FITNESS PROGRAM
Instructing Fitness Programs and Group Exercises
OVERVIEW OF THIS MODULE

This module introduces the student to basis of fitness programs, identifying the main components of fitness, principles of program design and elements that should be included when designing a program. The module then progresses developing a gym and group exercise programs.

BASIC PRINCIPLES OF FITNESS PROGRAMS

PROGRAM COMPONENTS

A well-designed fitness program will consist of several different components, which all have a specific purpose and are necessary for the client to participate in each component. Often, clients want to get straight into the main session element and then leave immediately following this component, without considering the importance of the pre-workout preparation and post-workout recovery. Therefore as a fitness professional, it important to explain and place great value on each of the following components, ensuring the client fully understands the benefit of each.

The components of a program consists of:

- Warm up
- Conditioning component
- Cool down

The following sections identify the relevance of each, which can be passed onto the client.

WARM-UP

A warm-up should be conducted prior to the main component of the program to prepare the body for the forthcoming activities both mentally and physically. When performed correctly, the warm up will have the following affects:

- increase the ventilation rate to increase the volume of oxygen being inhaled
- increasing the blood flow to the muscles increasing the delivery the oxygen and nutrients to provide energy for metabolism
- lubricate synovial joints to help with smooth joint mobility and absorb some additional shock
- warm up the body and specifically the muscles enabling them to become more elasticated
- mentally prepare the client for the upcoming conditioning exercises or get the individual in the right frame of mind for a competition

Remember the warm up is part of the session with the client, so you must consider how long to spend on this, ensuring you have enough time to perform the conditioning phase and the cool down.

The warm can be completed in 3 stages:

1. **General warm-up** involving cardio or heart rate raising exercises
2. **Flexibility and mobility training**
3. **Program or exercise specific warm up**

The general warm-up usually involves ten minutes of aerobic exercise. The aerobic exercise can be completed with treadmill walking or jogging, stationary bicycle, cross-trainer, or stepper machines. The main goal of this stage is to raise the heart rate and ventilation rate.
Stage 2 consists of flexibility and mobility exercises, usually involving light stretches (mainly dynamic during the warm-up), which focus on the muscle of body part which is being trained.

Program or exercise specific warm-up consists of performing movements that will be used in the conditioning element of the session. The aim of this is to target specific muscles that will be used and ensure they are prepared.

In some cases this exercise specific warm up can be perform prior to each exercise i.e. each weights exercise should include a warm-up with light weights and practicing the correct technique prior to performing with the intended weight load. Body weight or 50% of the weight used in the workout is a reasonable amount to use for a warm-up, but make sure you do not fatigue the client too much.

A tip you could use it to encourage your client to begin stage 1 of the warm up prior to the beginning of your allocated time. i.e. client begins their warm up at 12:50am and your session starts at 1pm.

Throughout the warm-up it is important to ensure that the activities that are being perform in each stage are suitable for the client and do not put them at any risks. In addition, these activities should be specific and effective for that individual client; therefore each warm-up should be unique.

### ACTIVITY

<table>
<thead>
<tr>
<th>Think about and document how you would perform a specific warm for an individual who is performing netball:</th>
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</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
</tr>
<tr>
<td><strong>Flexibility or ROM</strong></td>
</tr>
<tr>
<td><strong>Program specific</strong></td>
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### CONDITIONING

The conditioning component is the longest element of the program and consists of a routine or structured plan targeting particular components of fitness to achieve the goals of the client. This usually involves performing a range of different exercises for a regular amount of repetitions and sets.

Fitness professionals must ensure this element of the program is aim towards each individual client, addressing their needs, goals, exercise preferences and likes and dislikes. More specific details about the different types of programs are in more detail further in this module.

### COOL-DOWN

The cool-down has the opposite effect to the warm-up - it aims to slowly return the body to normal resting conditions. It is most commonly achieved by performing a cardiovascular activity at a gentle and comfortable intensity which decreases in intensity as it progresses. This will keep breathing rate elevated for a short period of time, helping the oxygen debt return to normal before heart rate and ventilation rate return to resting levels.

Once between 5-10 minutes of low intensity cardiovascular activity has been completed specific stretches to the muscles worked throughout the conditioning session should be performed. Unlike the warm up, stretches in the warm should be performed statically and held up to 30 seconds each.
Like the warm-up, the cool-down exercises should be safe and effective for the individual to prevent injuries or putting the client at any risk.

**FITT Principle of a Program**

The FITT principle is a great way to get started in fitness program design. It is a basic set of rules to be considered to design an effective fitness program for a client and can be used for variation or program modification.

FITT stands for the words - **Frequency, Intensity, Type and Time**.

**FREQUENCY**

**Frequency** is considered how often exercise or a session is performed and is usually gauged on the number of sessions in a week period.

The body goes through a process of ‘rebuild and repair’ during the recovery period following any form of fitness training. This process consists of the body initially replenishing its energy reserves consumed by the exercise, rebuilding and repairing any damaged tissues and adapting to the needs of the training.

The **frequency** of exercise is a fine balance between providing just enough stress for the body to adapt and allowing enough time for healing and adaptation to occur.

Suggested frequency guidelines for cardiorespiratory training recommend a minimum of three sessions per week and ideally five or six sessions per week, whereas resistance training frequency is dependent upon the particular individual and format of the program. For example, a program that works every body part every session should be completed 3-4 days a week with a day's rest between sessions.

On the other hand, a program that focuses on just one or two body parts per session, in theory, could be completed as frequently as six days per week.

**Frequency** can be modified simply by reducing the amount of training sessions, to regress, or by increasing the number of sessions, to progress the session.

**INTENSITY**

The second rule in the FITT principle relates to **intensity**. It defines the amount of effort that should be invested within a training program or any one session.

Similarly to the first FITT principle, with this principle there must also be a balance between finding enough **intensity** to overload the body but not so much that it causes overtraining. The **intensity** is used to focus on specific components of fitness or energy systems encouraging the body to continually adapt.

**Intensity** is a dynamic component which is relative to the aims of the training and component being trained; therefore it is explained in more detail in the relevant component sections. However, to give an example for this concept; training the cardiovascular system using Heart rate zones will see lower **intensity** focusing predominantly on the aerobic system, whereas at a higher intensity will focus primarily on the anaerobic system. More details on zonal heart rate training will be explained in following sections.

In addition to setting training level benchmarks, **Intensity** can be used as a tool to make modification in a training program by regression or progression the amount of effort performed. To regress a program, the intensity can be reduced and to progress a program, the intensity can be increased.

Workload is used to define the **intensity** of resistance training. This can include the amount of weight lifted during an exercise, number of repetitions completed for a particular exercise, the length of time to complete all exercises in a set, or total training session.
TYPE

The third component in the FITT principle dictates what type or kind of exercise you should choose to perform to obtain the desired and appropriate training response.

In the case of clients who participate in a specific sport or event, the type of training should most often reflect the type of exercise they are performing. For clients who are participating in general exercise for health, fitness, enjoyment or other reasons these aspects must be taken into consideration when deciding on the type of exercise the client is to perform. For example if a client is participating in exercise to be social, then a group fitness outdoor type of program would be most relevant, whereas if the client enjoys running, then a program can be designed to incorporate a vast amount of running.

The type of exercise performed by the client can be modified at various times to have the following effect:

- **Prevent overtraining** – by changing the type of exercise or the activity, it can allow some muscles to recover and rest and can incorporate relaxing exercises to encourage this.

  For example – if a runner is experiencing overtraining they can either perform swimming or to further encourage relaxing perform yoga.

- **Prevent Injury** – for region specific injuries the activity can be modified to avoid using the injured region. For example – a cyclist who has injured his hamstring can perform swimming with a float between the legs to avoid kicking.

- **Combat Boredom** – often a big reason for poor adherence is that programs become bored. By changing the type of exercises or even the activities, the client may become more interested in the program and continue participating. For example, if a client is bored of performing a program that includes bench press, squats, lunges, shoulder press etc. they can be changed to burpees, walkouts, pull-ups, triceps dips etc.

  Alternatively the activity performed by the client could be modified to give the client a whole new workout. For example the program could be modified from a weights session to a session in the pool, or just pure swimming.

TIME

The final component in the FITT principle of training is **time** – which can be described as the duration of the program or how long you should be exercising for.

**Time** can relate to different elements - it can be relevant to the whole session or more specific to each interval you are completing. I.e. you could increase your run from 30 minutes to 40 minutes, or you could increase the time you spend at 80% during a fartlek session.

When performing cardiorespiratory training, individuals with lower fitness levels should aim to maintain their heart rate within the target heart rate zone for a minimum of 20-30 minutes. This can increase to as much as 45-60 minutes as fitness levels increase.

In resistance training, the common consensus for the duration of resistance training session is no longer than 45-60 minutes. However there is a relationship between **intensity** and **time**, where if the **intensity** is high then then session **time** or duration may be less i.e. 20 – 30 minutes.

