front of the thighs. The back should be straight and the head up.

Movement: Raise the barbell forward and upward until the biceps are completely contracted. Hold the bar at the top of the position. Return slowly to the starting position.

Value: Develops bicep.

Precaution: Keep the upper arms and elbows to the side of the body. The body should not be jerked or leaned backward during the exercise.

Variations: Dumbbell curls are very effective. They allow a greater freedom of movement and reduce the stress on the wrist. This can be performed in either a seated or standing position. Another method to greatly isolate the bicep muscle is to perform the curls on a specially designed platform referred to as a preacher's board". This apparatus restricts both body sway and upper arm movement by using a padded board underneath the elbow. From a seated position, placing the upper arm against the inside of the leg performs dumbbell concentration curls. Allow the arm to be extended. Now perform a curling motion to the shoulder and return to the starting position. NOTE: The low pulley machine can also be used.

MANUAL RESISTANCE

MANUAL RESISTANCE EXERCISE

**Courtesy of Tim Swanger*

Here at **MICHIGAN STATE** we use Manual Resistance (MR) training extensively in all phases of our strength program. MR is an alternative to the more conventional forms of resistance in strength training. The resistance is provided by a training partner, or spotter, rather than a bar or a machine. This style of training could be incorporated into your regular workouts or as the only available training "tool" (out on the field during practice times). MR has definitely proven itself as a valuable form of strength training.

ADVANTAGES OF MANUAL RESISTANCE

Some of the more obvious advantages to using MR include:

1. **No equipment is required to perform the exercises**.
   Since no equipment is needed these exercises can be performed anywhere at anytime. Waiting to use equipment is no longer a problem with MR.

2. **Large numbers of individuals can be trained simultaneously.**
   Two people or two hundred people can perform the exercises simultaneously. One person exercises while the other supplies the workload.

3. **The muscles can be worked maximally with each repetition.**
   Maximum resistance can be obtained during the raising and lowering phase of each repetition. If the lifter can raise 80 lbs. on the first rep, the spotter can apply 80 lbs. worth of resistance. If the lifter can lift 5 lbs. of the last rep, the spotter can accommodate this decreasing strength level accordingly. Why is this an advantage? Because it reduces the level of strength closer to the point of zero. More of the muscle is brought into play, thereby causing a greater overload.

4. **The speed of the MR exercise can be controlled.** The rate of resistance during the raising phase will be dictated by the amount of resistance applied by the spotter.

DISADVANTAGES OF MANUAL RESISTANCE

With all of its advantages, MR also has some distinct disadvantages. By recognizing the limitations of MR, it can help provide a safer and more effective form, along with a better understanding, of the exercise. The 5 major limitations of MR include:

1. **Two people are needed to perform any MR exercise.**
   A lifter and a training partner to apply the resistance are required to perform each exercise.

2. **The lifter must learn how to perform each exercise.**
   Before maximum gains can be obtained, the lifter must learn how to perform each exercise and also learn how to coordinate the exercise with the spotter.

3. **The spotter must learn to how to safely and effectively apply the resistance.**
   The spotter's job is even more difficult than the lifter's. Remember, it is the ability of the spotter that dictates the quality of the exercise. There is a specific skill required. Some spotters develop a high skill level to spot effectively, while some develop lower skill levels. An educated lifter will immediately notice the skill level of the spotter. A lower skill level will obviously decrease the effectiveness of the exercise.

4. **The lifter may be significantly stronger than the spotter.**
   The weaker spotter has four alternatives while applying resistance to a lifter who is significantly stronger:

   A. Additional resistance can be held by the lifter (books, weights, etc).
   B. Allow 2–4 seconds for the raising phase instead of 1–2 seconds.
   C. Allow 2 seconds to lower the resistance instead of 4 seconds until the lifter has reached an adequate fatigue level.
   D. Perform the exercise one leg or arm at a time.

5. **Accountability.**
   With MR you cannot record and evaluate strength gains as you can with a barbell or machine. You are forced to relay upon your spotters to do their job. When they do, the lifter will be assured of gaining strength.

RESPONSIBILITIES OF INSTRUCTOR

Sure, there are limitations to MR. However, these limitations can be overcome by instructors who are willing to invest a little time in developing the ability to teach these exercises and in providing as much supervision as possible during their execution. Instructors should follow the following 3 guideline:

1. **Thoroughly understand the responsibilities of the lifter and spotter.**
   These exercises cannot be spotted and performed in a haphazard manner. If this occurs, the potentially beneficial results from the exercise will be reduced and the risk of injury to the lifter will be increased.

2. **Perform the exercises with another instructor in order to develop the skills needed to spot and perform each exercise.**
   The exact skills to apply the resistance and perform the exercises will not be developed unless the instructor practices what he preaches. Unfortunately, few instructors are willing to actually practice doing the MR exercises. It's obvious to every coach that doing something is better than talking about it.

   Note: There is nothing overly demanding about the skills needed to spot and perform each exercise. However, something will be lost from the instructor to the student, if the instructor does not experience some of the problems encountered with MR.

3. **Minimize the loss in the interpretation of this information from the instructor to the students.**
   The instructor's first responsibility is to adhere to the aforementioned rules. The eventual quality of MR exercise performed by the athlete will be determined by how well the instructor prepares himself and by how well that information is taught. This is not the type of information that is posted on the weight room bulletin board. Initially, constant supervision by the instructor is necessary to eliminate any confusion. Ideally, the instructor should discuss all of the concepts enclosed and then spot each student through the exercises until they have mastered the skills required.

RESPONSIBILITIES OF LIFTER

For MR to be safe and effective, the lifter must assume some responsibilities during the execution of each repetition. These responsibilities include the following 5 rules:

1. **Communication with the spotter is essential.**
   Cooperation with the spotter is needed for smooth and even resistance. Until the spotting and lifting skills have been mastered, the lifter may have to tell the spotter how to provide more efficient resistance. For example, "you're not giving me enough resistance," or "you're pulling to hard in the stretched position."

2. **Exert an all out effort.**
   A submaximal effort will produce submaximal results. The lifter must work as hard as possible if maximum gains are to be obtained. If the lifter exerts an all out effort and the training partner applies the MR correctly, the lifter will be assured of obtaining maximum benefits.

3. **Keep tension on the muscles.**
   The relief of muscular tension for just an instant will allow momentary rest, which will make the exercise less productive

4. **Pause momentarily in the contracted position.**
   If the lifter does not pause momentarily, maximal development of the muscle at each point during that range of motion will not occur. If the lifter does not concentrate on pausing in the contracted position, there will be a bouncing effect or recoil from the raising to the lowering phase. A good guideline to follow is to hold any contracted position for a count of 1001.

5. **Allow only 4 seconds for the lowering phase**.
   During the lowering phase of some exercises, the lifter may be capable of exerting more force than the spotter can apply during the first few repetitions. The lifter must cooperate with the spotter and perform the lowering phase of the exercise evenly and smoothly. If he so desired, the lifter could stop at any point of the lowering phase, not allowing the spotter to push him down. This makes the exercise less effective and also could invite injury. Remember that in each succeeding repetition, the lifter will fatigue and grow weaker. Eventually the spotter will be capable of applying more than enough resistance during the lowering phase. Until this point is reached, the lifter must cooperate with spotter during the lowering phase.

RESPONSIBILITIES OF SPOTTER

The effectiveness of MR exercise is almost totally dependent on the abilities of the spotter. It cannot be emphasized enough how important it is for the instructor to thoroughly educate the athletes. For the exercise to be safe and effective, the spotter should strictly adhere to the following guidelines:

1. **Communication and constant coordination with the lifter is essential.**
   The lifter's safety is the spotter's primary concern. How the spotter applies the MR dictates the quality and safety of the exercise. The spotter should pay attention to the execution of every repetition, making immediate corrections if needed and providing verbal encouragement for motivation.

2. **Vary the resistance of each rep during the raising phase.**
   This is the most difficult aspect of MR to master. The changing positions of the bones and muscles create leverage advantages and disadvantages, which will require more or less resistance by the spotter. The spotter should learn to gradually increase or decrease the resistance accordingly to accommodate these changing "strength curves." The spotter should also be aware that the lifter is gradually fatiguing with each succeeding repetition. If the resistance is being applied correctly, the resistance should feel constant to the lifter and should decrease with each repetition.

3. **Smooth transition from raising phase to the lowering phase.**
   The spotter cannot make a sudden change from the raising to the lowering phase or the lifter will be unable to hold the contracted position momentarily. He will not make a smooth transition. There will be a sudden drop which wouldn't allow the muscle to be exercised maximally at each point. It may also invite injury.

4. **Add more resistance during the lowering phase.**
   The spotter should learn to apply as much resistance as the lifter can resist while allowing 4 seconds to lower the weight. If too much resistance is applied during the lowering phase the lifter would be unable to allow 4 seconds to perform the lowering movement. This could invite possible injury.

5. **Change the angle of resistance being applied.**
   Most muscles contract around an axis of rotation, which in turn pulls the bones to form arc movements. The MR exercise must be supplied to coincide with the changing angles of each arc formed by the muscles involved. The spotter should develop the ability to recognize the correct angle of resistance.

6. **Provide enough resistance to stimulate strength gains.**
   For maximum gains the spotter needs to apply as much resistance as the lifter can exert during the execution of each exercise both during the raising and lowering phases of each repetition.

7. **Do not apply maximum resistance during the first few repetitions.**
   If maximum resistance is applied on the first few reps injury could result. Less than maximum resistance is required on the first few repetitions. This will also help to begin gradually fatiguing the muscles involved. This will decrease the potential for injury because the muscle will be adequately fatigued when the lifter does exert an all out effort.

8. **Do not apply maximum resistance for any exercise in an all out manner during the first few workouts.**
   Gradually increase the intensity of exercise in each succeeding workout until the techniques required for each exercise have been mastered.

9. **Apply less resistance as the lifter approaches the muscle's stretched position.**
   The spotter should sacrifice the application of maximum resistance to gain maximum stretching and prevent injury. It should be a smooth and gradual transition. The spotter is applying too much resistance near or at the stretched position if the lifter:

   A. Doesn't reach a completely stretched position (i.e., stops short)
   B. Feels the need to pull back in the stretched position to prevent hyper-stretching.

PERFORMING MANUAL RESISTANCE EXERCISES

While performing MR exercises, the following guidelines should be used to perform each exercise:

1. Perform 12 repetitions or continuous exercise for approximately 40–70 seconds.
2. Perform only one set per exercise.
3. Allow 4 seconds for the lowering phase (i.e., eccentric phase).
4. Allow 1–2 seconds for the raising phase (i.e., concentric phase).
5. Exercise 2–3 days per week on non-consecutive days.
6. Change the order of exercises regularly.

The most important aspect of MR is knowing the proper way to spot and to lift. All of you have been through our MR program from time to time, but for those of you who might have missed something along the way, here is a quick review of the MR exercises we perform at **MICHIGAN STATE.**

The following 19 exercises will be explained and illustrated on the next few pages:

1. Wall Sit
2. Leg Curl
3. Leg Extension
4. Hip Adduction
5. Hip Abduction
6. Lat. Pulldown
7. Towel Row
8. Chin-Ups
9. Push-Ups (Modified)
10. Dips
11. Bent-Arm Fly
12. Seated Press
13. Rear Delt
14. Lateral Raise
15. Front Raise
16. Upright Row
17. Tricep Extension
18. Bicep Curl
19. Sit-Ups

MANUAL RESISTANCE EXERCISES

1. Wall Sit

Muscle(s) Exercised: Major Muscles of Legs and Buttock

Starting Position: Sit down into a 90 degree position at the knee, pushing the low back into the wall. The arms are to be kept off of the wall in a defensive position.

