

The principles of training



UNTAMED
EDUCATION

1.3.3 Physical training

Karvonen Formula

Training Methods

Training programme

Specificity

Progression

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FITT

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1. Training programme

When people decide to get fit the best method is to create a training programme that meets the needs of the **individual** and their **goals**.

- ▶ A training programme should be designed using the **SPOR** Training principles.
- ▶ A person should use a **variety** of training methods to achieve their exercise goals.

We will look at these principles of training and training methods in more detail.



2. SPOR Principles of training

The **four SPOR training principles** help an athlete design their fitness programme.

Specificity

- ▶ An athlete needs to identify the muscles they need to train as well as the **energy system** (**aerobic** or **anaerobic**) and **fitness components**.
- ▶ You should also ensure that you are rehearsing the specific skills for your sport in training.



Progressive overload

- ▶ The aim of all training programmes is to **progress** your **fitness**.
- ▶ Progression needs to be **gradual** as too much too soon can cause **injury**.
- ▶ There is a danger of **plateauing** in training and staying at the same level. Motivation and determination is then required to push on and progress further.





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Overload

To ensure that the athlete makes progress we must **gradually** make the training programme **more difficult**.

We can do this using the **FITT principles**;



- ▶ **Frequency** - Increase the number of sessions you do (how often).
- ▶ **Intensity** - Increase the resistance or speed you are working at (how hard).
- ▶ **Time** - Increase the amount of time you train per session (how long/duration).
- ▶ **Type** - To ensure overload you should take part in different types of training, i.e. interval, continuous, running, swimming.

Reversibility

- ▶ If you **stop training** then you can quickly lose fitness.
- ▶ Your muscles may shrink, this is called **atrophy**.
- ▶ This can sometimes happen when you have a **long-term injury**.
- ▶ If you stop, it can take up to three times as long to gain that fitness back.



3. Heart rate

Resting Heart Rate

- ▶ The average resting heart rate is 72 beats per minute.

Working Heart Rate

- ▶ When we start to exercise our heart rate increases.

Recovery Heart Rate

This is lower than the working heart rate but still higher than resting so additional oxygen can be taken in to repay oxygen debt.



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4. Types of training

► The principles of training need to be applied to the training methods you use. In the GCSE course we focus on **7 training methods**.

- i. Circuit
- ii. Weight/resistance
- iii. Plyometrics
- iv. Fartlek
- v. Continuous
- vi. Interval
- vii. Static stretching

► For each type of training you need to know the **advantages**, the **disadvantages** and how to apply the SPOR training principles.



5. Circuit training



- A number of exercises or skill stations are set up in a circuit.
- A circuit usually has 6-12 stations.
- Timed circuits - complete as many reps as possible in a given time
- Fixed load circuits - complete a set number of repetitions
- Varied circuits - the time and the work:rest ratio changes from circuit to circuit

Advantages

- I. All components of fitness can be trained.
- II. Large groups can train together.
- III. Easy to set up.

Disadvantages

- I. Not really suited to individual training.
- II. Large space is required.
- III. Fatigue can affect technique and cause injury.

Athletes it would benefit

The flexibility of this training method benefits a range of athletes especially games players.



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6. Weight/resistance training

Weight training involves the use of free weights (experienced) or resistance machines (less experienced).

- ▶ To develop muscular endurance, lift lighter weights for a high number of reps.
- ▶ To develop strength/power, lift heavier weights for low reps.

Advantages

- I. Can focus on specific muscles or muscle groups.
- II. Depending on the weight and the number of reps either strength/power can be the focus or muscular endurance.

Disadvantages

- I. When using weights, poor technique can lead to injuries.
- II. A spotter is needed when using heavy weights.
- III. Weights can be expensive and you usually need to pay to use a gym.

Athletes it would benefit

Sports where power, strength and muscular endurance are important fitness components. These include boxing, rugby, sprinting and climbing.

7. Plyometrics

- ▶ Plyometrics are used to develop fast, explosive and powerful muscle contractions.
- ▶ The exercises involve different power jumping movements.
- ▶ On the downward phase the muscle extends and lengthens (eccentric isotonic contraction). A powerful contraction on the upward phase of the jump is produced (concentric isotonic contraction).

Advantages

- I. It simulates sporting movements, allowing you to run faster, throw further and jump higher and longer.
- II. Requires little or no equipment.
- III. The exercises can be done anywhere.
- IV. Short and high intensity work out.

Disadvantages

- I. The main disadvantage of plyometrics is the risk of injury. The exercise puts a large amount of strain on muscles and joints.
- II. Three days of recovery is needed between each session.
- III. Good levels of strength are needed.

Athletes it would benefit

Any sports that rely on power for high performance. These include sprinting, high jump, discus throwing.

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8. Fartlek training

- ▶ Fartlek means “speed play” in Swedish.
- ▶ The method involves exercising and changing the speed and intensity you work at.
- ▶ An example is running at 80% for 30 secs, then 50% for 2 mins, then 70% for 1 minute. This is repeated for the desired amount of time.

Advantages

- I. Improves both the aerobic and anaerobic systems.
- II. Helps to recreate the demands of game play.
- III. Can be done anywhere and individually.
- IV. Adds variety so relieves boredom.