Like the three previous components, **time** can be used to modify a program, making it easier or harder for the individual. This involves changing the duration of session, so using the above examples:
Cardiorespiratory | Reduce the time at the target HR zone | Increase the time at the target HR zone
--- | --- | ---
Resistance | Reduce the time performing resistance exercise (from 45 – 60 minutes to 30 – 45 minutes) | Increase the time performing resistance exercises (from 45 – 60 minutes to 60 – 75 minutes)

These components can also be used in conjunction with each other, perhaps by regress one and progressing another. This is quite often seen with the time and intensity. For clients who may struggle time wise, the session length can be reduced to 30 minutes but the intensity is the increase to help achieve the same level that would be achieved over a 60 minutes session.

Training concepts such as Tabata and Cross Fit use this principle.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
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<tbody>
<tr>
<td>Briefly explain in your own words the FITT principle, including an example.</td>
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**BASIC PRINCIPLES OF TRAINING SESSIONS**

There are some basic principles that can be applied to all types of training. There consist of:

1. **Overload** – for the body to adapt and improve, it needs to be stressed slightly over the amount that it can comfortably deal with. For example to improve the cardiovascular system, exercise that makes the heart work harder than it’s used to will encourage it to adapt so it can cope with the additional stress. Likewise, to increase the muscular system exercise must stress the muscle more than normal daily activities. To build muscle, you need to use more resistance than your muscles are used to. This is important because the more you do, the more your body is capable of doing, so you should increase your workload to avoid plateaus. In plain language, this means you should be lifting *enough weight that you can ONLY complete the desired number of reps* and the last rep should be completed with difficulty but also with good form.

2. **Progression** – to constantly encourage the body to adapt to the training needs and improvement in fitness to occur, it is important to progress or increase the demands of the fitness program for an individual. The fitness level of an individual will increase if the overload principle is followed; however, this will only be to the point at which the fitness level becomes comfortable. Once or perhaps before it becomes comfortable, the demands of the program should be increased or progressed to seek a new level of fitness. Progression can be achieved using the FITT principle in the following ways:
   - increasing the frequency of the exercise (4 sessions per week as opposed to 3),
   - increasing the intensity of the session (increased amount of weight lifted or modifying sets/reps),
   - increasing the time spent exercising (60 minute sessions as opposed to 60 minutes)
   - changing the exercises or the type of activity (swimming rather than weight training).
These changes can be made on a weekly or monthly basis.

In addition, there are other methods to increase the progress of the program, which can be applied directly to the resistance exercise, such as:

- Increase complexity of movement – add another movement i.e. lung with a weighted torso twist
- Change body position in specific resistance exercises
- Increase speed of exercise – more explosive movements
- Change hand position (in certain resistance exercises) – perform wide arm pull ups

When performing progression, it can be made directly towards one component of fitness, gradually increasing a single component within a program, or to the whole program itself.

3. **Specificity** - this principle means training should be specifically orientated around a goal or the client’s needs. Therefore, if strength is the component requiring attention, the program should be designed around that goal (e.g. train with heavier weights closer to 1 RM (1 rep max). To lose weight, choose a variety of rep ranges to target different muscle fibers.

4. **Rest and Recovery** - rest days are just as important as workout days. It is during these rest periods that muscles grow and adapt. Therefore it is important to allow the body or body part time for this to occur, so allow for adequate rest or make sure the same muscle groups are not being worked 2 days in a row.

5. **Reversibility** - this principle suggests that the effects of training will be lost following a period of no activity or exercise. For example, a more efficient cardiovascular system following an exercise program will return to normal efficiency after a period of inactivity. The previous principle states how important rest periods are, however, if the rest period is too long, reversibility make occur.

6. **Individuality** - this principle considers that each individual has a distinct and unique physiological make-up, and therefore training should complement this. For example some clients may be naturally strong, whereas others may be naturally fast, training programs so relate to these individual traits.

7. **Adaptability** - suggesting each individual adapts to fitness demands at different rates, this principle recommends a trainer should be aware that not all clients will progress and change and require overload a different rates.

**TYPES OF FITNESS PROGRAMS**

There are 5 components of **health related fitness**:

- Muscular Strength
- Muscular Endurance
- Cardiovascular Endurance
- Flexibility
- Body Composition

6 components of **Motor skill related fitness components**:

- Agility
- Speed
As a fitness professional you can either help clients develop programs that include elements of all these OR you can develop programs that focus on specific components.

This module explores the creation of fitness programs for the various fitness elements.

**Muscular Strength**
Strength is defined as the ability of a muscle to exert a force to overcome a resistance, over a short period of time.

Resistance includes external objects such as free weights or household objects as well as your own body weight.

Physiologically, muscular strength is the ability of your body to supply ATP (Adenosine Tri-Phosphate or muscle energy) to your muscle fibres for concentric, eccentric and isometric contractions in a short period of time, which can range from 0 to around 15 seconds.

Strength is an important component for your body to perform daily activities efficiently as well as for our health as it enables us to:
- Avoid injuries
- Maintain good posture
- Remain independent (in older age)

**Muscular Endurance**
Muscular endurance, unlike strength, is the ability of a muscle to make repeated contractions over a period of time and is a component used in day-to-day life in activities such as climbing stairs, digging the garden and cleaning.

Muscular endurance is also important in sports, such as:
- Football – repeated running and kicking
- Tennis – repeated swinging of the arm to hit the ball
- Swimming – repeating the stroke

**Cardiovascular Endurance**
Cardiovascular endurance is often referred to as your Aerobic Fitness and is also sometimes known as “stamina”.

It is the ability of your body to continuously provide enough energy to sustain submaximal levels of exercise. To do this the circulatory and respiratory systems must work together efficiently to provide the working muscles with enough oxygen to enable aerobic metabolism.

This type of fitness has enormous benefits to our lifestyle as it allows us to be active throughout the day, for example walking to the shops, climbing stairs or running to catch a bus. It also allows us to get involved in sports and leisure pursuits.

If we have good cardiovascular fitness then our health is also good as it helps with:
- Fat metabolism
- Improved delivery of oxygen
- Faster removal of waste products
- Decreased levels of stress

**Flexibility**
Flexibility is the movement available at our joints, usually controlled by the length of our muscles. This is often thought to be less important than strength, or cardiovascular fitness; however it still has a great importance especially with regards to functional capacity and posture.

Flexibility is if we are not flexible our movement decreases and joints become stiff. Flexibility in sports allows us to perform certain skills more efficiently, for example a gymnast, dancer or diver must be highly flexible, but it is also important in other sports, such as rugby and soccer, to aid performance and decrease the risk of injury.

In daily activities we must be flexible to reach for something in a cupboard, or off the floor. It also helps:
- Prevent injuries
- Improve posture
- Reduce low back pain

Body Composition
Body composition is the amount of muscle, fat, bone, cartilage etc. that make up our bodies.

In terms of health, fat is the main point of interest and everything else is termed lean body tissue. The amount of fat we carry varies from person to person and healthy averages vary with gender and age. A healthy amount of fat for a man is between 15-18% and for women it is 20-25%. It is important to maintain a healthy percentage of body fat because:
- Excess body fat can contribute to developing a number of health problems such as heart disease and diabetes
- It places strain on the joints, muscles and bones, increasing the risk of injury

A deficiency in body fat –
- Affects the production of hormones and immune function
- Reduces the absorption of vitamins (A, E and K) and the transmission of nutrients
- Leaves body organs and bones unprotected from shock
- Reduces the ability of the body to insulate itself
- Affects nerve function and the transmission of impulses

MOTOR SKILL RELATED FITNESS COMPONENTS
Motor skill related fitness components are elements that are likely to improve an individual’s sport or athletic performance.

Agility – Agility is the ability of the body to change direction quickly. This element is an important component used in many sports such as rugby, tennis, football, hockey etc.

Balance – is the ability of the body to remain in equilibrium whilst stationary or moving.

Speed - is the ability to move in one direct quickly.

Power – Power is the combination of speed and strength, and is the ability to perform a movement quickly yet with a great force.

Co-ordination – training that involves multiple components to train at the same time. This may involve multiple body systems and movement patterns to form an individual skill or movement.