Movement: Hold seated position for as long as possible without moving.

Spotting: If sandbags are used for extra resistance, the spotter is to make sure the athlete does not fall down by removing the sandbags as needed.

2. Leg Curl

Muscle(s) Exercised: Hamstrings

Starting Position: Lying face down with legs extended and toes pointed.

Movement: Keeping thighs on bench, pull heels as close to buttock as possible. Pause momentarily before returning to starting position.

Spotting: Stand behind the lifter. Grasp lifter's heels for resistance.

3. Leg Extension

Muscle(s) Exercised: Quadriceps

Starting Position: Sitting on a bench or chair so feet do not touch floor.

Movement: Extend left leg upward to the parallel position. Pause momentarily before returning to starting position. Mirror with right leg.

Spotting: Stand or kneel in front of lifter with hands on lifter's left ankle for resistance.

4. Hip Adduction

Muscle(s) Exercised: Adductors (Inner Thigh)

Starting Position: Sit on floor with the arms extended behind body for support. Legs should be flexed at about 90 degrees. Soles of feet are facing each other but remain 3-4 inches apart. Knees are downward and outward as far as possible.

Movement: Raise the knees upward and inward as far as possible. Pause momentarily before returning to starting position.

Spotting: Face the lifter and apply pressure with both hands on the inside upper portion of the knees throughout the exercise.

5. Hip Abduction

Muscle(s) Exercised: Abductors (Outer Thigh and Hips)

Starting Position: Lying on left side with upper and lower body in line.

Movement: Raise the right leg as high as possible. Pause momentarily before returning to starting position. Mirror with left leg.

Spotting: Kneel near the lifter's knee and place the left hand above the knee on the thigh to apply the resistance. The right hand should be placed on the lifter's shoe to hold the foot in place.

6. Lat. Pulldown

Muscle(s) Exercised: Latissimus Dorsi

Starting Position: Sit with arms extended upwards with elbows bent and pointed outwards. Forearms above head.

Movement: Pull elbows downward towards side of body. Pause momentarily before returning to starting position.

Spotting: Stand behind lifter. Hands grasping lifter's elbows for resistance.

7. Towel Row

Muscle(s) Exercised: Latissimus Dorsi

Starting Position: Sitting on row machine with chest on the pad, arms fully extended, grasping both towel ends.

Movement: Keeping elbows parallel to floor, drive outward and backwards to a position slightly behind upper body. Pause momentarily before returning to starting position.

Spotting: Stand while facing the lifter, with staggered stance for base of support. Grasp inside portion of towel to apply resistance.

8. Chin-Ups

Muscle(s) Exercised: Latissimus Dorsi and Biceps

Starting Position: Grasping overhead bar with arms and body fully extended. Palms facing towards body.

Movement: Bend arms, pulling body upward until chin is above bar level, while keeping your chest pointed upward. Pause momentarily before returning to starting position.

Spotting: Pull on the lifter's hips to provide additional resistance if the lifter is capable of performing more than 12 repetitions.

9. Push-Ups

Muscle(s) Exercised: Chest, Shoulders, and Triceps

Staring Position: Assume the push-up position with only feet and hands touching the floor with the body straight. When no longer able to properly perform another repetition drop to the hands and knees position, keeping the toes off the ground. Hands should be out in front of the shoulders.

Movement: Lower the chest (Do not touch thighs or abdomen) to a position just short of the floor. Pause momentarily before returning to starting position.

Spotting: (Optional) Straddle the lifter and place both hands on the upper back to apply resistance. Ideally the lifter must fail in the hands and knees position.

Modified Push-Ups

Movement: Same as push-ups except the lifter performs the exercise on her knees when a regular push-up cannot be performed.

10. Dips

Muscle(s) Exercised: Pectorals, Deltoids, and Triceps

Starting Position: Mounted on the dip bars with arms extended and legs bent to provide full range of motion during the lowering phase.

Movement: Bend the arms, lowering the body just enough is break parallel with the tricep. Pause momentarily before returning to starting position.

Spotting: Pull on the lifter's hips to provide additional resistance if the lifter is capable of performing more than 12 repetitions.

11. Bent-Arm Fly

Muscle(s) Exercised: Pectorals and Anterior Deltoid

Starting Position: Lying face up on a bench or floor. Place feet on floor and interlock fingers behind head.

Movement: Bring elbows upward and inward together above face. Pause momentarily before returning to starting position.

Spotting: Stand or kneel directly behind lifter's head. Place hands, outer wrist or forearms on inside of lifter's elbows to provide resistance.

12. Seated Press

Muscle(s) Exercised: Deltoids

Starting Position: Sit with arms bent upward holding a broomstick and allow upper body to lean back slightly against the end of a bench for support.

Movement: Extend arms upward. Pause momentarily before returning to starting position.

Spotting: Grasp broomstick and apply the resistance.

13. Rear Delt

Muscle(s) Exercised: Posterior Deltoid

Starting Position: Lying face down with head and shoulders hanging off the end of the bench. Arms are crossed and hanging down at a 90 degree angle.

Movement: Raise arms (elbows) sideward and upward to a position parallel to floor. Pause momentarily before returning to starting position.

Spotting: Standing at lifter's head and bent at the waist. Place hands on the back of the lifter's forearms to apply resistance.

14. Lateral Raise

Muscle(s) Exercised: Medial Deltoid

Starting Position: Stand erect with arms extended to the side with palms facing inward.

Movement: Raise the arms sideward and upward to shoulder height. Pause momentarily before returning to starting position.

Spotting: Stand behind the lifter with hands on back of the lifter's wrist.

15. Front Raise

Muscle(s) Exercised: Anterior Deltoid

Starting Position: Stand erect with feet staggered and arms extended well behind the body. Palms should be facing away (to the rear) from body.

Movement: Raise the arms forward and upward to eye level. Pause momentarily before returning to starting position.

Spotting: Stand facing the lifter with hands on back of lifter's wrist. Spotter will need to move closer to lifter in starting position and move away from lifter during the movement.

16. Upright Row

Muscle(s) Exercised: Deltoids, Trapezius, and Biceps

Starting Position: Sit on an incline bench or stand with arms extended downward holding a towel with both hands. A closer grip with palms facing towards the body should be used. Head is looking straight ahead.

Movement: Pull towel upward touching under the chin. Pause momentarily before returning to starting position.

Spotting: Sitting under the lifter. Look upward and with hands grasping both ends of the towel to provide resistance.

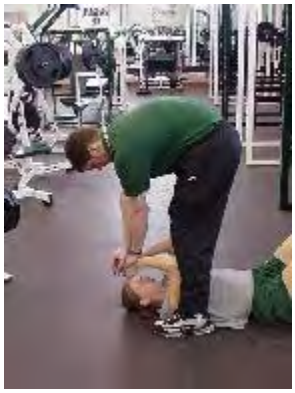
17. Tricep Extension

Muscle(s) Exercised: Triceps

Starting Position: Lying on back with arms bent and elbows pointed upward. Hands grasping one another. Upper arm must remain perpendicular to body throughout exercise.

Movement: Raise forearm forward and upward until arm is fully extended. Pause momentarily before returning to starting position.

Spotting: Straddle lifter with a bent waist position. Lifter's elbows should be resting on lower leg, for stabilization. Grasp lifter's hands to provide resistance.



18. Bicep Curl

Muscle(s) Exercised: Biceps

Staring Position: Sitting down in a preacher becnh with fingers clasped together or broomstick/bar hanging downward. Arms are fully extended with palms facing upward.

Movement: Raise the bar forward and upward contracting the biceps. Pause momentarily before returning to starting position.

Spotting: Stand facing the lifter while grasping the lifter's hands or the bar above the lifter's hands. Palms facing downward.


19. Sit-Ups

Muscle(s) Exercised: Abdominals

Starting Position: Lying face up on floor and place lower legs under a bench, to form a 90 degree angle between upper body and lower body. Fold arms across chest and lift head off floor.

Movement: Bring torso upward and inward toward legs. Pause momentarily before returning to starting position.

Spotting: Stand or kneel directly behind lifter and grasp lifter's shoulders to provide resistance.


NUTRITION

NUTRITION FOR PERFORMANCE & HEALTH

Brought to you by SNAPP

Spartan Nutrition & Performance Program

Scott Sehnert, MS, RD, CSCS; Program Coordinator;
Joe Carlson, PhD, RD; Program Director

Being a part of the Michigan State University women's basketball team requires discipline in the classroom, on the court, in the weight room, *and* the foods you put on your plate. To excel as a student athlete it is essential that you properly fuel your mind and body. This will not happen with a magical powder or pill, but rather with a consistent balanced approach including the amount of food, the quality of these foods, and the timing of your intake. Properly fueling your body will help you perform optimally in the classroom, weight room, and on the court. The following are guidelines to help you achieve peak performance and optimize your short-and long-term health. This includes strategies for losing excess fat weight, or adding lean muscle weight, meal planning and snack selection, timing of intake, as well tips for reading labels.

Nutrition 101

The calories or energy we get, come from food. Food components that supply energy include carbohydrates, protein, fat, and alcohol. Carbohydrate and protein both have 4 calories per gram, fat contains 9 calories per gram and alcohol has 7 calories per gram. Water and other nutrients called micro-nutrients which include vitamins and minerals, contain no calories, however are essential for the body to function normally. One of the keys of good nutrition for sports performance and health is to focus on *nutrient density*. ***Nutrient density*** refers to the amount of nutrients you are getting per the amount of food you are eating. For example a glass of 100 percent orange juice would be more nutrient dense than a glass of soda. Below is a summary of the key nutrients that give us calories (energy).

Carbohydrates (CHOs) (4cals/g)

Types:
Simple: sugar, sweets, candy, soda
Complex: Cereals, pasta, rice, potatoes, breads, fruits, veggies

Functions: Stored as glycogen in muscle and liver and is an important fuel during exercise. Storage is limited so needs to be emphasized in diet.

CHOs are the best fuel for moderate & high intensity exercise and also fuels the brain. Important for recovery & to help with muscle building. Complex CHOs contain essential vitamins, and minerals.

Amounts: 55-65% of total calories. 2.7 grams / pound body weight or 3.6-4.5g during heavy training and competition. 190 pounds x 2.7 = 513 grams of carbohydrate

Fat (9 cals/g)

Types:
Unsaturated fat (liquid at room temp) "healthy fats": Vegetable oils i.e. canola & olive oil, nuts, seeds, fish oil
Saturated Fat (solid at room temp.) "unhealthy fats": Butter, lard, full fat dairy products, coconut oil.