Disadvantages

- I. Sometimes it is hard to determine how hard to work at the different intensities.
- II. High motivation is needed from the performer when the harder parts of the session are being performed.

Athletes it would benefit

This would benefit experienced athletes who are required to vary their pace during performance. This includes long distance runners, footballers, hockey players, rugby players and cyclists.

9. Continuous training

- ▶ Continuous training focuses on improving the aerobic system and cardio-vascular endurance.
- ▶ It requires the athlete to perform cardio-vascular activities such as running, cycling and swimming in the aerobic training zone for a minimum of 20 minutes.
- ▶ Continuous training is also a good way to burn calories.

Advantages

- I. Improves aerobic performance.
- II. No specialist equipment needed.
- III. Easy to overload by increasing the distance or time.
- IV. Ideal for beginners and people training individually.

Disadvantages

- I. Performing the same activity for long periods of time can be boring.
- II. Not suitable for groups or teams.
- III. Does not improve anaerobic fitness.
- IV. Over use injuries such as shin splits can occur.

Athletes who would benefit

Any athlete who requires large amounts of cardio-vascular endurance to perform. Cyclists and marathon runners.



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10. Interval training

- ▶ Interval training involves working at high intensity followed by a period of rest or low intensity.
- ▶ This is repeated a number of times.
- ▶ An example is - 200m, 3 mins rest, 200m, 3 mins rest, 200m, 3mins rest.
- ▶ You can change the distance or the time you're allowed to rest.

Advantages

- I. Allows you to mix aerobic and anaerobic work.
- II. Training is suitable to team sports.
- III. Monitoring progress is easy.
- IV. No specific facilities or equipment are needed.

Disadvantages

- I. Working the body at maximum intensity can result in injury.
- II. High motivation is needed from the performer to work at high intensity.
- III. At least 48 hours of recovery is needed.

Athletes who benefit

Any athlete who is required to work anaerobically for long or short amounts of time.
Racket players, middle distance athletes and games players.

11. Fitness classes

- ▶ Body pump - group exercise that involves resistance training to improve strength.
- ▶ Aerobics - Exercise that involves movements to music to improve cardiovascular fitness.
- ▶ Pilates and Yoga - exercises that focus on core body strength
- ▶ Spinning - High intensity work on stationary bikes to improve cardiovascular fitness.

Advantages

- I. Variety reduces boredom.
- II. Meet new people.
- III. Motivating and encourages high effort.
- IV. Training is organised for you.

Disadvantages

- I. Classes cost money so this type of training can be expensive.
- II. Classes are not tailored to individual needs.
- III. Incorrect technique may not be corrected.

Athletes it would benefit

All athletes as this is important in injury prevention.
Specialist flexibility athletes such as gymnasts, dancers and trampolinists.

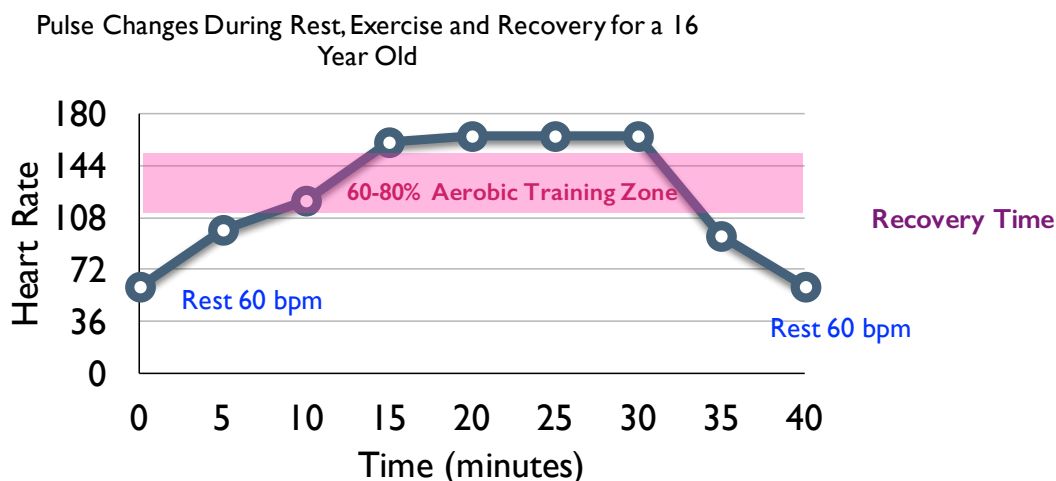
12. Karvonen Formula

- ▶ Training zones are an effective way to measure intensity.
- ▶ To calculate your target heart rate we use the **Karvonen formula** and these heart rate measurements
 - ▶ RHR = Resting heart rate.
 - ▶ MHR = Maximum heart rate = $220 - \text{age}$
 - ▶ THR = Target heart rate

$$\text{THR} = (\text{MHR} - \text{RHR}) \times \% \text{ Intensity} + \text{RHR}$$

13. Aerobic training zone

- ▶ To improve your cardiovascular endurance you must **raise your heart rate** into the training zone and stay there for at least 15 minutes.
- ▶ Aerobic training thresholds are calculated between **60 and 80%** of the maximum heart rate using the Karvonen Formula



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14. Anaerobic training zone

- Anaerobic **training thresholds** are calculated between **80 and 90%** of the maximum heart rate using the Karvonen Formula.