Reaction Time – the ability to respond to a stimulus. This is used in performances like sprinting, when an athlete is required to respond to the starting pistol.
The following tables explain the type of training that can be performed to train each specific fitness component:

### Health related fitness components

<table>
<thead>
<tr>
<th>Training Type</th>
<th>Explanation of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscular Strength</td>
<td>Resistance training that involves low repetitions (6 or under) with high load and long rest (3 minutes or above).</td>
</tr>
<tr>
<td>Muscular Hypertrophy</td>
<td>Resistance training involving moderate repetitions (7-12) with heavy/moderate loads and moderate rests (1 – 2 minutes).</td>
</tr>
<tr>
<td>Muscular Endurance</td>
<td>Resistance training that involves high repetitions (13 or above) with relatively low/moderate load and short rest (1 min or under).</td>
</tr>
<tr>
<td>Aerobic Fitness</td>
<td>Low/moderate intensity, continuous aerobic activity for long duration (15 minutes or more) without having rest periods.</td>
</tr>
<tr>
<td>Anaerobic Fitness</td>
<td>High intensity, short bursts of continuous activities with short recovery.</td>
</tr>
</tbody>
</table>

### Motor skill related fitness components

<table>
<thead>
<tr>
<th>Training Type</th>
<th>Explanation of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscular power</td>
<td>Explosive resistance training that involves moderate/heavy loads with a long rest to allow full recovery.</td>
</tr>
<tr>
<td>Speed</td>
<td>Maximal or near maximal intensity efforts over a specific distance involving long rest periods.</td>
</tr>
<tr>
<td>Agility</td>
<td>Bursts of high intensity efforts which include a quick direction change</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Periods of extending and holding a muscle or joint to its end-range to encourage the lengthening of the muscle or increase range of motion of the joint. End position is held for a 15+ seconds allowing the muscle to relax and begin to lengthen.</td>
</tr>
<tr>
<td>Co-ordination</td>
<td>Catching and throwing exercises. Skipping rope.</td>
</tr>
<tr>
<td>Reaction Time</td>
<td>Reacting to a stimulus i.e. Ruler drop, reaction sprints.</td>
</tr>
</tbody>
</table>

**WHICH COMPONENT OF FITNESS IS THE MOST IMPORTANT?**

You cannot rank one of the health related components of physical fitness over the other. However there are some components that are more beneficial in certain events or sports, and therefore become more important to work on. For example, a marathon runner is more likely to improve his performance by improving his cardiovascular endurance and will please less importance on muscular strength.

You need to advise your clients that all 5 components of physical fitness are interdependent upon each other.

If you are very strong but cannot jog a mile without getting out of breath, you need to focus more on your aerobic exercise. If you are very lean and cardiovascular fit but you cannot touch your toes you need to work on your flexibility, and so on.

**DESCRIBE THE HEALTH BENEFITS OF PHYSICAL ACTIVITY**

Exercise and physical activity has a range of beneficial effects to an individual’s health. These can include:

- Reduced risk of chronic health conditions which can include; heart attack, stroke, developing high blood pressure and diabetes
- Maintained or reduced healthy body weight
- Lowered bad cholesterol and increase good cholesterol
- Reduced feelings of stress, anxiety and depression
- Building and maintaining health bones, muscles and joints
- Reduced blood pressure
- Improved mental health and mood
- Improve sleep
- Improved cardiovascular and respiratory systems
- Reduced risk of developing colon cancer and possibly other cancers

**ACTIVITY**

In your own words, briefly define the health related fitness components, and an example sport or activity which predominantly uses that component:

<table>
<thead>
<tr>
<th>Definition</th>
<th>Example</th>
</tr>
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<tbody>
<tr>
<td><strong>Muscular strength</strong></td>
<td></td>
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<tr>
<td><strong>Muscular endurance</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cardiovascular Endurance</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Body composition</strong></td>
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</tr>
</tbody>
</table>

**DESIGNING AND DELIVERING A GYM PROGRAM**

When designing and delivering gym programs there are certain aspects which should be included and considered for the program to be effective and enjoyable for clients - the following section will consider these elements.
Creating the right program for your clients

As discussed in the previous section, there are vast amount of diverse components that can be included in a program. Therefore, due to the range of components and individual needs, it is unlikely two clients will have the same program, so to ensure the correct components are incorporated into an individual’s program there is information that is required to be captured and evaluated. To ensure this information is accurate it is important the instructor:

- Clarifies and uses the needs, preferences and expectations of a client in their fitness program – to ensure the program is design to focus on the right elements as well as
- Establishes special health or injury related requirements – the pre-screening process will capture medical and injury problems within the questionnaire and the fitness level from the fitness assessments. During these two processes, any contraindications will be identified and referral requested.

ADDITIONAL FACTORS AFFECTING THE CLIENT'S ABILITY TO PERFORM A FITNESS PROGRAM

There may be additional factors, which influences the design and development of a program and should be understood and considered by the fitness professional. These additional factors may include:

- Religious restrictions
- Cultural restrictions
- Lifestyle
- Previous experience or knowledge
- Functional limitations
- Family commitments

By considering these factors will helps the trainer accurately and effectively design a fitness program for the individual.

PROGRAMMING EXERCISE FOR PHYSICAL FITNESS AND FOR HEALTH BENEFITS

Exercise in general has huge health benefits; however, a program can be orientated to focus on mainly physical fitness or for health benefits and is dependent on the goals or needs of the client.

Physical fitness – this type of fitness program is usually dependent on the sport or activity that is being performed. The key components of the activity are established, and these will make up the main basis of the program.

Physical fitness can incorporate a range of fitness components, which may vary between a select few health related and any fitness related component. The health related fitness usually consists of cardiovascular endurance and strength.

For example, a client may want to improve their performance in a soccer team. This should focus on the physical fitness of the individual and revolve around all components that relate to soccer. Therefore cardiovascular endurance, agility, and speed (a mixture of health and fitness related components) should be considered.

Health benefits – training to encourage the health benefits will revolve around components that have a direct relationship to improving a system within an individual’s body, or have a non-direct impact on their health. This program will only contain the elements that are represented in the health related fitness components.

For example, by performing exercise to target body composition will improve the health of the individual and reduce the risk of chronic conditions.

Muscular Strength Programs

STRENGTH TRAINING RECAP

Strength is developed by lifting relatively heavier weights with a longer rest period in between sets.
This differs from bodybuilding and strength endurance programs, which tend to utilize lighter weights with less rest in between sets.

Lifting heavy weights rather than light weights enhances the response of the nervous system and its stimulation of nerve fibres.

**ADAPTATIONS FOR STRENGTH TRAINING**

The major adaptation that occurs from strength training is change in whole-muscle size (muscle hypertrophy). This increase in size comes from the increase in the cross section of the myofibril size and increase in amount of myofibrils (individual muscle fibres).

A result of this increase in area size causes an increase demand for nutrients and oxygen, therefore the amount of blood capillaries around the muscles, providing nutrients and oxygen to these muscle fibres.

Other adaptations that may occur are:

- Improved co-ordination
- Increase motor unit recruitment
- Improved strength and function of support tissues – ligaments, tendons and fascia.
- Bone mineral content increases (occurs over a longer period of time 6 months – 12 months)
- Energy systems become more efficient (increase in store of Phosphocreatine, increase Lactic acid tolerance)

**SETS & REPS**

The basic terminology of a strength program includes the terms “sets” and “reps”.

Reps is short for repetitions, and is defined as one complete movement through an exercise e.g. a bicep curl, when you curl your arm up, and then back down – that is one repetition or rep.

A set is a group of repetitions and can be programmed in a workout plan depending on the goal of the client. A typical set will be anywhere from six to twenty reps, although many use reps that are around ten to twelve. The idea behind a set is to use a weight that will fatigue the muscle or muscle group that you’re exercising by the end of the set.

However there are varying benefits from completing different amounts of reps, these are indicated below:

**How many reps and sets are optimal?**

The number of reps and sets you plan for a client is based on the desired goals of the program and considers the load that is used.

In general, the following table identifies the amount of reps, used with a specific percentage of 1 max rep to achieve a specific adaptation:

<table>
<thead>
<tr>
<th>Reps</th>
<th>Sets</th>
<th>% of 1RM</th>
<th>Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 6</td>
<td>4–6</td>
<td>80–90</td>
<td><strong>Main adaptation</strong> - increase maximum strength</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Secondary adaptation</strong> - muscle hypertrophy</td>
</tr>
<tr>
<td>1 to 4</td>
<td>3–6</td>
<td>45–55</td>
<td>Power (if completed at speed)</td>
</tr>
<tr>
<td>6 to 12</td>
<td>2–3</td>
<td>60–80</td>
<td><strong>Main adaptation</strong> – increase muscle size (hypertrophy)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Secondary adaptation</strong> - strength</td>
</tr>
</tbody>
</table>
Although these are the ideal training reps for different adaptations, you must also consider the level and stage of the client. For example, you will not complete 4 to 6 reps and a high load with a beginner client.

Therefore, for the purpose of strength training, a repetition range between 1 to 6 reps will have the greatest effect on maximum strength, and between 6 to 12 reps will mainly see a hypertrophic adaptation, with also some improve strength.

**Rest periods**
The rest period considered the time frame between sets, where the client “relaxes” or does not working the same muscles. It can also be considered the time taken to recover after a session.

Looking at the rest period between sets, a typical rest period can be between thirty seconds and 5 minutes, and is dependent on the goals of the session.

The following table identifies the rest that should be incorporated within a program targeting different fitness components:

<table>
<thead>
<tr>
<th>Session goal</th>
<th>Rest between sets</th>
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</thead>
<tbody>
<tr>
<td>Strength</td>
<td>2 – 3 minutes</td>
</tr>
<tr>
<td>Power</td>
<td>2 – 5 minutes</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td>30 – 90 seconds</td>
</tr>
<tr>
<td>Muscular Endurance</td>
<td>&lt;60 seconds</td>
</tr>
</tbody>
</table>

Strength training is best to performed when muscles have fully or almost fully recovered, this allows them to achieve greatest intensities and volumes within training. Therefore rest should be long enough to allow this recovery and is usually between 2 – 3 minutes. In contrast to this, strength endurance requires shorter rest periods between sets, allowing higher repetition velocities during submaximal muscle actions. In addition to this, muscles also benefit from being slightly fatigued from the previous set for strength and conditioning training.