Functions:
Is the primary fuel we burn at rest & during low intensity exercise. Also is a fuel during moderate intensity exercise. Liquid fats contain essential nutrients that aid in the health of all cells, helps inflammation and reduces the viscosity /thickness of our blood

Amounts: 20-35% of total calories (emphasize healthy fats)

Proteins (4 cals/g)

Types:
Lean red meat, poultry, fish, eggs, low fat dairy, soy, beans/legumes, nuts, seeds

Functions: Muscles and hormones are proteins. Each protein is made of amino acids. Amino acids are the building blocks for protein synthesis, muscle building & repair.

Note: If you are not eating enough calories or carbohydrate, protein will be used for energy and limit your ability to make new muscle.

Amounts: 15-25% total calories
0.6-0.8 grams per # body weight
Ex) 220 pounds
0.7 grams x 190# = 133 grams
Ex) 286 pound
0.7 grams x 220# = 154 grams

ESTIMATED CALORIC AND MACRONUTRIENT NEEDS

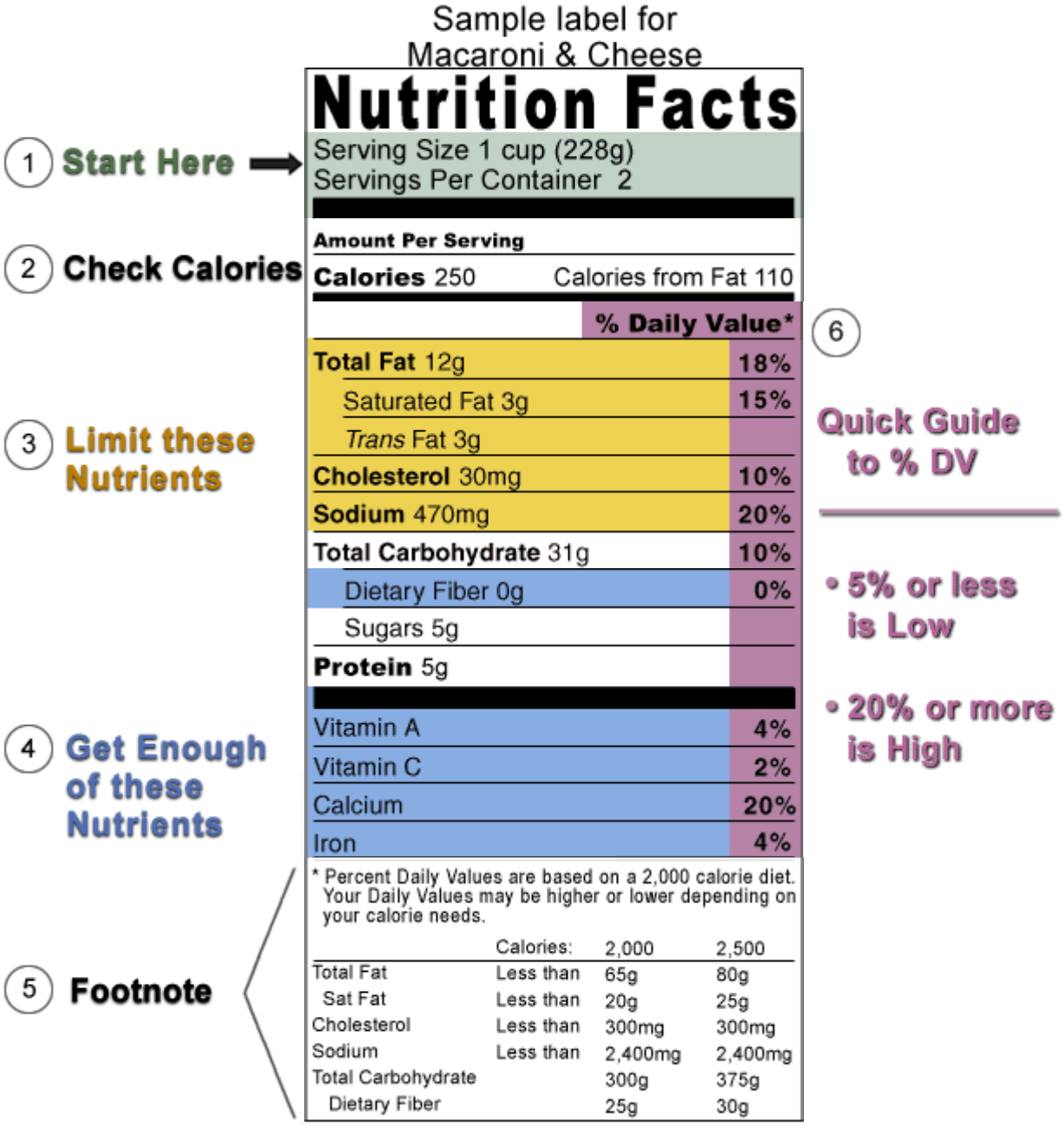
Weight	Calories	Carbohydrate in grams	Protein in grams	Fat (total) in grams	Saturated Fat (max)
140	2900-3400	380 min. 505-630 HT/C[t]	85-110 (125*)	64-115	29-34
150	3100-3600	405 min. 540-675 HT/C[t]	90-120 (135*)	70-120	31-36
160	3300-3900	430 min. 575-720 HT/C[t]	95-130 (145*)	75-130	33-39
170	3500-4100	460 min. 610-765 HT/C[t]	100-135 (155*)	80-140	35-41
180	3700-4300	490 min. 650-810 HT/C[t]	110-145 (160*)	85-150	37-43
190	3900-4600	510 min. 680-850 HT/C[t]	115-150 (170*)	90-155	39-46
200	4100-4800	540 min. 720-900 HT/C[t]	120-160 (180*)	90-165	41-48
210	4300-5000	570 min. 760-940 HT/C[t]	125-170 (190*)	95-170	43-50
220	4500-5300	590 min. 790-990 HT/C[t]	130-175 (200*)	100-180	45-50

[t] Heavy Training or Competition

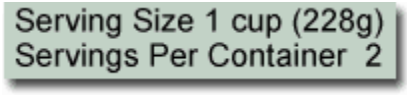
* If restricting calories for weight loss, additional protein is recommended

The above calorie and nutrient levels are specific for basketball players in training. During periods of "down time" (not working out regularly), your calorie and nutrient needs will to be reduced. If your goals are to *lose weight*, a rule of thumb is to reduce calorie intake 250-500 calories per day. To *gain weight,* increase calorie intake 250-750 calories /day. For specific tips on weight gain or weight loss see pages 12 and 13.

TIPS FOR READING FOOD LABELS



1 The Serving Size

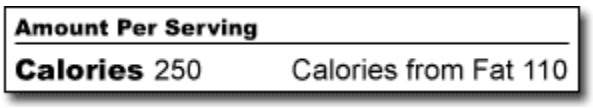


The first place to start when you look at the Nutrition Facts label is the serving size and the number of servings in the package. Serving sizes are standardized to make it easier to compare similar foods; they are provided in familiar units, such as cups or pieces, followed by the metric amount, e.g., the number of grams.

The size of the serving on the food package influences the number of calories and all the nutrient amounts listed on the top part of the label. **Pay attention to the serving size, especially how many servings there are in the food package. Then ask yourself, "How many servings am I consuming"? (e.g.,**

1/2 serving, 1 serving, or more) In the sample label, one serving of macaroni and cheese equals one cup. If you ate the whole package, you would eat **two** cups. That doubles the calories and other nutrient numbers, including the %Daily Values as shown in the sample label.

(2) Calories (and Calories from Fat)



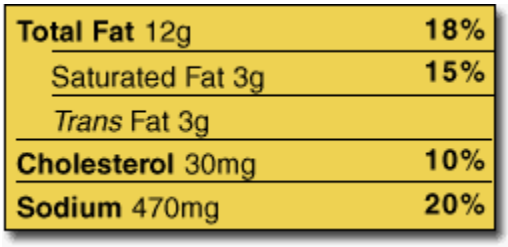
Calories provide a measure of how much energy you get from a serving of this food. Many Americans consume more calories than they need without meeting recommended intakes for a number of nutrients. The calorie section of the label can help you manage your weight (i.e., gain, lose, or maintain.) **Remember: the number of servings you consume determines the number of calories you actually eat (your portion amount).**

In the example, there are 250 calories in one serving of this macaroni and cheese. How many calories from fat are there in ONE serving? Answer: 110 calories, which means almost half the calories in a single serving, come from fat. What if you ate the whole package content? Then, you would consume two servings, or 500 calories, and 220 would come from fat.

(3) (4) The Nutrients: How Much?

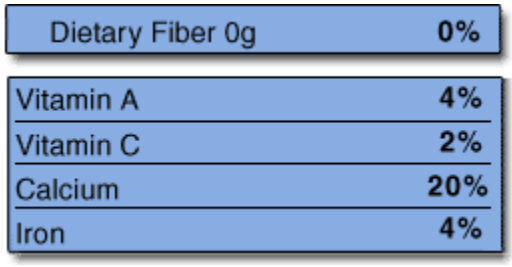
(#3 and 4 on sample label):
Look at the top of the nutrient section in the sample label. It shows you some key nutrients that impact on your health and separates them into two main groups:

Limit These Nutrients



The nutrients listed first are the ones Americans generally eat in adequate amounts, or even too much. They are identified in yellow as **Limit these Nutrients.** Eating too much fat, saturated fat, *trans* fat, cholesterol, or sodium may increase your risk of certain chronic diseases, like heart disease, some cancers, or high blood pressure. ***Important: Health experts recommend that your intake of saturated fat, trans fat (both solid fats) and cholesterol should be consumed in moderation to reduce your risk of heart disease and other diseases.***

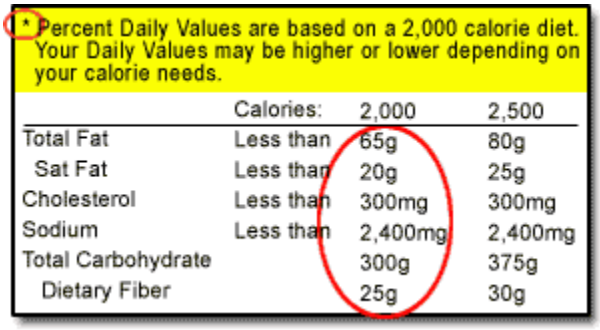
Get Enough of These



Many Americans do not eat enough foods rich in dietary fiber as well the nutrients that are found in fiber rich foods including, vitamin A, vitamin C, calcium, and iron. They are identified in blue as **Get Enough of these Nutrients**. Eating enough of these nutrients can improve your health and help reduce the risk of some diseases and conditions. For example, getting enough calcium may reduce the risk of

osteoporosis, a condition that results in brittle bones as one ages. Eating foods high in dietary fiber including fruits, vegetables grain products, and beans promotes healthy bowel function, and lower risk for heart disease and some forms of cancer.

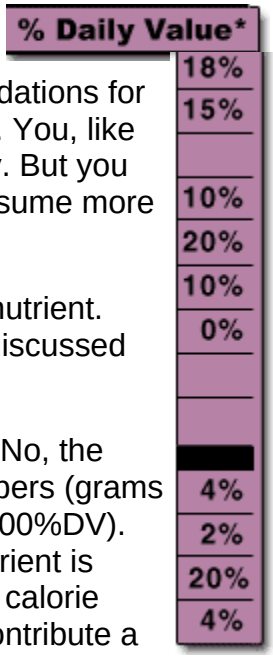
5 Understanding the Footnote on the Bottom of the Nutrition Facts Label



Note the ***** used after the heading "%Daily Value" on the Nutrition Facts label. It refers to the Footnote in the lower part of the nutrition label, which tells you "**%DVs are based on a 2,000 calorie diet**". This statement must be on all food labels. But the remaining information in the full footnote may not be on the package if the size of the label is too small. When the full footnote does appear, it will always be the same. It doesn't change from product to product, because it shows recommended dietary advice for all Americans--it is not about a specific food product.

Look at the amounts circled in red in the footnote--these are the Daily Values (DV) for each nutrient listed and are based on public health experts' advice. DVs are recommended levels of intakes. DVs in the footnote are based on a 2,000 or 2,500 calorie diet. Note how the DVs for some nutrients change, while others (for cholesterol and sodium) remain the same for both calorie amounts. **Keep in mind that if you are greater than 190 pounds and are regularly working out, your calorie (energy needs) are 4,000 or more a day.**

6 The Percent Daily Value (%DV):



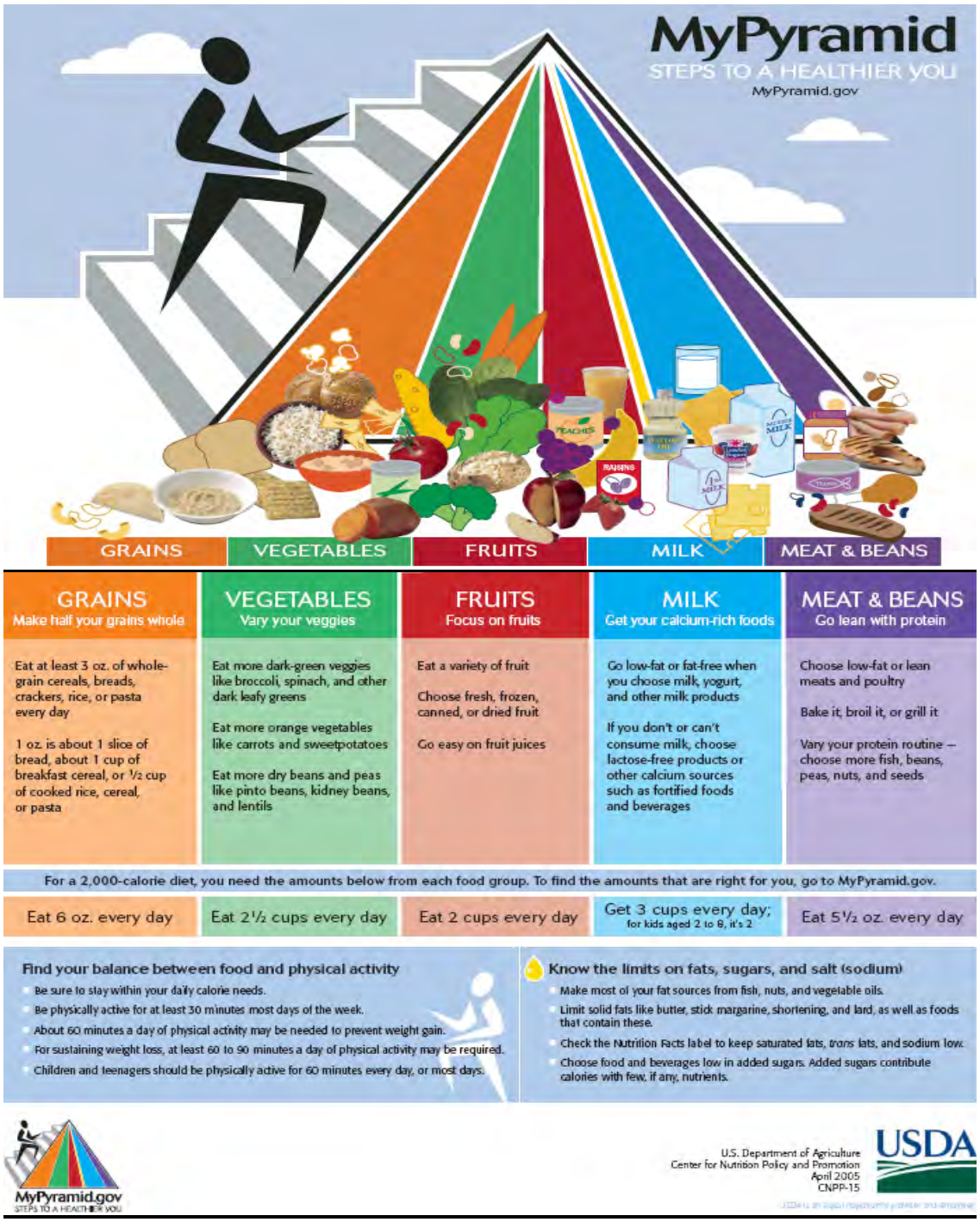
The % Daily Values (%DVs) are based on the Daily Value recommendations for key nutrients but only for a 2,000 calorie daily diet--not 2,500 calories. You, like most people, may not know how many calories you consume in a day. But you can still use the %DV as a frame of reference whether or not you consume more or less than 2,000 calories.

The %DV helps you determine if a serving of food is high or low in a nutrient. Note: a few nutrients, like *trans* fat, do not have a %DV--they will be discussed later.

Do you need to know how to calculate percentages to use the %DV? No, the label (the %DV) does the math for you. It helps you interpret the numbers (grams and milligrams) by putting them all on the same scale for the day (0-100%DV). The %DV column doesn't add up vertically to 100%. Instead each nutrient is based on 100% of the daily requirements for that nutrient (for a 2,000 calorie diet). This way you can tell high from low and know which nutrients contribute a lot, or a little, to your **daily** recommended allowance (upper or lower).

MONITORING YOU NUTRITION HABITS

A tool that is designed help you understand the amount and type of food you need is the USDA My Pyramid. The www.mypyramid.gov website is an interactive tool to help you gauge your food intake by food group and also provides information on the role of food and health. Keep in mind that as Division IA basketball players the amount of food you require is generally much higher than what is recommended on this site. You are encouraged to review the basketball specific calorie and nutrient need recommendations on page 2 of this chapter as well as meal plans on pages 14-23. However, you can then use the mypyramid site to monitor your intake with a daily food log and learn about overall health.



FUELING BEFORE, DURING & AFTER TRAINING & COMPETITION

While the amount and type of food you choose matters for daily refueling, the timing of intake relative to your workouts and competition is also important. In fact, **when you eat** can either help or reduce your exercise capacity. For example, eating a meal a few minutes before a workout will not be digested quickly enough to supply energy to your working muscles and will also likely lead to an upset stomach. However, eating a small snack 30-60 minutes before a workout can be helpful to your performance and recovery. Building a solid routine of pre-training/competition foods and fluids and knowing what to eat and drink before, during, and after training and competition is a key for effective exercise training and successful performance.

EATING BEFORE TRAINING AND COMPETITION

Eating and drinking before training helps to:

- prevent feelings of light-headedness
- minimize fatigue & maximize performance by fueling muscles with CHO
- increase ability to concentrate by fueling the brain
- prevent feelings of hunger and thirst
- helps with recovery including the building of new muscle

Pre-training/game meals- Your meal should be eaten at least ~3-5 hrs before training/games, and should be high in carbohydrate (at least half of the calories), and moderate in protein, and fat. This meal should contain around a ¼ of your total calorie needs for the day. Everyone is different with respect to the exact types and amounts of food they can tolerate before practice or games, but over time you will learn what works best for you. Make sure you are consuming adequate fluids with your meal (2-3 cups /16-24 ounces). (For examples see sample meals at the end of this chapter).

Pre-workout or game snacks - A small snack is recommended particularly before a strenuous or long duration workout, or when you are doing two workouts a day. It is suggested you eat a small snack 30-60 min before training or competition that includes mostly carbohydrate (30-50 grams) a modest amount of protein (7-10 grams) and small amounts of fat. Examples include a bowl of cereal with low-fat milk or a Powerbar/Clif Bar, which contain around 250 calories. A general rule may be that you should never begin your workout thirsty nor hungry! (see 250 calorie snack list for additional examples at the end of this chapter).

FUELING DURING TRAINING AND COMPETITION

For workouts lasting *longer than 60 minutes* or during games and scrimmages, it is recommended to fuel with small amounts of carbohydrate to help maintain exercise intensity (muscle contraction requires carbohydrate), reduce fatigue, cramping, a maintain mental focus. Maintaining hydration is also important, so a sport drink or diluted juice (around 5-8% carbohydrate) is an ideal choice because it is quickly absorbed and replaces fluids and electrolytes (sodium, potassium), in addition to supplying carbohydrates. The key is not to consume a beverage that is too concentrated (soda, or full strength juice) because it will not

be quickly absorbed and will likely lead to an upset stomach. With respect to gels or similar products, practice with these products first during a practice---not a game.

In summary, during exercise:

- Drink 2-4 cups of sport drink (or diluted juice) per hour by drinking 4-8 oz every 15-20 minutes. During high temperatures and humidity you use your water and carbohydrate stores much quicker so make sure to achieve the upper end of these recommendations during these conditions.

EATING FOR RECOVERY & MUSCLE BUILDING AFTER TRAINING/GAMES

Eating after an intense workout or a game is essential for recovery and preparation for your next workout. It helps you replace carbohydrate stores in your muscle (glycogen) and helps repair damaged muscle and build new muscle. This is especially true during two-a-day workouts, when there is a small amount of time between training sessions. If you do not eat a snack or meal after a workout, your body will breakdown your muscle for energy and reduce your muscle mass. This is counter productive. *Eat within 30-60 minutes after training session or competition*. The snack or meal should contain a mixture of carbohydrate and protein and modest amounts of fat. Include at least 70-100 grams of carbohydrate and 20-30 grams of protein (~400-600 calories). Also remember to include fluids. As a rule, drink ~3 cups of fluid per pound of body weight lost during the workout.

SUMMARY OF RECOMMENDATIONS FOR FUELING BEFORE, DURING AND AFTER WORKOUTS OR GAMES

Situation	Timing	Carbohydrate Goals	Protein Goals	Food Examples
BEFORE practice or game (MEAL)	3-5 hours before practice, workout, competition	100-200 g	20-40 grams	▪ 1 cup milk + 2 cups cereal + 1 banana + water ▪ 1 bagel + 2 Tbsp peanut butter + 1 apple + 10 oz milk ▪ 1-2 poached eggs + 2 pieces toast + 1 orange + 10 oz milk ▪ 2 cups of pasta with tomato sauce + ½ cup cottage cheese + H20
Pre-workout or game (SNACK)	30-60 minutes before practice, workout, competition	30-50 g	7-10 grams	▪ 1 sport bar + 1 cup water ▪ 1 fruit yogurt + ½ cup cereal + 1 cup water ▪ 1 bagel + 2 slices turkey with mustard + 1 cup water ▪ 1 cup milk + 1 cup of cereal + 1 cup water
Fueling/Hydrating DURING practice or game	During training sessions & competition lasting longer than 60-90 minutes	Drink 4-8 oz of sport drink or diluted juice every 15-20 min. (1 g/minute or 30-60 g per hr)		▪ 20 – 32 oz sport drink ▪ 16 – 20 oz sport drink + sports gel or bar + water Bars: Luna, Pria, Clif, Powerbar
After workout or games RECOVERY FUEULING (snack or meal)	within 30-60 minutes after training session or game	70-100 g	20-30 grams of protein. No need to exceed 50.	▪ 2 cups sport drink + 1 cup low fat milk + sport bar ▪ 2 cups sport drink + 1 - 2 cups water + peanut butter sandwich ▪ 2 cups sport drink + 1 - 2 cups water + turkey sandwich ▪ 2 - 3 cups water + 1 cup low-fat chocolate milk + 3 graham crackers ▪ 2 cups sport drink + 1 - 2 cups water + 1 fruit yogurt

TIPS FOR MAINTAINING OR IMPROVING BODY COMPOSITION

Energy (calories)
Food containing carbohydrate, protein, and fat provide important nutrients and energy (calories). Your body weight will remain the same if energy intake equals energy expenditure (output). Regardless if you desire to maintain your weight, lose weight or gain weight, the principles summarized above summarizing the timing of intake are important. Additionally the composition of the food intake recommended is similar, only the amounts will differ. General guidelines on food choices are summarized below. Following this you will find specific tips for your body composition goals as well as meal and snack examples.