**Recovery between sessions:**
The American College of Sports Medicine recommends training each muscle group 2 to 3 times a week. But, the number of times you lift each week will depend on your training method.

In order for muscles to repair and grow, you’ll need about 48 hours of rest between workout sessions. If you’re training at a high intensity, take a longer rest.

**More advanced Strength (Resistance) training terminology**

**Super Set** ~ a superset is a set of exercises with no rest periods in between. These sets may work the same muscle groups, or they may work opposing muscle groups (such as your quadriceps and hamstrings, chest and back, or biceps and triceps).

**Giant Set** ~ a giant set is a group of three or four sets that work the same muscle group. An example for the legs might be a set of squats followed by walking lunges followed by leg extensions.

**Drop Sets** ~ in a drop set, you begin your set with a heavier weight, and toward the end of the set, as you can no longer complete any more reps, and you switch to a lower weight and complete a few more reps.

**Negative Sets** ~ these sets work your muscles using only the eccentric portion of the exercise. This is a good way to work up to certain exercises. If you cannot do a pull-up for example, you can use a bench or spotter to lift yourself to the mid portion of the exercise, and then you can lower yourself to the starting position.
**Pyramid Sets** ~ here the load is increased and the repetitions are reduced until the middle set, and then it is reversed until the first weight and repetition is repeated again (e.g. 100kg x 10, 120kg x 8, 130kg x 5, 120kg x 8, 100kg x 10). Pyramid lifting is only for experienced lifters who have an established good technique.

**Half Pyramid Set** ~ this is similar to a pyramid set but it is stopped at the highest weight and lowest reps rather than returning to starting point. (E.g. 100kg x 10, 120kg x 8, 130kg x 5, 140kg x 3).

**DESIGNING A BASIC STRENGTH TRAINING PROGRAM**

Training programs are always most efficient when tailored specifically for individuals and their goals. Once you have established goals or needs of the client, then you will be able to determine different elements of the program. For example, someone who would like to improve muscles mass and strength would require high weight with low reps.

**Choice of exercises**

For beginners you can select a range of exercises that will focus on all the major muscle groups. A good “beginner” sequence of exercises would be:

- Squat (or leg press)
- Bench press (or chest press)
- Crunch
- Seated cable row
- Lunges
- Triceps pushdown
- Lat pull down
- Overhead press
- Biceps curl

For more advanced clients you can focus on only 1 or 2 muscle groups. And choose a selection of exercises just for that body muscle group.

**Order of exercises**

Most experts recommend starting with your larger muscle groups and then proceeding to the smaller muscle groups. The most demanding exercises are those performed by your large muscle groups and you will need your smaller muscles to get the most out of these exercises.

**Selecting equipment for strength training (pros and cons)**

Weight machines can be a good choice, especially if your client is just getting started with strength training.

The benefits of machines include:

- **They're supportive.** Most machines provide support, which is great for people who need help when learning new exercises. It can also be good for people rehabbing injuries or those who want to lift heavy weights without a spotter.

- **They're easy to use.** Because most machines work on a fixed path and have instructions and diagrams posted, it's easier to use good form.

- **They save time.** It usually doesn't take as much time to change weights on machines as it would for many free weight exercises.

- **They're less intimidating.** Trying to figure out what to do with a bunch of dumbbells can seem impossible. With machines, you know exactly what muscles you're working and how to do the exercise correctly.

On the other hand, machines do have disadvantages such as:

- **They're too supportive.** Because you have so much support, you use fewer muscle groups at the same time. This means you burn less calories and work the body in a less functional way.

- **They're limited.** Most machines offer one exercise for one part of the body, which means having to use multiple machines for a total body workout.
They don't allow you to work on weaknesses. Many machines require you to use both arms and legs to move the weight, so if one side is stronger than the other, that side may do more work than the weaker side.

They don't allow the body to work naturally. Because many machines work on a fixed path, there's not much room for working the body throughout different planes of motion.

The Pros and Cons of Free Weights
Free weights have the following advantages:

- **Versatility.** Free weights can be used for a variety of exercises for the entire body, so you don't have to move from machine to machine to work different muscle groups.

- **Functionality.** With free weights, you’re able to move the body through natural motions as well as through a variety of planes allowing you to mimic movements you do in real life like squatting, lifting things over your head and rotating the body.

- **Building whole body strength.** Because you’re supporting your own body, you can work on specific muscles while involving smaller stabilizer muscles that can get neglected with machine training...this can also help you burn more calories during your workout.

Like machines, free weights also have some disadvantages:

- **They’re hard to learn.** Using free weights requires skill and coordination, so you may need some instruction when using them for the first time. Good form is harder to achieve without the added support from machines, so there's a higher learning curve with free weights.

- **Risk of injury.** Because there isn't a fixed path when using free weights, it’s easier to put your body in the wrong position, which could lead to injury. There's also the risk of dropping the weights, especially if you're lifting heavy.

- **Confusion.** With machines, you know exactly what exercise you’re doing and what muscle you’re working. With dumbbells, there are so many exercises you can perform; it is easy to get confused about where to start.

With strength training, a variety of tools is often the best way to get an effective workout.

Selecting equipment for your client
When designing a program for a client, consider the following:

- Are they a beginner? It is best to build core muscles first, so best to stick with machines until they feel more comfortable with the movements.

- Do clients need quick workouts? Workouts can be more time-efficient when machines are used, as there is no equipment to be set up. However, free weight sessions can be quick if the same equipment is used throughout. If you would like to save time you could design a problem using body weight or the same free weights.

- Is your client recovering from injury? Stick with machines since they offer the most support, but always follow your doctor/physical therapist’s advice.

- Your client is comfortable with strength training and wants to get the most out of each workout in the fastest possible time: stick with free weights. You can incorporate more muscle groups at the same time.

Time management
Ensure you design the program to finish in the allocated training time. This means you ensure all the exercise time and rest periods total no more than the entire time the client has to train. This element must consider the warm up and cool down as well. An hour session should have roughly 40-45 minutes of conditioning exercises, therefore 15-20 minutes of warm up and cool down.

Ensure that your conditioning session has enough exercises to last the 40-45 minutes, it does not look very professional for a client if you run out of exercises, so it is always better to have in mind to do more, than less exercises.
Sets, repetitions and starting weight
As discussed earlier (page 12) strength training usually requires short amount of reps with an increased load, however it is best to set the session according to the level of the client’s ability. Sets that are between 8 to 12 x reps are a fairly good beginner guide for set selection.

The weight chosen for the client should enable them to sufficiently perform a maximum set of 8 to 12 repetitions to failure with good form and the last repetition being relatively difficult for the client. For beginners it is often quite hard to estimate correct weight, so you may need to trial your client on various starting weights to get this set.

Rest periods
The rest period between sets is variable according to your client’s fitness goals and may also be dependent on the time frame they have to train.

There are 3 primary aspects to consider when working out how long to rest between sets, these are:
1. The clients primary goal
2. What intensity/rep range you are using for the given exercise
3. How demanding the exercise is on your whole body.

Strength goals usually consist of longer rest periods – preferably about two minutes or more. To achieve a combination of strength and endurance – one minute rests would be fine.

Frequency of workout
You should also advise your clients how frequently they do their program which will depend on choice of exercises, goals and client availability to train.

Example: The program is for a beginner. This program is based around 18 sessions comprised of either 6 weeks of 3 sessions or 9 weeks of 2 sessions for 9 exercises.

Here’s how it works (sets X repetitions, seconds break between each set of exercise):
- Session 1 – 1 X 12, 60 seconds
- Session 2 – 1 X 12, 60 seconds
- Session 3 – 1 X 12, 60 seconds
- Session 4 – 2 X 12, 60 seconds
- Session 5 – 2 X 12, 60 seconds
- Session 6 – 2 X 12, 60 seconds
- Session 7 – 2 X 12, 60 seconds
- Sessions 8+ – 3 X 12, 60 seconds

If you look at this program, the number of sets of each exercised increased from the previous session. As the client trains and their muscular strength increases, you advise them to undertake more exercise.

Progressing a Program
Programs will need to be progressed once a client finds the sessions easier and easier. The reason for this is that clients systems within the body will have adapted to become more efficient and therefore make the exercise easier. For the client to continue to show improvements in fitness the conditioning session must be progressively made harder so the body can adapt to a new level of stress on the systems.

To produce a harder session, this can be done by applying the principles of FITT, as explained on page 6-8.
Evaluate, modify with progression and regression according to clients’ needs
At the end of a program it is important to evaluate and modify accordingly with the client’s needs, which may involve progression or regression.
As this applies to all program more information regarding this is discussed in more details in the ‘REVIEW, EVALUATE AND MONITOR PROGRAM’ section towards the end of this module.

Instruction Tips for Strength Training
Before you get started on setting up your routine, keep a few key points in mind:
✓ Have your client always warm up before starting to lift weights. Allow them to warm up with light cardio or by doing a light set of each exercise before going to heavier weights.
✓ Advise clients to lift and lower the weights slowly. Don’t allow them to use momentum to lift the weight. If you have to swing to get the weight up, chances are you’re using too much weight.
✓ Breathe. Don’t let your client hold their breath when lifting. Encourage your client to breathe out during the hard part of the lift.
✓ Stand up straight. Pay attention to your client’s posture. Ensure they remain balanced.