Choose nutrient dense foods over low nutrient dense foods (empty calories).

- Whole grain bread, pasta, and cereals, brown rice
- Fruits and vegetables
- Lean protein sources including:
  - Lean cuts of red meat, poultry, fish
  - Eggs (if you have high cholesterol, consume in moderation)
  - Bean containing dishes (e.g. rice & beans, beans & corn, chili)
  - Nuts and seeds (if you are trying to lose weight eat in moderation)
  - Dairy products (select low fat sources when possible; if lactose intolerance select Lactaid or soy milk such as Silk)

Decrease foods high in animal fats and trans-fats (saturated/ solid) fat.

- Fried foods (chicken, fish, potato chips, French fries)
- High fat meats (bacon, sausage, ribs, skin on chicken, prime rib)
- Foods loaded with cheese, sauces, and sour cream

Increase foods high in plant fat and fish oils (unsaturated/ liquid fats)

- Nuts and seeds (e.g. peanut butter, almonds, cashews, walnuts)
- Vegetable oils (olive, canola, soybean, safflower &sunflower oils)
- Non-hydrogenated margarine (e.g. Smart Balance)
- Fish
- Selected oils from beans (note: most beans are very low in fat with the exception of soy and garbanzo beans)

Choose your sugars wisely for training!

- Instead of soda choose 100% juice, diluted juice or sport drinks,
- Instead of cakes, cookies, candy bars, & pies choose fresh fruit, dried fruit, yogurt, frozen yogurt, sorbet, reduced fat ice cream, whole grain muffins, energy bars (Clifbar, Powerbar, Harvest bar)

Limit alcohol- excess alcohol impairs protein synthesis and muscle building. It also increases your risk for heart disease and cancer.

EATING PATTERNS FOR TRAINING & PERFORMANCE

Eat breakfast! (or at least a snack if you have an early morning workout)

Breakfast is one of the most important meals for athletes. Training on an empty stomach for an athlete who wants to gain muscle mass is counter productive. Instead of building muscle you will break down muscle for energy.

- Bowl of whole grain cereal, skim milk, banana, almonds, and a glass of juice.
- PB & J sandwich, glass of milk, glass of OJ (or two pieces of fruit)
- 1 whole egg, 3 egg whites (particularly if you have high cholesterol), whole grain toast, butter/margarine or peanut butter, jam, juice or fruit

Eat frequently!

Eating frequently (every ~3 hours) prevents athletes from energy drain and excessive hunger (for specifics on timing of intake see previous section)

- Eat breakfast, lunch, dinner
- Eat several snacks

Depending on body your composition goals, refer to the appropriate section below for tips for guidance on achieving your goals. This information combined with the snack and meal plans that will follow will guide you in selecting a food pattern that will provide you with the proper amounts of carbohydrate, protein, fat and nutrients to fuel your training and game day performances.

WEIGHT MAINTENANCE TIPS

If your goal is to maintain weight or improve your body composition, try to keep a consistent pattern and avoid eating too few calories, or too little carbohydrate or protein. The proper balance and the timing of intake are essential to avoid muscle breakdown and have carbohydrates available to fuel muscles. For a guide on how many calories and the amount of carbohydrate, protein and fat you need see the table on page 2. Also see the sample menus and snack ideas at the end of this section.

WEIGHT GAIN STRATEGIES

If your goal is to gain weight see the tips below and select the appropriate calorie level on page 2, as well as the meal plans and snacks at the end of this section. To achieve weight gain, more calories from food need to be consumed than is expended through exercise and daily activities. A pound of weight is equal to approximately 3500 calories. If your weight is stable and you add 500 extra calories per day you should gain about 1 pound per week. If you gain the weight too quickly (more than 2 pounds/wk) you will be adding more fat than muscle.

Energy (Calories)

Weight gain, and particularly muscle gain, is best achieved by eating nutrient dense calories from carbohydrate and protein with modest amounts of added fat. This must be done in combination with a strength training program, and adequate recovery time.

Key Tips!

*To gain one pound of weight per week, add approximately 500 cal/day (see snack handout or below).

* If you gain the weight too quickly (more than 2 pounds/wk) you will be adding more fat than muscle

* Timing of intake is important--eat several meals and snacks each day. This will ensure adequate fuel (carbohydrate and amino acids) are available for workouts which will also help with recovery and the building of new muscle.

500 Calorie snack examples

- Peanut Butter & Jelly Sandwich + 1 cup 1% Milk
- Bagel + 2 T. Peanut Butter
- Turkey and Cheese Sandwich + 20oz. Sports Drink
- 1 Pita Bread + ¼ cup Hummus or Refried Beans + 1 Banana + 2 sticks String Cheese
- 1 cup Kashi Go Lean Crunch (cereal) + 1 cup 1% Milk + 20oz Sports Drink
- 1oz Nuts + 1oz Dried Fruit + 1oz Tortilla Chips + ½ cup Guacamole

Be creative with your protein sources, choose those with less saturated (solid) fats. If you are eating plant proteins always mix beans with a grain and nuts and seeds with a grain. For example beans and rice, peanut butter with bread.

WEIGHT LOSS STRATEGIES

Energy (Calories)

Your body weight will remain the same when energy intake equals energy expenditure (output). To create a weight loss you need to create an energy deficit and expend more energy than you take in through food.

Weight loss basics: To minimize muscle loss, and have energy to train, you should not lose more than 1-2 pounds per week. A one pound weight loss is equal to a 3500 calorie deficit. To lose 1 pound per week you need a 500 calorie deficit per day (500 cal x 7 days = 3500). You could achieve this by eating 500 fewer cal /day, or eating 250 fewer calories and expending 250 extra calories. A simple way to remove calories from your intake is to remove excess amounts of empty calories in your meals and snacks. Negative side effects of losing weight too quickly include, muscle loss, fatigue, dehydration, and illness are common when using inappropriate methods such as fasting, high protein diets, laxatives, and sweat suits.

KEY GUIDELINES for ACHIEVING WEIGHT LOSS

Choose Nutrient Dense foods that will provide satiety (fullness). See snack & meal examples

- Quality protein sources: Poultry, fish, red lean meat, beans, eggs/ egg whites (moderation on yolks if you have high cholesterol)
- Select fiber and nutrient- rich foods: Whole grain breads, cereals, pasta, brown rice, beans, and lentils
- Select low fat dairy (milk, cottage cheese, yogurt, & cheese), if lactose intolerant try Lactaid or soy (example Silk soy milk, and yogurts)
- Consume whole pieces of fruit rather than drinking large amounts of juice or fruit punch
- Consume a variety of vegetables
- Consume nuts and seeds and other healthy fats in moderation

Reduce the intake of foods with excess fat.

- Fried foods (chicken, potato chips, French fries)
- Biscuits with gravy, croissants
- Cream based soups and sauces (select those made with broth)
- High fat meats (bacon, sausage, ribs, skin on chicken, prime rib)

Lower the amount of added sugar.

- Instead of regular soda replace with flavored water, diluted juice or sports drinks, or diet soda in moderation.
- Instead of cakes, cookies, and pies choose whole grain muffins, fruit, or yogurt.

Limit or avoid alcohol. Alcoholic beverages are high in calories and lead to dehydration. Excess alcohol intake impairs muscle synthesis. Note: 12oz beer or 5oz wine or 1.5oz liquor is ~150 cal.

EATING PATTERNS (see snack and meal handouts for examples)

Eat frequently throughout the day.

- Eating every few hours maintains your energy level and maximizes recovery from training and competition.
- Avoids becoming over-hungry.
- Maintains satiety (fullness) and prevents overeating.

Eat breakfast everyday.

- Jump starts your engine for the day.
- Reduces chances for overeating later in day.
- Ensures a high quality workout.
- Maximizes protein building and carbohydrate storage in the muscle.

Reduce portion sizes of your high-fat and high-sugar choices

- Avoid super-sized meals and drinks.
- Share a meal with a friend or use a doggy bag.
- Focus on nutrient dense choices and you can eat a larger volume of food without excess calories (for example instead of consuming a large cheese burger, large fries and large coke (~1800 cal) select a chicken sandwich with veggies, fruit and a baked potato and you'll have more nutrients and ~500 fewer calories).

Be a mindful eater.

- Do not eat too fast (Once you begin eating it takes approximately 15 minutes for your brain to sense you are getting full).
- Ask yourself if you're hungry before you start eating.
- Focus on eating and enjoy it (minimize TV while eating).

Use the table on the second page of this section to estimate your approximate calories needs. Below are several sample meal plans that will give you an idea of the types and amounts of foods you should consume. Also following the meal plans refer to the list of 250 and 500 calorie snacks.

2500-Calorie Menu 1

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Pancake, 4", fzn	4 each	240	48	7	3	1
Syrup, maple	2 Tbsp	104	27	-	-	-
Blueberries, fzn	½ cup	35	9	1	1	-
Yogurt, low-fat, fruit on bottom	½ cup	110	21	3	1	1
Orange Juice	1 cup	114	27	-	-	-
		603	**132(87%)**	**11(7%)**	**5(7%)**	**2(3%)**
Snack						
Apple	1 medium	72	19	-	-	-
Peanut Butter, crunchy	1 Tbsp	90	3	4	8	1
		162	**22(54%)**	**4(9%)**	**8(44%)**	**1(5%)**
Lunch						
Deli Sandwich: 2 slices whole wheat, 4oz turkey, 1T mayo, 1 slice cheese	1 sandwich	452	33	32	23	6
Carrots, baby, fresh	1 cup	53	12	1	-	-
Milk, 1%	1.5 cups	165	20	13	4	2
		670	**65(39%)**	**46(27%)**	**27(36%)**	**8(10%)**
Snack						
Wheat thin crackers	12 each	110	8	1	2	1
Chocolate Milk 2%	½ cup	95	15	4	2	2
		205	**23(45%)**	**5(10%)**	**4(17%)**	**3(13%)**
Dinner						
Grilled Chicken Breast	6 oz	196	-	36	6	2
Baked Potato	1 med (6 oz)	158	36	4	-	-
Sour Cream, fat free	2 Tbsp	29	5	2	-	-
Chili, con carne, w/ beans	1.5 cups	403	38	24	18	6
Saltine crackers	6 each	71	12	2	2	-
		857	**91(42%)**	**68(32%)**	**26(27%)**	**8(8%)**
Totals		**2497**	**333(53%)**	**134(22%)**	**70(25%)**	**22(8%)**

Menu created by Ashley Meyers, Dietetic senior.