Example - Beginner Strength Program
For clients who are beginners you want to design an all-around strength workout.

Beginners are not ready to specifically target a muscle group. It helps to first build up a general all over strength before this more advanced training.

To design your program, choose about 8-10 exercises, which comes out to about one exercise per muscle group. The list below offers some examples:

- **Chest**: bench press, chest press machine, pushups, pec deck machine
- **Back**: one-armed row, seated row machine, back extensions, Lat pull downs
- **Shoulders**: overhead press, lateral raise, front raise
- **Biceps**: bicep curls, hammer curls, concentration curls
- **Triceps**: triceps extensions, dips, kickbacks
- **Quadriceps**: squats, lunges, leg extension and leg press machines
- **Hamstrings**: deadlifts, lunges, leg curl machine
- **Abs**: crunches, reverse crunches, oblique twists, pelvic tilts

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Identify the sets, reps and loads for the following adaptations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reps</td>
<td>Sets</td>
</tr>
<tr>
<td>Hypertrophy</td>
<td></td>
</tr>
<tr>
<td>Muscular strength</td>
<td>Power</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------</td>
</tr>
</tbody>
</table>

**Additional Reading – ‘Weight training 101’**
**SAMPLE MUSCLE STRENGTH PROGRAM**

Client Name: Joe Blogs

Date: 28/12/2013

**Program Type:** Advanced shoulder and arms muscle strength program  
**Program Goal:** Build strength  
**Injury consideration:** Poor technique, too heavy weights  
**Session Duration:** 60 mins

| Warm up |  
| 5 mins on the rower @ 80 RPM |  
| 5 mins of ROM Dynamic Stretches - |  
| 10 spiderman crawls, 10 push-ups, |

<table>
<thead>
<tr>
<th>Exercise description</th>
<th>Progression/Regression</th>
<th>Load</th>
<th>Reps</th>
<th>Set s</th>
<th>Rest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder press</td>
<td>Higher/lower weight</td>
<td>85% 1RM</td>
<td>6</td>
<td>4</td>
<td>2 mins</td>
</tr>
<tr>
<td>Chest fly</td>
<td>Higher/lower weight</td>
<td>80% 1RM</td>
<td>6</td>
<td>4</td>
<td>2 mins</td>
</tr>
<tr>
<td>Bench triceps</td>
<td>Higher/lower weight</td>
<td>85% 1RM</td>
<td>6</td>
<td>4</td>
<td>2 mins</td>
</tr>
<tr>
<td>Seated bicep curls</td>
<td>Higher/lower weight</td>
<td>85% 1RM</td>
<td>6</td>
<td>4</td>
<td>2 mins</td>
</tr>
<tr>
<td>Wide grip chin up</td>
<td>Increase weight or assisted machine</td>
<td>Body weight or additional 10KG</td>
<td>10</td>
<td>3</td>
<td>2 mins</td>
</tr>
</tbody>
</table>

**Conditioning**

| Cool down |  
| 5 mins on the rower |
| 10 mins Static stretch of the traps, lats, rotator cuffs, triceps, and biceps.
Muscular Endurance Programs

MUSCULAR ENDURANCE RECAP

The combination of strength and endurance results in muscular endurance - the ability to perform many repetitions against a given resistance for a prolonged period of time.

While muscular strength deals with short duration muscle contractions, muscle endurance deals with sustained muscle contractions and other anaerobic activities lasting less than about 90 seconds.

For example, consider a sport such as rowing. The rower is exerting a strength movement e.g. each stroke, and sustaining this over a long period of time during the race. This is muscle endurance.

WHY IS MUSCULAR ENDURANCE IMPORTANT?

Muscular endurance is the bridge between muscular strength and cardiovascular endurance. In order to be cardiovascular fit, you must demonstrate muscular endurance.

<table>
<thead>
<tr>
<th>Muscle fibres</th>
<th>Muscle contractions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Muscle strength</strong></td>
<td>Type II, fast twitch muscle fibres</td>
</tr>
<tr>
<td></td>
<td>short duration muscle contractions</td>
</tr>
<tr>
<td><strong>Muscular endurance</strong></td>
<td>Type I, slow twitch muscle fibres</td>
</tr>
<tr>
<td></td>
<td>sustained muscle contractions</td>
</tr>
</tbody>
</table>

DIFFERENT TYPES OF MUSCULAR ENDURANCE

There are different types of muscular endurance ranging from shorter bursts of power which occur many times over a long period of time - like a tennis play, to longer requirements such as marathon runner. Muscular endurance programs you design for clients will need to meet the needs of the muscular endurance required.

If a client is looking to improve muscular endurance, the best way would be to involve a client with any cardiovascular activity, such as running, biking, and playing sports.

Then if they are looking to improve the endurance of their upper body, bodyweight exercises such as chin-ups, push-ups, triceps dips, etc., will improve this, and their strength as well.

 Ideally you can blend a variety of exercises in the same routine.

<table>
<thead>
<tr>
<th>Day</th>
<th>Exercise #1</th>
<th>Exercise #2</th>
<th>Exercise #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Treadmill 15-20min-light jog to run</td>
<td>Rowing Machine 15-20min-quick pace</td>
<td>Pushups-3 sets of max # of reps</td>
</tr>
<tr>
<td>2</td>
<td>Cardio Bike 15-20min-medium to fast pace</td>
<td>Chin-ups 3 sets of max # of reps</td>
<td>Step Machine 15-20min- quick pace</td>
</tr>
<tr>
<td>3</td>
<td>Treadmill 15-20min-light jog to run</td>
<td>Skipping Rope 10-15min- fast pace</td>
<td>Triceps Dips 3 sets of max # of reps</td>
</tr>
</tbody>
</table>

*This program is meant to be spread out over a period of a week. It is also to be noted that this same program can be used as an aerobic program to improve cardiovascular endurance and performance.
Evaluate, modify with progression and regression according to clients’ needs
At the end of a program is it important to evaluate and modify accordingly with the client’s needs, which may involve progression or regression.

As this applies to all program more information regarding this is discussed in more details in the ‘REVIEW, EVALUATE AND MONITOR PROGRAM’ section towards the end of this module.

Cardiovascular Endurance Programs

CARDIOVASCULAR ENDURANCE RECAP

Cardiovascular exercise is aerobic physical activities that last longer than 90 seconds.

To understand the terminology you should know:

- cardio = heart
- vascular = related to blood vessels, and
- pulmonary = related to the lungs.

Cardiovascular or cardiopulmonary endurance is your physical ability to maintain aerobic exercise for prolonged periods of time.

Physiologically, cardiovascular endurance deals with the efficiency of your body’s (heart, lungs and vascular system) ability to transfer oxygen-rich blood to your working muscles during activities that last longer than 90 seconds.

Why is cardiovascular endurance important?
Cardiovascular endurance is very important because the more cardiovascular fit you are, the healthier your lungs, heart and vascular system is.

If you demonstrate high levels of cardiovascular endurance during exercise you also have more efficient heart, lungs and vascular system while at rest which takes up the bulk of your time.

This means less stress is put on your heart and lungs around the clock and that enables you to avoid illness and live a long healthy life. Many argue that cardiovascular endurance is the most important of the 5 components for physical fitness.

PRINCIPLES OF CARDIO FITNESS PROGRAMS

In order to improve cardio fitness it is necessary to know how to:

1. Increase the difficulty of the exercise
2. Monitor the cardio exercise to select when to progress to the next level

This can be achieved by applying the FITT principles explained on page 6-8 of this document.

Cardio Sessions
You can perform the cardio session up to 6 days per week for advanced clients.

As a general rule, for good health and weight management, everyone should aim for at least three non-consecutive days of cardiovascular activity each week. For maximum fat loss, six days of cardiovascular sessions are required.
Most cardiovascular sessions should last between 20-60 minutes for health and fitness. People on interval training programs (see further in notes) may find that they can do less and still receive considerable benefit.

**Volume and intensity**
With cardio sessions there is a correlation between volume and intensity.

This means that, by necessity, the longer you perform your cardio session, the lower the intensity will be. And vice versa, the more intense your session, the shorter it will be.

What considering the intensity of cardio training the aim or goals of the session must also be considered, there is certain training zones which will affect and improve different elements fitness. For example, training within specific heart rate zones will achieve varying adaptations; this is explained in more details below.

**BEST TIME TO PERFORM CARDIOVASCULAR ACTIVITY**

There is not a best time to perform cardiovascular activity to achieve cardiovascular adaptations. There is a misconception that training in the morning is best to perform this type of exercises, but this is more related to weight loss due to insufficient amount of energy present in the blood stream therefore fat might be utilised earlier.

However, to achieve fat loss, the best time to perform cardiovascular training is when glycogen, blood sugar, and insulin levels are low. This is not always advised and could be detrimental to some individuals, due to little energy being available to produce the energy needed.