3000 Calorie Menu 1

	Amount	Calories	CHO (g)	Protein(g)	Fat (g)	Saturated fat (g)
Breakfast						
Fiber one	1 cup	120	50	4	2	
Low fat vanilla yogurt	8oz	208	34	12	3	2
All bran muffin	1 each	138	23	3	5	1.2
Orange juice	8 oz	112	23	2		
		578	**130(90%)**	**21(15%)**	**10(16%)**	**3.2(5%)**
Snack						
Mandarin oranges	½ cup	62	15	1		
Low fat cottage cheese	1 cup	162	6	28	1	.7
Wheat crackers	10 each	142	19	3	6	1.6
		366	**40(43%)**	**32(35%)**	**7(17%)**	**2.3(6%)**
Lunch						
Mixed greens	2 cups	20	4	2		
Tomatoes	¼ cup	8	2			
Cucumbers	¼ cup	11	3			
Tuna, all white in h20	3oz	110		20	3	.7
Balsamic dressing	2 T	140	1		16	2.8
Whole wheat roll	1 each	76	15	2	1	.2
Margarine	1T	108			12	6.1
Banana	1 each	105	27			
		578	**52(36%)**	**24(16%)**	**32(50%)**	**9.8 (15%)**
Snack						
Wheat bread	2 each	130	24	4	2	.4
Peanut butter	2 T	192	6	4	16	3.2
Jelly	2 T	100	26			
Gatorade	20 oz	158	38			
		580	**94(65%)**	**8(10%)**	**18(28%)**	**3.6(6%)**
Dinner						
Couscous	½ cup	300	68	6	1	
Green beans	½ cup	22	5	2		
Breaded fish fillet baked	1 each	100		22	1	.08
Potato, baked	1 each	220	51	5		
		642	**124(77%)**	**35(22%)**	**2(3%)**	**.08 (Trace)**
Snack						
Pita bread	1 each	165	33	5	1	.1
Hummus	2 T	43	4		2.5	.4
Carrots	½ cup	25	6	1		
		233	**43(74%)**	**6(10%)**	**3.5(14%)**	**.5(2%)**
Daily Totals		**2,977**	**481(65%)**	**126(17%)**	**72.5 (22%)**	**19.5 (6%)**

Rachel A. Hill

3000 Calorie Menu 2

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Pancakes	4, med sized	275	52	6	4	1
Nut butter	1 Tbsp	101	3	2	9	1
Maple syrup, honey, or fruit jam	2 Tbsp	105	27	0	0	0
Fruit	1 cup	109	28	1	1	0
Milk (Skim)	1 cup	86	12	8	0	0
100 % Orange Juice	1 cup	113	27	2	0	0
		789	**149 (75%)**	**19(10%)**	**14(16%)**	**2 (2%)**
Snack						
Clementine	1 med	40	9	1	0	0
Cottage cheese, low fat	1 cup	164	28	6	2	1
		204	**37(72%)**	**7(14%)**	**2(8%)**	**1(4%)**
Lunch						
Nachos: 2oz. tortilla chips, 2oz reduced fat cheese, ½ cup reduced fat refried beans, ¼ cup guacamole, ¼ cup salsa	1	608	55	30	33	9
Cranberry Juice	¾	93	24	1	0	0
Fruit	Med sized	81	21	0	0	0
		782	**100(51%)**	**31(16%)**	**33(37%)**	**9(10%)**
Snack						
Quaker Oatmeal on the Go Bar	1 bar	220	43	4	4	1
		220	**43(78%)**	**4(8%)**	**4(7%)**	**1(4%)**
Dinner						
Mushroom Swiss Burger: 4oz ground beef (90 % or better), whole wheat bun, ¼ cup grilled mushrooms, 1 slice swiss cheese	1 burger	513	22	40	32	13
Baked potato	1 large	134	31	3	0	0
Sour cream, fat free	2 T	58	2	2	5	3
Apple Juice	1 cup	87	22	0	0	0
		792	**77(38%)**	**45(22.7)**	**36.5(41%)**	**16(18%)**
Evening Snack						
Kashi Go Lean Crunch	1 cup	190	36	3	3	0
Milk (Skim/2%)	½ cup	45	12	8	0	0
		235	**48(81%)**	**11(18%)**	**3(11%)**	**0**
Daily Total		**3022**	**454 (59%)**	**117 (16%)**	**92.5(27%)**	**29 (8.7%)**

Menu created by Katie Ludwig, Dietetic senior.

3000-Calorie Menu 3

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Quick or cooked oats	2 packets 1 cup	145	25	6	2	0
Milk (Skim)	1 cup	86	12	8	0	0
Raisins	¼ cup	109	29	1	0	0
Nuts	2 oz	334	11	12	30	3
Fruit	1 cup	109	28	1	1	0
		783	**105(54%)**	**28(14%)**	**33(38%)**	**3(3%)**
Snack						
Pretzels	1 oz	107	22	3	1	0
Hershey's dark chocolate kisses	4 pieces	103	12	1	6	4
		210	**34(65%)**	**4(8%)**	**7(30%)**	**4(17%)**
Lunch						
Deli sandwich: 2 slices whole grain bread, 4oz. turkey, 1 slice cheese, 1T mustard	1 sandwich	339	32	30	11	6
Baby carrots	1 cup	55	13	1	0	0
Peach	1 medium	42	11	1	0	0
Yogurt, low fat	1 cup	250	47	11	3	2
100 % Orange juice	1 cup	113	27	2	0	0
		799	**130(65%)**	**45(22.5%)**	**14(16%)**	**8(9%)**
Snack						
Trail mix	½ cup	176	14	5	12	2
Fruit	½ c	82	8.5	1	1	-
		217	**22.5(41%)**	**6(11%)**	**13(53%)**	**2(8%)**
Dinner						
Tacos: 4-6oz lean ground beef, 3 flour tortillas, ¼c salsa, ¾c reduced fat cheese	3 tacos	585	46	39	27	9
Fresh fruit salad	1.5 cup	152	22	1	8	2
Sour cream, reduced fat	2 T	58	2	2	5	3
		795	**70(35%)**	**42(21%)**	**40(45%)**	**15(17%)**
Snack						
Power Bar	1 bar	**210**	**38(72%)**	**10(19%)**	**2(8.5%)**	0
Daily Total		**3014**	**400 (53%)**	**135 (18%)**	**109 (32.5%)**	**32 (10%)**

Menu created by Katie Ludwig, Dietetic senior.

3500-Calorie Menu 1

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Pancakes	5 medium	240	48	5	3	1
Maple Syrup	¼ c	227	57	-	-	-
2% milk	2 c (16 oz)	242	24	16	9	6
Fruit	1 c	82	17	1	1	-
		791	**146 (74%)**	**22 (11%)**	**13 (15%)**	**7 (8%)**
Snack						
Sports drink or diluted juice[1]	20 oz	160	40	-	-	-
Almonds	~22 almonds	154	7	9	10	1
		314	**47 60%)**	**9 (11%)**	**10 (29%)**	**1 (3%)**
Lunch						
Deli sandwich: 4 (1oz) turkey slices, 1 slice cheese, 2 T mayo, 2 slices whole wheat bread	2 sandwiches	858	66	63	38	10
Water	16 oz	-	-	-	-	-
Baby carrots	10	40	10	1	-	-
		898	**76 (34%)**	**64 (29%)**	**38 (38%)**	**10 (10%)**
Snack						
Sports drink or diluted juice[1]	20 oz	160	40	-	-	-
Banana	1 medium	97	21	1	1	-
		257	**61 (95%)**	**1 (2%)**	**1 (3%)**	**-**
Dinner						
Spaghetti noodles	2 c	390	79	14	2	-
Spaghetti sauce w/meat	1 c	283	21	16	15	4
Broccoli, cooked	1 c	59	5	3	3	-
Dinner roll	2 medium	204	36	6	4	1
2% milk	2 c	242	24	16	9	6
		1178	**165 (56%)**	**55 (19%)**	**33 (25%)**	**11 (8%)**
Totals		**3438**	**495 (58%)**	**151 (18%)**	**95 (25%)**	**29 (8%)**

[1] Diluted juice= 1 part juice + 2 parts water

Menu created by Crystal Rivero, Dietetic senior.

3500-Calorie Menu 2

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Oatmeal	2 c, cooked	297	51	12	5	1
Honey	2 T	124	31	-	-	-
Egg, hard boiled	1 large	101	1	8	7	2
2% milk	1c (8oz)	121	12	8	5	3
Orange juice	1c (8oz)	108	25	2	-	-
		751	**122 (65%)**	**30 (16%)**	**17 (19%)**	**6 (7%)**
Snack						
Peanut Butter Sandwich	1 sandwich	355	42	13	15	3
Banana	1 medium	97	21	1	1	-
Sports drink or diluted juice[1]	20 oz	152	38	-	-	-
		604	**101 (67%)**	**14 (9%)**	**16 (24%)**	**3 (13%)**
Lunch						
BLT (3 slices turkey bacon, 1 leaf of lettuce, 2 slices tomato, 2 T mayo)	2 sandwiches	704	68	27	36	9
Baby carrots	10	40	10	1	-	-
Water	16 oz	-	-	-	-	-
		744	**78 (42%)**	**28 (15%)**	**36 (44%)**	**9 (11%)**
Snack						
Power Bar	1 bar	210	38	10	2	-
Sports drink or diluted juice[1]	20 oz	152	38	-	-	-
		362	**76 (84%)**	**10 (11%)**	**2 (5%)**	**-**
Dinner						
Grilled chicken	8 oz	348	0	69	8	2
Baked sweet potato	1 large	238	43	3	6	1
Dinner roll	2 med	204	36	6	4	1
2% milk	2 c (16oz)	242	24	16	9	6
		1032	**103 (40%)**	**94 (36%)**	**27 (24%)**	**10 (8%)**
Totals		**3493**	**480 (55%)**	**176 (20%)**	**98 (25%)**	**28 (7%)**

[1] Diluted juice= 1 part juice + 2 parts water

Menu created by Crystal Rivero, Dietetic senior.