**TARGET HEART RATE**

Heart rate can be used effectively throughout the cardio session to achieve specific adaptations; this is called Heart Rate Zone Training. The benefits range from weight management, aerobic zone, anaerobic zone, and red line zone. Each effect is targeted by using a specific percentage of the maximum heart rate as shown in the table below:

<table>
<thead>
<tr>
<th>Heart Rate Zone</th>
<th>Effect</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 – 70%</td>
<td>Weight Management (recovery zone)</td>
<td>This training zone efficiently uses fat to produce energy, therefore good to reduce fat levels. This training zone will develop your cardiovascular and respiratory systems</td>
</tr>
<tr>
<td>70 – 80%</td>
<td>Aerobic zone</td>
<td>Increasing your VO2 maximum (the highest amount of oxygen that can be consume and utilised during exercise. Also increases Lactate tolerance – therefore fight fatigue better.</td>
</tr>
<tr>
<td>80 – 90%</td>
<td>Anaerobic zone</td>
<td>This zone burns the most calories but can only be maintained for short period of time. This usually occurs during interval training.</td>
</tr>
<tr>
<td>90 – 100%</td>
<td>Red line zone</td>
<td></td>
</tr>
</tbody>
</table>

Working inside your target heart rate training zone is the best way to ensure that you get the best out of your cardio workout.

Staying between the upper and lower limits will prevent you either stressing your body too much or working at a level that will not give results.

The optimal heart rate to train cardio is at your “Target Heart Rate” or THR.

It is calculated as:
- 60-85% of the **maximum heart rate** - the ideal intensity level to exercise the heart at.
- Maximum heart rate = 220 minus your age

The problem with this type of training is that it is not always possible to know the clients heart rate unless they have a heart rate monitor.
CARDIO TRAINING PROGRAMS

Cardio Machines – Standard Training
Cardio machine sessions are probably the most common form of cardio training in fitness centres. There is a wide range of cardio trainers in most fitness centres to base a cardio session on, they include:

- Treadmills
- Stair climbers
- Stationary Bikes
- Cross Trainers
- Rowers

Standard cardiovascular training is simply a 20-60 minute session on one of these machines. However there are more advanced training methods you can use these machines for in your clients’ programs.

Interval Training
An interval exercise is one which raises your heart rate up to high levels for short periods of time.

To achieve this simply means alternating between higher and lower levels of intensity during your cardio training.

The advantage of interval workouts is their increased intensity causes your body to adapt more efficiently compared to steady state activities.

Additional Reading - ‘The Insider Secrets of Interval Training’

Fartlek Training
Fartlek means ‘speedplay’, and refers to completing a continuous session but constantly altering the intensity of the activity.

For example:
Running for a specific duration whilst changing the intensity from lower to high and then high to low:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>50%</td>
</tr>
<tr>
<td>2 minutes</td>
<td>75%</td>
</tr>
<tr>
<td>4 minutes</td>
<td>50%</td>
</tr>
<tr>
<td>30 seconds</td>
<td>85%</td>
</tr>
<tr>
<td>1 minute</td>
<td>30%</td>
</tr>
</tbody>
</table>

The intensity can be related to the length of the overall activity, so you might have more often high intensity burst if the duration is short or less high intensity burst if the duration is long.

This type of training is a great way for the clients’ systems to adapt, resulting in an increased fitness level. The reason for this is that the heart rate is constantly being elevated and then reduced, so to keep up with the higher intensities the body adapts to make it more efficient.

Circuit Training
Circuit training is similar to interval training in that the purpose of circuit training is to keep participants moving by only allowing minimal breaks between exercises.

However circuit training does not necessarily have to “spike” the heart rate as in interval training.

Circuit training creates an environment to keep pushing the body aerobically, while still challenging strength development.
Circuit training will be discussed in detail further in this module under group training.

**Cross Training**

Cross training involves performing a program that contains an activity that is different from the normal activity that the client participates within. For example, a client who regularly competes in running events can perform swimming as a form of cross training.

It can be done within the same routine or just on alternate days. For within a single workout someone can spend five minutes on a treadmill, five minutes on a stationary cycle, and so on for a total of 30 minutes.

Cross-training can help you improve your overall fitness and performance. But that’s not all. Cross-training can also:

- **Reduce your risk of injury.** Cross-training gives your bones, muscles and joints a rest from repetitive stresses. Alternating between a high-impact activity, such as running, and a low-impact activity, such as cycling, can help you avoid overuse injuries and reduce the risk of other injuries.

- **Keep you interested.** Exercise can be more fun when you’re not doing the same activity every day. The variety may help you stick with your exercise program.

- **Help you burn extra calories.** Cross-training can keep you exercising more regularly, which helps you burn more calories. Any fat you lose can improve your performance.

- **Double as a backup plan.** If your bike breaks down, you can still jog. If you hurt your ankle, you may still be able to swim.

**Example of Cross Training:**

- **Warm-up:** Five minutes of walking
- **Treadmill:** 10 minutes at 70% of MHR
- **Bike:** 10 minutes at 70% of MHR
- **Elliptical:** 10 minutes at 70% of MHR

**ESTABLISHING THE RIGHT INTENSITY**

With a new client it is important to establish the required intensity. This can be estimated using heart rate programming as previously discussed.

In addition, you can start a client on a program and gradually increase intensity – for example: when developing a “cross training” cardio program for beginners consider alternating low-level aerobic activities with more intense activities until they gradually get more cardiovascular fitness.

**Example:**

- → 20 minutes of stationary cycling (low level)
- → Plus 10 minutes of jumping rope

**Evaluate, modify with progression and regression according to clients’ needs**

At the end of a program is it important to evaluate and modify accordingly with the client’s needs, which may involve progression or regression.

As this applies to all program more information regarding this is discussed in more details in the ‘REVIEW, EVALUATE AND MONITOR PROGRAM’ section towards the end of this module.
Identify the heart rate zone to gain the following benefits:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase VO2 Max</td>
<td></td>
</tr>
<tr>
<td>Burn fat</td>
<td></td>
</tr>
<tr>
<td>Improve the function of the cardiovascular system</td>
<td></td>
</tr>
</tbody>
</table>
# SAMPLE CARDIO PROGRAM

<table>
<thead>
<tr>
<th>Client Name: Joe Blogs</th>
<th>Date: 4/01/2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Type:</strong> Aerobic interval session</td>
<td><strong>Program Goal:</strong> Develop aerobic capacity</td>
</tr>
<tr>
<td><strong>Injury consideration:</strong></td>
<td><strong>Session Duration:</strong> 60 mins</td>
</tr>
</tbody>
</table>

## Warm up
- 5 mins jogging
- 5 mins of ROM Dynamic Stretches – walking lunges, walking toe touch (hamstring stretch)
- 3 x 10 metres high knees, bum kicks, high skips

## Exercise description

### Conditioning
- 600 metres @ 60% effort
  - Rest for 30 seconds
- 200 metres@ 80% effort
  - Rest for 90 seconds

**Repeat X 5**

### Cool down
- 5 mins jogging
- 10 mins Static stretch of the traps, lats, rotator cuffs, triceps, and biceps.
Flexibility Programs

FLEXIBILITY RECAP

Flexibility is the range of motion possible for each of your joints or groups of joints. Each joint has a different potential range of motion.

WHY IS FLEXIBILITY IMPORTANT?

To some degree, flexibility determines how efficiently your muscles are. Increased flexibility has also been associated with decreased risk of acute and chronic (overuse) injuries.

Poor flexibility can also directly affect cardiovascular endurance, muscle strength and muscular endurance.

Increase flexibility with stretching

Stretching is the most popular way of increasing flexibility. Some of the benefits include:

- You'll improve your performance and reduce your risk of injury
- You'll reduce muscle soreness and improve your posture
- You'll help reduce lower back pain
- You'll increase blood and nutrients to the tissues
- You'll improve your coordination
- You'll enjoy exercise more and help reduce stress

HOW TO STRETCH

Before you begin stretching, ensure your clients are properly warmed up. Therefore stretching BEFORE a session consists of the client performing an activity (usually aerobic activity) to increase the metabolism and blood to warm the client, stretching cold muscles can lead to injury.

Stretching AFTER a session is ideal, as the muscles are already warm. When stretching after the workout, focus on the muscles used, paying close attention to any chronically tight areas.

Try to hold each stretch for 15-30 seconds to get some long-term flexibility benefits. You can also have your clients stretch between strength training sets.

Evaluate, modify with progression and regression according to clients’ needs

At the end of a program is it important to evaluate and modify accordingly with the client’s needs, which may involve progression or regression.

As this applies to all program more information regarding this is discussed in more details in the ‘REVIEW, EVALUATE AND MONITOR PROGRAM’ section towards the end of this module.

Additional Reading – ‘Types of Stretching’
Body Composition Programs

BODY COMPOSITION RECAP

Body composition is the make-up of the body and refers to the percentage of muscle, fat, bone and other vital parts of the body. A fitness professional is mostly concerned about the percentage of body fat and percentage of muscle.

The easiest way to look at body composition is comparing:

- A - Body fat to
- B - Lean body mass such as muscle, bone, water, and organs.

WHY IS BODY COMPOSITION IMPORTANT?