4000- Calorie Menu 1

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Honey nut cheerios	2 cups	220	44	6	4	
Skim milk	1 cup	83	12	8	1	.29
Low fat fruit variety yogurt	8 oz	243	46	10	3	1.8
Multigrain toast	2 each	130	24	6	2	.4
Jelly	2 T	100	26			
Butter	1T	101			11	2.2
		877	**154(70%)**	**30(14%)**	**21(22%)**	**4.7(5%)**
Snack						
Apple	1 each	72	19			
Granola Bar (Nature Valley)	2 each	280	50	6	8	1
		352	**69(78%)**	**6(7%)**	**8(21%)**	**1(3%)**
Lunch						
Pita bread, whole wheat	1 each	170	35	6	2	.26
Deli turkey	2 slices	100	2	11		
Deli ham	2 slices	50	1	8	2	.5
Swiss cheese	1 slice (1 oz)	106		8	8	5
Mustard	2T	6				
Pretzels	1 oz	103	23	3	1	.16
Chicken noodle soup	1 cup	117	11	11	3	.8
Orange juice	1 cup	112	26	2		
		764	**98 (51%)**	**49 (26%)**	**17 (20%)**	**7 (8%)**
Snack						
Power bar	1 each	230	45	10	2	.5
Skim milk	1 cup	83	12	8		
Heresy's syrup,	2 T	105	24	1		
Gatorade	20 oz	158	38			
		576	**119(83%)**	**19(13%)**	**2(3%)**	**.5(1%)**
Dinner						
Whole grain rice	2 cups	258	44	4	6	1.4
Mixed vegetables	2 cup	120	24	6		
Grilled chicken breast	3 oz	130		23	3	1
Butter	1 T	101			11	2.2
Chocolate chip cookies	2 each	280	32	4	16	4
		889	**100(45%)**	**37(17%)**	**36(36%)**	**8.6(9%)**
Snack						
Bagel	1 each	195	38	7	1	.16
Shake						
Honey	1 T	64	17			
Skim milk powder	½ cup	128	18	12		
Banana	1 each	105	27			
Frozen raspberries	½ cup	53	14			
Non-fat vanilla yogurt	6 oz	60	11	5		
Ice						
		605	**125(83%)**	**24(16%)**	**1(1%)**	**.16**
Daily Total		**4,063**	**665(65%)**	**165(16%)**	**85(19%)**	**22(5%)**

4000 Calorie Menu 2

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Frozen waffles	3 each	207	39	7.2	3.4	.6
Maple syrup	4 T	209	54			
Low fat yogurt	8 oz	243	46	10	3	1.8
Apple juice	8 oz	116	28			
Butter	1 T	108			12	6.13
		883	**167(76%)**	**17.2(8%)**	**18.4(19%)**	**8.5(9%)**
Snack						
Blueberry muffin	1 each	160	23	3	6	.9
Craisins	1 package	109	28	1		
Skim milk	8 oz	83	12	8		
Heresy's syrup	2 T	105	24			
		457	**87(76%)**	**12(11%)**	**6(12%)**	**.9(2%)**
Lunch						
Tuna Melt						
Canned tuna- all white in H20	1 can	191		42	1.4	**.4**
Miracle whip light	2 T	37	3		3	**.5**
Whole wheat toast	2 pieces	256	48	8	4	**.8**
American cheese	1 slice	31	2.5	5	.2	
Tortilla chips	1 oz	138	19	2.2	6.6	**.7**
Salsa	¼ cup	16	3	.7	.2	
Peaches	½ cup	29	7	1		
		698	**83(48%)**	**60(34%)**	**15.4(20%)**	**2.4(3%)**
Snack						
Hard boiled eggs	2 each	158	2	12	10	3.2
Pita bread	1 each	165	33	5	1	.10
American cheese	1 slice	31	2.5	5	.2	
Gatorade	20 oz	158	38			
		512	**76(59%)**	**22(17%)**	**11.2(20%)**	**3.3(6%)**
Dinner						
Chicken Quesadilla						
Flour tortillas	2 each	208	36	6	4	1.2
Chicken breast	6 oz	260		46	6	1.9
Shredded cheese	¼ cup	90	2	5	7	1.5
Romaine lettuce	½ cup	5	1			
Tomatoes, diced	¼ cup	8	2			
Sour cream	2 T	51	1	1	5	3
Refried beans	119	20	7	2	.6	
Whole wheat roll	76	15	2	1	.2	
Mexican rice	½ cup	218	46	4.52	1.62	.3
		875	**97(44%)**	**65(30%)**	**24(25%)**	**7.9(8%)**
Snack						
Chocolate pudding	½ cup	154	23	5	3	2.8
Banana	1 each	105	27	1		
Animal crackers	20 each	134	22	2	4	1
Skim milk	8 oz	83	12	8		
		476	**84(71%)**	**16(13%)**	**7(13%)**	**3.8(7%)**
Daily Total		**3,901**	**594(61%)**	**192(20%)**	**82(19%)**	**26.8(6%)**

Rachel A. Hill

4500-Calories Menu 1

Food	Amount	Calories	CHO(g)	Protein(g)	Fat(g)	Saturated fat (g)
Breakfast						
Low fat fruit yogurt	8oz	243	46	10	3	1.8
Whole grain bagel	1each	195	38	7	1	
Small banana	1 each	105	27	1		
Apple juice	8 oz	112	28			
Peanut butter	1 T	94	3	4	8	1.5
		749	**154(82%)**	**22(12%)**	**12(14%)**	**3.3(4%)**
Snack						
Chocolate power bar	1 each	230	45	10	2	.5
Gatorade	20 oz	158	38			
Raisins	½ cup	244	64	2		
		632	**147(93%)**	**12(8%)**	**2(3%)**	**.5(1%)**
Lunch						
Omelet						
Eggs	3 each	222		18	15	4.7
American cheese	1 oz	106		6	9	5.6
Chopped mushrooms, peppers, onions	½ cup	25	5	2		
Whole wheat toast	2 each	256	48	8	4	.7
Jelly	2 T	100	26			
Cantaloupe	1 cup	54	14	1		
Orange juice	1 cup	112	26	2		
		875	**119(54%)**	**37(17%)**	**28(29%)**	**11(11%)**
Snack						
Whole wheat bread	1 each	128	24	4	2	.4
Deli turkey	2 slices	40		9	1	
Miracle whip	1 T	37	3		3	.5
Shake						
Skim milk powder	½ cup	128	18	12		
Honey	2 T	128	34			
Small banana	1 each	105	27	1		
Frozen raspberries	½ cup	129	33	1		
Non-fat vanilla yogurt	6 oz	60	11	5		
		755	**150(80%)**	**32((17%)**	**6(7%)**	**.9(1%)**
Dinner						
Frozen salmon fillets	2 each (6 oz)	198	0	30	6	1.5
Romaine lettuce	2 cups	20	4	2		
Italian salad dressing	2 T	86	3		8	1.3
Whole wheat dinner roll	1 each	76	15	2	1	
Medium baked potato	1 each	222	51	5		
Butter	1 T	108			12	6.1
		710	**73(41%)**	**39(22%)**	**27(34%)**	**8.9(12%)**
Snack						
Frozen pepperoni pizza	2 slices	362	40	20	14	4.5
Oatmeal cookie	1 each	234	45	6	4	.7
Gatorade	20 oz	158	38			
		754	**123(65%)**	**26(14%)**	**18(21%)**	**5.2(6%)**
TOTALS		**4,475**	**766(68%)**	**168(15%)**	**93(19%)**	**30(6%)**

Rachel A. Hill

4500 Calorie Menu 2

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Cinnamon toast crunch	1 ½ cups	254	47	3	6.6.	1
Skim milk	1 cup	83	12	8	-	-
Whole wheat toast	2 each	256	48	8	4	.7
Butter	1 T	108		-	12	6.1
Jelly	2 T	100	26	-	-	-
Orange juice	1 cup	112	26	2	-	-
		838	**159(76%)**	**21(10%)**	**22.6(24%)**	**7.8(8%)**
Snack						
String cheese	1 each	71	1	7	4	2.8
Wheat thins	2 oz	284	38	6	6	1.6
Gatorade	20 oz	158	30			
		513	**89(70%)**	**13(10%)**	**10(18%)**	**4.4(8%)**
Lunch						
Subway club (or deli sandwich)	12 in	588	80	44	10	3.0
Cream of broccoli soup	1 cup	164	15	6	4	.70
Fruit punch	16 oz	220	58			
		972	**153(63%)**	**50(21%)**	**14(135)**	**3.7(3%)**
Snack						
Shake						
Skim milk powder	½ cup	128	18	12	-	-
Honey	1 T	64	17	-	-	-
Banana	1 each	105	27	1	-	-
Non-fat vanilla yogurt	6 oz	60	11	5	-	-
Ice						
Frozen strawberries	1 cup	198	54	2	-	-
Honey graham crackers	4 each	118	22	2	3	.4
		673	**149(89%)**	**22(13%)**	**3(4%)**	**.4(1%)**
Dinner						
Hamburger (large) on bun vegetables condiments	1 each	512	40	26	27	10.4
Macaroni and cheese	1 cup	393	40	15	19	8.2
Mashed potatoes, instant	½ cup	122	17	2	5	1.3
Carrots	½ cup	25	6	1	-	-
Ranch dressing-light	2 T	62	2	-	6	1.1
		1,114	**105(38%)**	**44(16%)**	**51(41%)**	**21(17%)**
Snack						
Microwave popcorn-94% fat free	4 cups	124	24	4	-	-
Open face turkey sandwich						
Turkey breast	2 slices	100	2	22	-	-
Mayonnaise	1 T	99			11	1.64
Rye bread	1 slice	83	15	3	1	.2
		406	**41(40%)**	**29(29%)**	**12(27%)**	**1.8(4%)**
DAILY TOTALS		**4,516**	**696(62%)**	**179(16%)**	**113(23%)**	**42(8%)**

Rachel A. Hill

5000- Calorie Menu 1

	Amount	Calories	CHO (g)	Protein (g)	Fat (g)	Saturated fat (g)
Breakfast						
Oatmeal, instant packets	2 cups	224	40	8	4	.7
Brown sugar	1 T	51	12			
English muffin	1 each	128	25	4	1	.14
Jelly	2T	100	26			
Banana	1 each	105	27	1		
		608	**130(86%)**	**13(9%)**	**5 (7%)**	**.8(1%)**
Snack						
Low fat fruit variety yogurt	8oz	243	46	10	3	1.8
Granola	½ cup	219	31	5	9	3.8
Gatorade	20 oz	158	38			
Granola bars	2 each	245	38	3	9	5.3
		865	**153(71%)**	**18(8%)**	**21(22%)**	**11(11%)**
Lunch						
Mixed vegetables	1 cup	120	24	6		
Rice	1 ½ cups	324	66	9	3	
Grilled chicken breast	6 oz	260		46	6	2
Bread sticks	2 each	123	20	4	3	.4
Butter	1 T	101			11	2.2
		928	**110(47%)**	**65(28%)**	**23 (22%)**	**5 (5%)**
Snack						
Apple	1 each	72	19			
Cheese crackers	30 each	151	17	3	8	2.8
Fruit punch	16 oz	358	66			
		581	**102(70%)**	**3(2%)**	**8(12%)**	**2.8 (4%)**
Snack						
Honey bunches of oats	1 cup	160	33	3	2	.7
Skim milk	1 cup	83	12	8		
		243	**45(74%)**	**11(18%)**	**2(7%)**	**.7(3%)**
Dinner						
Lean ground beef	3 oz	231	0	21	16	6.2
Penne pasta	2 cups	460	96	16		
Marinara sauce	1 cup	92	14	2.4	3	.4
Garlic bread	2 each	372	42	8.3	19	4.8
Romaine lettuce	2 cups	20	4	2		
Ranch dressing	2 T	146	2	16	2	
		1321	**158(48%)**	**66(20%)**	**40(27%)**	**11(7%)**
Snack						
Grilled cheese	1 each	292	27	10	16	6
Skim milk	1 cup	83	12	8		
Heresy's chocolate syrup	2 T	105	24	1		
		480	**63(53%)**	**19(16%)**	**16(30%)**	**6(11%)**
Daily Totals		**5,026**	**761(61%)**	**195(16%)**	**116(21%)**	**37(7%)**

Rachel A. Hill

Athletic and Healthy Snacks

~500 Calorie (75g CHO, 20g pro.)

- Bagel + 2 T. Peanut Butter
- Clif Bar/Powerbar/Harvest Bar + 16oz. 1% Milk
- Peanut Butter and Jelly Sandwich* + 1c. 1% Milk
- 1 low-fat fruit Yogurt + 1 Banana + 20oz. Sports Drink
- 1 Fruit Smoothie* + 1 All Bran Bar
- 1 low-fat fruit Yogurt + 1 package (2 bars) Nature Valley Granola Bars + 4 Dark Chocolate Hershey Kisses
- 1 Turkey Sandwich* + 20oz. Sports Drink
- 1c. Kashi Go-Lean Crunch + 1c. 1% milk + 1 slice Banana Bread or 20oz. Sports Drink
- 1oz. Almonds + 1oz. Dried Tart Cherries/Raisins + 1oz. tortilla chips + ½ c. guacamole
- 1 Pita Bread + ¼ c. Hummus/ Refried beans + 1 Banana + 2 sticks String Cheese
- 1oz. Pretzels + 4 Dark Chocolate Hershey Kisses + 8 Dried Apricots + 20oz. Sports Drink
- ¼ Trail Mix* + 1c. 1% Milk
- Tuna Melt* on English Muffin/ Toast + 1 Apple

~250 Calorie (30g CHO, 10g pro.)

- 1oz. Almonds + 1oz. Dried Tart Cherries/Raisins
- 1 Apple sliced + 2 T. Peanut Butter
- 4 Fig Newtons + 1 Clementine/ Tangerine
- 1c. reduced-fat Cottage Cheese + 1c. sliced fresh Peaches
- 1 package (2 bars) Nature Valley Granola Bars + 10oz Sports Drink
- 1c. Chocolate Milk +1 Apple
- 1c. Wheaties + 1c. 1% Milk + 1 Clementine/Tangerine

Recipes (**<u>Serving Sizes:</u> T: Tablespoon; t: teaspoon; cup: 8 oz; 4 oz ~100g; 3 oz ~palm size)**

*_P,B&J_: 2 slices whole wheat bread, 2T. peanut butter, 1T. 100% fruit jelly
*_Fruit Smoothie_: 8oz low-fat plain yogurt, 1 banana, ½ c. frozen blueberries, ½ c. O.J.
*_Turkey Sandwich_: 2 slices whole wheat bread, 3oz (2-3 slices) turkey breast, 1T. mustard, 1 slice provolone cheese
*_Trail Mix_: 1c. peanuts, 1c. raisins, ½ c. M&M's, ½ c. sunflower seeds
*_Tuna Melt_: 3oz can chunk light tuna in water, 1T. light mayo, 1T relish, 1 slice cheddar

HYDRATION

Water is a critical nutrient for growth, development, health and performance. It is the most abundant nutrient in your body. About 60% of the body's weight is water, and muscle is comprised of over 70% water. Water is needed for digestion, absorption, circulation, excretion, regulation of body temperature, and for the functioning of every cell. Adequate hydration is essential for transport of vitamins, minerals, and carbohydrates to the muscles. Sweating and water loss during training or games can cause a significant decrease in performance if it is not replenished. Even a 2% decrease in hydration can lead to significant reductions in performance in part due to increases in heart rate, reduced transport of nutrients, and poor regulation of body temperature ("overheating" can occur).

A good rule of thumb is to drink before you're thirsty and drink fluids often. If your urine is clear or light in color, and you are going to the bathroom every 2 to 4 hours, you are probably drinking enough. Approximately 2 hours prior to an intense workout or competition, at least 2 cups (16 oz.) of fluid should be ingested. During activity, drink 4-8 ounces of cool fluids every 15 to 20 minutes. Water is fine, but for intense exercise lasting longer than one hour, or if conditions are hot and humid, a sports drink or diluted juice is recommended. To ensure you are properly hydrating after a workout, it is recommended that you drink 3 cups (24 oz.) of fluid for each pound of body weight lost.

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An easy method to monitor your hydration status is by remembering W.U.T.

W- Body **weight** - Weigh yourself before and after a workout and replace each pound lost with 3 cups of fluid.

U- **Urine** - If your urine is dark in color you are dehydrated. Your urine should be clear or only slightly yellow (an exception to this is if you are taking a multi-vitamin or other vitamin supplements your urine color can be fairly dark despite being hydrated.

T- **Thirst** - Drink before you are thirsty. A person is typically 1% or more dehydrated by the time he senses thirst.

Sore throat, dry cough, and a hoarse voice are all additional signs of dehydration.

(Adapted from Nancy Clark's Sports Nutrition Guidebook)

SAFETY PRECAUTIONS FOR SUMMER TRAINING

- Perform warm-up and cool-down activities in the shade whenever possible to prevent sudden, excessive rises in body temperature.
- Wear loose-fitting, light-colored clothing when possible.
- Adjust the intensity and/or the duration of the workout session to fit the environmental conditions.
- Exercise in the morning or evening hours to avoid extreme mid-day temperatures.

Be aware of the signs and symptoms of heat illness including: headache, nausea, dizziness, rapid pulse, muscle cramps, disorientation, and red, hot, dry skin.

SUPPLEMENT FACTS

What is a supplement?
A dietary supplement is any product taken by mouth that contains "dietary ingredients" (loosely used term) and its label clearly states that it is a dietary supplement. The "dietary ingredients" in dietary supplements may include vitamins, minerals, herbs and amino acids as well as substances such as enzymes, organ tissues, metabolites, extracts or concentrates. Dietary supplements can be found in many forms such as pills, tablets, capsules, liquids or powders. It is required for components to be identified on the label.

The manufacturer is responsible to make label information truthful and not misleading. If the product label does not make a disease claim the wording can be somewhat misleading. You will note nearly all supplements, following the "claim" it states *"This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.* The manufacturer is also responsible for making sure that all the dietary ingredients in the supplements are safe however they are not typically tested by an independent agency before they are put on the market. Unlike "drugs" used for medical purposes, manufacturers and distributors of supplements, do not need to register with FDA or get FDA approval before producing or selling dietary supplements unless they make a disease claim.

Things to be aware of:

- Supplement companies do not have to prove a supplement's safety, effectiveness or potency before placing it on the market. **Therefore, potential harmful side-effects are unknown!**
- Do your homework on the safety and effectiveness of supplements. A good site to check is the National Institute of Health Office of Dietary Supplements in Washington DC. Go to *http://dietary-supplements.info.nih.gov/*
- Supplements are expensive and will not take the place of a poor diet. Consider using the money for improving the quality of the food you buy
- **DO NOT** take a dose larger than is recommended on the package!
- If you feel you are having a reaction (e.g., headache, upset stomach, dehydration, etc.) **STOP TAKING THE PRODUCT IMMEDIATELY!**

Partial List Of Possible Hazardous Side-Effects of Weight-Loss Pills

- Nervousness
- Irritability
- Headaches
- Nausea
- Constipation
- Abdominal pain
- Diarrhea
- Sleep problems
- Dry mouth

The following is the NCAA Banned-Drug Classes for 2005-2006.
BE AWARE

NCAA Banned-Drug Classes
2005-2006

The NCAA list of banned-drug classes is subject to change by the NCAA Executive Committee. Contact NCAA education services or www.ncaa.org/health-safety for the current list. The term "related compounds" comprises substances that are included in the class by their pharmacological action and/or chemical structure. **No substance belonging to the prohibited class may be used, regardless of whether it is specifically listed as an example.**

Many nutritional/dietary supplements contain NCAA banned substances. In addition, the U.S. Food and Drug Administration (FDA) does not strictly regulate the supplement industry; therefore purity and safety of nutritional dietary supplements cannot be guaranteed. Impure supplements may lead to a positive NCAA drug test. The use of supplements is at the student-athlete's own risk. Student-athletes should contact their institution's team physician or athletic trainer for further information.

Bylaw 31.2.3. Banned Drugs

The following is a list of banned-drug classes, **with examples of substances under each class:**

(a) Stimulants:

amiphenazole	methylenedioxymethamphetamine
amphetamine	(MDMA, ecstasy)
bemigride	methylphenidate
benzphetamine	nikethamide
bromantan	pemoline
caffeine[1] (guarana)	pentetrazol
chlorphentermine	phendimetrazine
cocaine	phenmetrazine
cropropamide	phentermine
crothetamide	
diethylpropion	phenylpropanolamine (ppa)
dimethylamphetamine	picrotoxine
doxapram	pipradol
ephedrine	prolintane
(ephedra, ma huang)	strychnine
ethamivan	synephrine
ethylamphetamine	(citrus aurantium, zhi shi, bitter
fencamfamine	orange)
meclofenoxate	**and related compounds**
methamphetamine	

(b) Anabolic Agents:

anabolic steroids

androstenediol	methyltestosterone
androstenedione	nandrolone
boldenone	norandrostenediol
clostebol	norandrostenedione
dehydrochlormethyl-	norethandrolone
testosterone	oxandrolone
dehydroepiandro-	oxymesterone
sterone (DHEA)	oxymetholone
dihydrotestosterone	stanozolol
(DHT)	testosterone[2]
dromostanolone	tetrahydrogestrinone (THG)
epitrenbolone	trenbolone
fluoxymesterone	**and related compounds**
gestrinone	
mesterolone	
methandienone	**other anabolic agents**
methenolone	clenbuterol

(c) Substances Banned for Specific Sports:

Rifle:

alcohol	pindolol
atenolol	propranolol
metoprolol	timolol
nadolol	**and related compounds**

(d) Diuretics:

acetazolamide	hydrochlorothiazide
bendroflumethiazide	hydroflumethiazide
benzhiazide	methyclothiazide
bumetanide	metolazone
chlorothiazide	polythiazide
chlorthalidone	quinethazone
ethacrynic acid	spironolactone
flumethiazide	triamterene
furosemide	trichlormethiazide
	and related compounds

(e) Street Drugs:

heroin	tetrahydrocannabinol
marijuana[3]	(THC)[3]

(f) Peptide Hormones and Analogues:

corticotrophin (ACTH)
human chorionic gonadotrophin (hCG)
luteinizing hormone (LH)
growth hormone(HGH, somatotrophin)
insulin like growth hormone (IGF-1)

All the respective releasing factors of the above-mentioned substances also are banned:

erythropoietin (EPO)	sermorelin
darbepoetin	

(g) Definitions of positive depends on the following:

[1]for caffeine—if the concentration in urine exceeds 15 micrograms/ml.

[2]for testosterone—if the administration of testosterone or use of any other manipulation has the result of increasing the ratio of the total concentration of testosterone to that of epitestosterone in the urine to greater than 6:1, unless there is evidence that this ratio is due to a physiological or pathological condition.

[3]for marijuana and THC—if the concentration in the urine of THC metabolite exceeds 15 nanograms/ml.