You could say body composition depends on the other components of physical fitness.

Having a poor body composition has many negative physical and psychological effects such as increased chance of a host of chronic diseases and depression.

As mentioned previously, improper exercise habits and choices can not only lead to being overweight and obese, but also may lead to decreased bone mass associated with osteopenia and osteoporosis.

USING BODY COMPOSITION MEASUREMENT FOR TRAINING

Body composition is commonly measured by the Body Mass Index (covered elsewhere in this course).

The body mass index (BMI) will give a measurement of the percentage of body fat a client has. If a client has a high body fat %, then you can target a lower % body fat as a training goal.

Weight Loss versus Fat Loss

Weight loss is a very misunderstood aspect of body composition. You can use weight loss to improve your fitness but it can also negatively affect your fitness levels if weight loss is related to muscle mass reduction.

Consider the example of a large athlete who is fit and healthy, yet weighs considerably more than a typical person because of higher muscle mass. In this scenario measuring just weight is not a good gauge of health or fitness.

The Importance of Fat Loss

Fat Loss is not only about helping your client look or feel better about their body image.

Your body’s ability to store body fat is almost limitless. Most of our stored body fat serves as an energy reservoir which is readily available for use.

Most of our excess body fat is stored as subcutaneous (under the skin) fat which you can see on the right as the white tissue surrounding the muscles.

Excess body fat can be the primary cause of a host of problems not limited to high cholesterol, heart disease and high blood pressure.

What is a Good Fat Loss Training Strategy?

When working with clients on a Fat Loss program, slow and steady weight loss with proper exercise and nutrition is the only way to lose fat, maintain muscle and keep the client’s metabolism stable so they do not rebound and regain the weight lost.

The reason so many Fat Loss exercise programs fail is they are designed for the short term.

These programs do not work and the body’s metabolism can be negatively affected. Even worse, each time weight is lost and regained the body may become more and more resistant to reaching your ideal weight.
The key mix for efficient fat loss programs includes:
- resistance training
- cardiovascular exercise
- healthy nutrition
- option for dietary supplements

**BEST EXERCISE CHOICES FOR FAT LOSS PROGRAMS**

**Cardio Exercises**
Any modes of cardiovascular exercise such as running, jogging, hiking, bicycling, and cardio machines can be exercises to lose weight efficiently.

It is important to note the type of cardio exercise is NOT as important as the exercise intensity. For example ~ going at a slower pace but more intense on a stepper, is better than going faster but less intense, say, on the treadmill.

It is also important to change around your client’s cardio routine often. The body can begin to adapt and get used to routines, so changing the routine will ensure the body is constantly adapting.

While most of the time exercises to lose weight quickly are high intensity and vigorous, it is very important to 'keep your body guessing' by changing your activities and exercise intensities periodically. Plus, high intensity cardio exercise can be hard on the body. If you perform the same motion over and over again at high intensities (especially on a low calorie diet) you become likely to develop nagging problems such as stress fractures and tendonitis.

**Strength Exercises**
For fat loss, you should design programs with exercises that work as much muscle mass as possible. Isolation exercises ('toning exercises') serve no purpose for anyone looking to lose weight fast.

Choose exercises that have **compound** movements, these exercises work several muscles groups at the same time. For example, an isolated bicep curl only targets one muscle group, whereas a chin up will target biceps and other muscles in the back during the same movement.

There are also exercises which can be combined to turn into a compound movement, for example lunge with a twist.

**Combining Cardio and Strength exercise**
A combination of cardio and strength exercise used within an exercise program can be an effective way to increase the energy burnt by the body and therefore encourage weight loss. However, it is not always possible to long slow cardio activities within a session that only lasts 45-60 minutes, instead, the cardio exercise can include short bursts in between the strength exercises. This stimulates the heart rate to increases and more energy to be used, increasing metabolism.

The short bout of cardio can be the same, or may be different. An example of combining cardio and strength exercises using different cardio exercise is as follows:

<table>
<thead>
<tr>
<th>Strength exercise 1</th>
<th>Walking lunges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short bout of cardio</td>
<td>Skipping 60 seconds</td>
</tr>
<tr>
<td>Strength exercise 1</td>
<td>Push up with dumbbell row</td>
</tr>
<tr>
<td>Short bout of cardio</td>
<td>Mountain climbers for 60 seconds</td>
</tr>
<tr>
<td>Strength exercise 1</td>
<td>Squat with shoulder press</td>
</tr>
</tbody>
</table>
FAT LOSS MYTH

There is no such thing as spot reduction – where you lose weight in a certain area.

The common myth of “spot reduction” is where clients think they can burn fat off the stomach by completing sit ups or abdominal crunches. In fact this is likely to cause a bigger stomach as the development of the abs underneath the fat will cause the stomach to bulge further.

Whether your client thinks they need to "lose the most weight" in arms, legs, mid-section or face - exercise selection is going to be relatively the same.

Evaluate, modify with progression and regression according to clients’ needs
At the end of a program is it important to evaluate and modify accordingly with the client’s needs, which may involve progression or regression.
As this applies to all program more information regarding this is discussed in more details in the ‘REVIEW, EVALUATE AND MONITOR PROGRAM’ section towards the end of this module.

MONITOR EXERCISE INTENSITY

Talk Test
The talk test can be used to identify how hard the client is finding the exercise, and is effective when a heart rate cannot be obtained.

The Talk Test ✎ You should be able to carry on a conversation while exercising. This doesn’t mean you shouldn’t breathe hard, but if you can’t speak and can’t catch your breath, that’s too much exertion, so slow down.

Rate of Perceived Exertion (RPE)
This is another method used to identify the intensity of the client, by receiving feedback from the client on how hard they are feeling it.

It consists of the instructor presenting the client with a RPE scale (as seen below), where they can identify their rate of perceived exertion according to the description. This basically suggests how hard to client feels they are working and can be used to evaluate the intensity level of the client. This method is great to use with individual who may have a heart condition.
<table>
<thead>
<tr>
<th>EFFORT</th>
<th>Description</th>
<th>Intensity level</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Extremely light</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Very light</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>50% MHR</td>
</tr>
<tr>
<td>11</td>
<td>Light</td>
<td>60% MHR</td>
</tr>
<tr>
<td>12</td>
<td>Somewhat hard</td>
<td>70% MHR</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>80% MHR</td>
</tr>
<tr>
<td>14</td>
<td>Hard</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Very hard</td>
<td>90% MHR</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Very, very Hard</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>MAXIMUM EFFORT</td>
<td></td>
</tr>
</tbody>
</table>
GROUP EXERCISE TRAINING

Group Exercise Participants
Planning a group class is different from an individual program because you now need to consider the needs and goals of a group of people, not just one person.

For example, with an individual client you need to undertake a detailed health screening to determine their exercise or health needs and goals, and therefore be able to create a program to target these. However in a group training scenario, there may be up 20 or 30 individuals who have contrasting needs or goals as well as a range of abilities.

Therefore a group training sessions should be dynamic enough to try to accommodate a range of participants that might range from:

- Experienced (advanced)
- Inexperienced (beginners)
- Different age groups – older adults through to children
- Pregnant women or new mothers
- School groups
- Participants with special needs
- Tourists
- Club members
- Clients with different work schedules
- General public
- Variety of ethnic group

PARTICIPANT AIMS

Whilst it is difficult to target individual goals of clients in a group context, a fitness professional can still target ‘group aims or needs’.

It is always a good idea to ensure in the promotion of a group class that you clearly indicate the description and goals of the class. This way, participants can choose to undertake the class or not based on their needs.

The aims of group participants could include:

- General fitness (i.e. whole body circuit training)
- Self-improvement
- Specific fitness components (i.e. cardio blast)
- Lifestyle adjustments (i.e. functional master class)
- Technical (i.e. strict yoga poses versus general stretch)
- Social (i.e. mums and prams)
- Competition or performance targets

CLASS TYPES

There are many different group exercise class types. Some of the most popular group exercise classes include the following; however this is only a small selection of the range that is available:

- Body Combat
- Body Attack
- Body Step
- Body Pump
- Tabata/Cross Fit
- Aqua
- TRX
- Kettlebells
CATEGORISING GROUP EXERCISE PROGRAMS

It is important that you categorize and describe your training program. Why? It helps clients self-select the class based on their needs and objectives. For example, it will provide the basic overview for a new client and describe what they can expect in this class.

The client can then determine for themselves if they are right for the class or not.

Types of ‘class categories’ you can use include:
- Advanced / Intermediate / Beginner
- Low impact / high impact
- Morning / lunch / afternoon / Evening
- Circuit based
- Body weight/Free weights
- With Music/Without music
- Choreographed / freestyle
- Physiology categorized i.e. body fat utilization / muscle conditioning / flexibility / relaxation
- Equipment used i.e. stationary cycle, free weights

For example if you run a “Body Pump Class at 6am” this may be categorized by the following:
- Early morning class
- Circuit based
- Body fat based
- Free weights based

This would give clients a good understanding of what is involved.

WRITING A PROGRAM

Not only do you need to plan the program, but you need to be able to write this program down clearly.

Writing down a program helps you plan the program properly and then communicate this with other members of staff if required.

A written down fitness program is a clear guide which your client can then follow and refers to when exercising.

We will look at program writing in the following steps:

1. Pre-Program
2. Program Session
3. Review Program

PRE-PROGRAM

There are a lot of aspects to consider for a program before the class even begins.

Client Screening and Enrolments
Typically with group classes you will not be able to conduct individual and detailed screening so alternative screening methods are needed for groups.

Effective measures for screening groups can include:
- Describing your class aims and level in promotion so clients self-screen themselves
- Talking to new participants prior to class
- Explanation of exercises prior to class so clients can opt out

You also need to consider enrolment details:
- How will clients join your class?
- Will they pay before or after?
- How do you manage late arrivals?

The group should be address and asked whether anyone has any injuries or conditions that might stop them participating in some exercises that may be incorporated in the program.

Safety Considerations
You must also ensure you have thought through all safety considerations in running your class. These considerations include:
- appropriate intensity and complexity
- overcrowding
- ventilation
- hygiene
- climate control
- floor surfaces
- room structure
- stage position
- participants’ clothing and footwear
- access to First Aid support

Equipment Selection
Determine what equipment and resources you need for your class. Ensure they are all in working order and you have enough for necessary for the class.

Pre-class instructions
The pre-class instructions involve the fitness professional discussing the following aspects with the client:
- welcome
- personal introduction
- outline the class level
- appropriate and safe footwear and clothing
- pain/discomfort
- rests
- correct exercise techniques
- exercise sessions per week
- correct breathing
PROGRAM SESSIONS

Sessions or Phases within the Program
Your program needs the following phases:
  o preparation phase i.e. set up and warm-up
  o conditioning phase i.e. core part of the training session, high intensity
  o recovery phase i.e. warm-down and session end

Duration of Sessions
You need to decide on the duration and frequency of sessions. This might be influenced by both the aims and the time available.

Exercise Selection
The next step is to choose and allocate types of exercises in each of the phases in the plan.

Choose your exercises based on the physiological response you want for the class (fat burn, cardio, strength) and the intensity for the class. It is also important to select a varied exercise repertoire to maintain interest and motivation.

You’ll also need to estimate a timeline for each exercise to stay within the overall class time.
QUICK GUIDE TO CREATING A GROUP FITNESS PROGRAM

Step 1
Establish the target audience

Step 2
Create the aims for the group exercise class

Step 3
Determine the type of class

Step 4
Establish exercises to be included in the group program.
These are associated to the aims and type of class.

Step 5
Determine the reps (duration), sets and loads of the program

Step 6
Create a program specific warm up and cool down.

Step 7
Write the pre-program instructions
REVIEW THE PROGRAM

The final element of the program is the review it once the program has been implemented.

This allows continual improvement and development which should keep client happy.

As the trainer you will get direct and indirect feedback from participants e.g. what do they like and don’t like.

What was the general feedback?
As people participate, their abilities and fitness level should change and the program they are undertaking should change accordingly.

You review section might mention ways to increase intensity or to adapt the program to different groups. Similar to the programs for individuals, more information regarding this is discussed in more details in the ‘REVIEW, EVALUATE AND MONITOR PROGRAM’ section towards the end of this module.

Circuit Training

OVERVIEW & OBJECTIVES

Circuit training is a combination of high-intensity aerobics and resistance training designed to be easy to follow, give you a great workout, and target fat loss, muscle building and heart-lung fitness.

An exercise “circuit” is one completion of all prescribed exercises in the program; the idea being that when one circuit is complete, you start at the first exercise again for another circuit. Traditionally, the time between exercises in circuit training is short, often with rapid movement to the next exercise.

Equipment or no equipment? Circuits can be designed using all sorts of equipment to no equipment at all. They can be designed for indoor or outdoor delivery. The concepts of design and delivery are the same for any circuit program you design, regardless of whether you make use of equipment or not.

BENEFITS OF CIRCUIT TRAINING

Circuit training is well suited for developing aerobic endurance or fat burning.

Advantages of circuit training:

- May be easily structured to provide a whole body workout.
- Does not require expensive gym equipment.
- Participants normally work in small groups, allowing beginners to be guided by more experienced individuals, as well as benefitting from the supervision of the instructor.
- Can be adapted for any size workout area.
- Can be customized for specificity; easy to adapt to your sport.
It is, however, not so suitable for those wishing to build strength or muscle bulk. The duration of some circuit training stations can be in the region of 45 to 60 seconds, and in some cases as long as two minutes. These circuits typically mean that the number of repetitions performed on each station is relatively high, putting each exercise way out on the endurance end of the intensity continuum.

Those wishing to optimize their increase in strength or muscle bulk (hypertrophy) can reduce the number of repetitions performed and increase the weight to be lifted or increase the intensity, when hydraulics or elastics are used.

On the other hand, longer station length is quite appropriate for any cardiovascular (aerobic) stations included in the circuit.

Station times can be reduced to 15 or 20 seconds when all of the participants have an adequate level of experience. Reduced station times will encourage the participants to lift a heavier weight, which means they can achieve overload with a smaller number of repetitions: typically in the range of 4 to 12 depending on their training goals. However, this provides little time for an instructor to ensure that the activity remains safe and effective by observing technique, posture, and form.

CIRCUIT EXERCISES & EQUIPMENT

Circuits can be designed with no equipment. The range of non-Equipment Exercises you can consider include:

- Pushups & variations
- Sit ups & variations
- Step ups
- Crunches
- Back extensions
- Free squats
- Jumping jacks

If you plan to use equipment, common choices of equipment include:

- Dumbbells
- Hand weights
- Barbells
- Therabands
- Skipping ropes
- Cones
- Medicine Balls
- Bosu Balls
- FitBalls
- Kettlebells
- Cable machines
- Machine based equipment
- Step box
POINTS OF PROGRAMMING A CIRCUIT CLASS

Typically a circuit is made up of nine to 12 stations. This number varies according to the design of the circuit. The program may be performed without equipment or using equipment such as exercise machines, hydraulic equipment, hand-held weights, elastic resistance, calisthenics or any combination.

Here is what you need to consider when planning circuit class:

- Your clients’ standards of fitness
- The fitness aims of those taking part
- Amount of time available, normally 45 - 60 minutes
- Confirm appropriate exercise area
- Time at each station (or how many reps/sets)
- Rest periods between stations
- Transition between stations i.e. instructor blows whistle or time limit set or number reps set
- Space and equipment that is available
- Motivational music, and suitable sound system
- Support materials i.e. instructional cards
- Time and opportunity to teach and demonstrate exercises
- How you will monitor the session
ADDITIONAL CIRCUIT IDEAS

Stretch or relaxation circuit
A circuit does not always have to train at high intensity or to the maximum of clients ability; instead a circuit training session could revolve around more relaxed exercises that involved stretching, breathing and relaxation techniques.

DUPLICATION i.e. set up station with pairs
Think about setting up the circuits and have clients train in pairs rather than on their own. This can give clients an additional person to motivate them or even be competitive against. For example, one client may have to do 10 sit ups, and then swap, and whilst their partner is performing the exercise, they get to rest.

It is important that clients are paired off with a partner of similar capabilities and motivation. Remember motivation can be an individual thing, but clients can be categorized into enjoying certain types of motivation.

The apparatus to be worked on is also duplicated. Each person competes simultaneously against the other in the number of repetitions attained in the present time. This is the most common lay out.

Split Circuit
Person moves along line of apparatus performing predetermined repetitions on each selected apparatus in personal preferential order, no rest allowed. For example 15 reps on each exercise, then move on to the next exercise. Second time around reps may change.

Overtaking
Circuit training persons start off at intervals and try to overtake the person in front - techniques must be correct. Always have a minimum of two sets of equipment laid out. An excellent addition to this is to get the group to run completely around the circuit stations, then on to the next exercise. Make sure that if you do this method, your group is fit, and there is sufficient space to run around.

Team Circuit
One team performs, the others rest - time or reps tried to be bettered, or set teams in lines and all work together. Move on to next exercises when the whole team has finished. (Teams must be of similar ability). Good for motivating and bonding teams.

BENEFITS OF CIRCUIT TRAINING
There are a number of benefits that can be enjoyed by conducting circuit classes, these include:

- Ease of conducting the session
- Ease of controlling a group of participants
- Client can familiarise themselves with exercise that are repeated so less instruction is required
- Clients feel part of a team in group circuit training
- The session can be completed in a short amount of time
- The session can be complete with minimal equipment

Additional Reading – ‘Circuit training and equipment’ & ‘Sample body circuit’
List 4 exercises for each category listed below, that can be used within a circuit:

<table>
<thead>
<tr>
<th>Category</th>
<th>Exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardio Based exercises (non-machine)</td>
<td></td>
</tr>
<tr>
<td>Body weight exercises</td>
<td></td>
</tr>
<tr>
<td>Using non-traditional equipment</td>
<td></td>
</tr>
<tr>
<td>Combination exercises incorporating 2 exercises together</td>
<td></td>
</tr>
<tr>
<td>Body composition based exercises</td>
<td></td>
</tr>
</tbody>
</table>