

4° ESO

PRINCIPLES OF TRAINING

FOOD

BALANCE DIET

DIET AND ENERGY

DIET AND SPORT

**PHYSICAL
EDUCATION**

FOUR BASIC PRINCIPLES OF TRAINING

- **Specificity**
- **Overload**
- **Progression**
- **Reversibility**

Training needs to be done to maintain or improve fitness levels and skilled performances

SPECIFICITY

- Specificity: training must be specific to particular sport or aspect of fitness



OVERLOAD

- Overload: Overloading body systems with higher work rates and increased loads means the body has to adapt and meet these demands

This can be done in three ways:

- **Frequency:** number of training sessions, eg. one per week or per day.
- **Intensity:** increasing distances run, repetitions or weight.
- **Duration:** length of training sessions.



PROGRESSION

- Progression: as the body adapts, training needs to be more progressive so that greater demands are made. It is a necessary progression from simple skills through intermediate to complex skills.

Sometimes the performer makes little progress and reaches a plateau where performances remain the same, but this may



REVERSIBILITY

- ❑ Reversibility: use it or lose it. The body also adapts to reduced levels of training, particularly fitness training, although well-learned skills are not lost in the same way



To stay FIT, use FITT

FREQUENCY	INTENSITY	TIME	TYPE
How often?	How hard?	How long?	What kind?

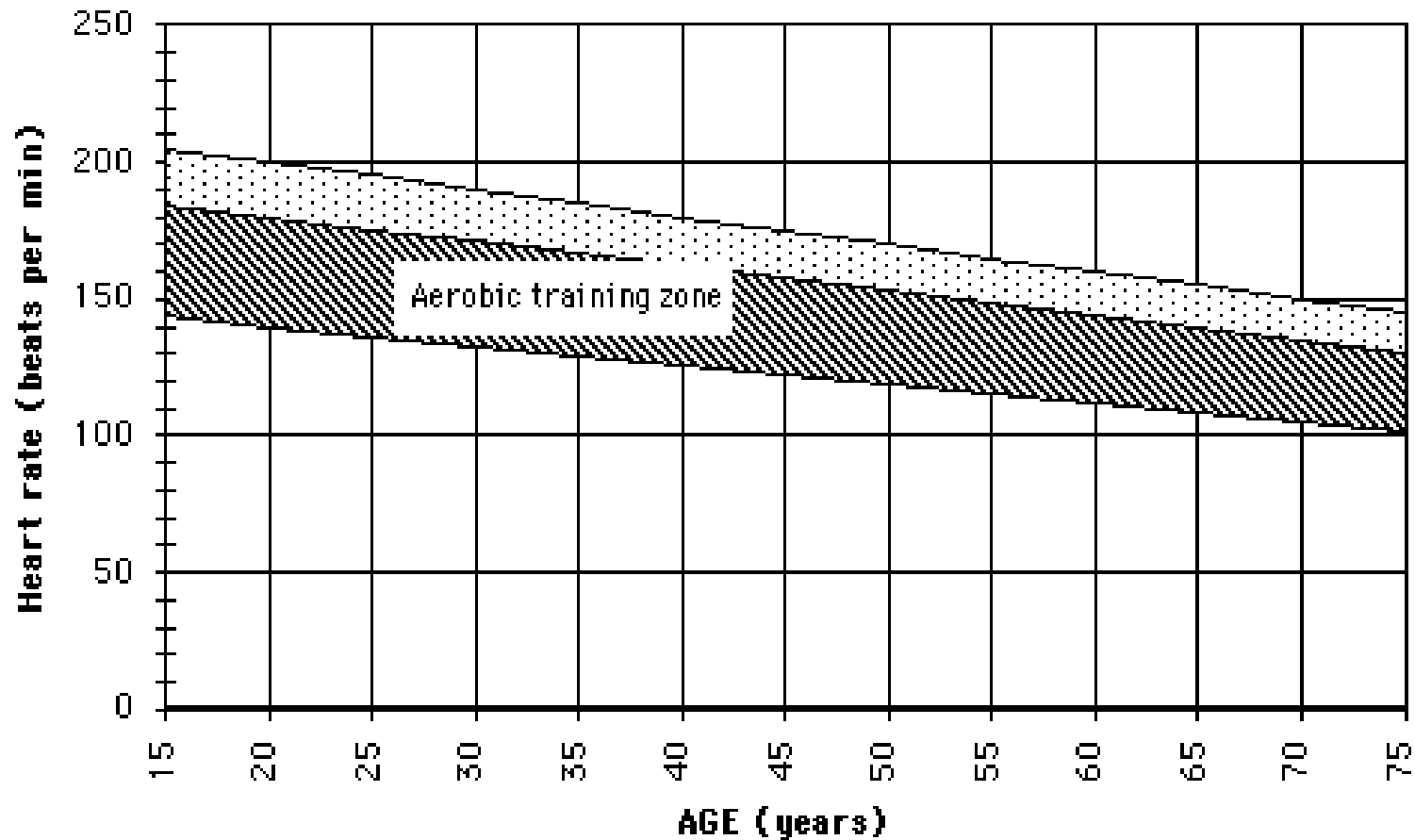


TRAINING ZONE

- **The intensity of training is very important;** too little and the body does not need to adapt, too much and the body cannot adapt.
- **A safe training zone** depends on the age and fitness levels of the subject. The maximum safe levels is known as the **threshold**
- This can be worked out using the following **formula:**

$$220 - \text{age of subject} = \text{maximum heart rate}$$

TRAINING ZONE



FOOD

Food is the body's source of energy. Diet is important, not only to maintain healthy body systems, but also to provide energy for exercise

- CARBOHYDRATES
- FATS
- PROTEINS
- VITAMINS
- MINERALS
- FIBRE
- WATER

CARBOHYDRATES

Carbohydrates: the body breaks down carbohydrates to provide glucose and glycogen. Carbohydrates can be split into two types.

- **Simple carbohydrates** are known as sugars, e.g. in honey, cakes, chocolate, fruit, milk and sugar.
- **Complex carbohydrates** are known as starches, e.g. in vegetables, cereals, rice, pasta and bread. During digestion, carbohydrates are broken down into glucose. Glucose is converted into glycogen and stored in the liver and muscles.



FATS

Fats: energy can be provided by fats but is not as readily available as energy from carbohydrates.

- **Saturated fats** are found in animal products like milk, meat, cheese, cream and butter.
- **Polyunsaturates** are found in fish and vegetable oils

Fatty animal products contain **cholesterol**. Too much cholesterol in the food leads to a clogging of the artery walls increasing blood pressure and causing circulatory problems.



PROTEINS

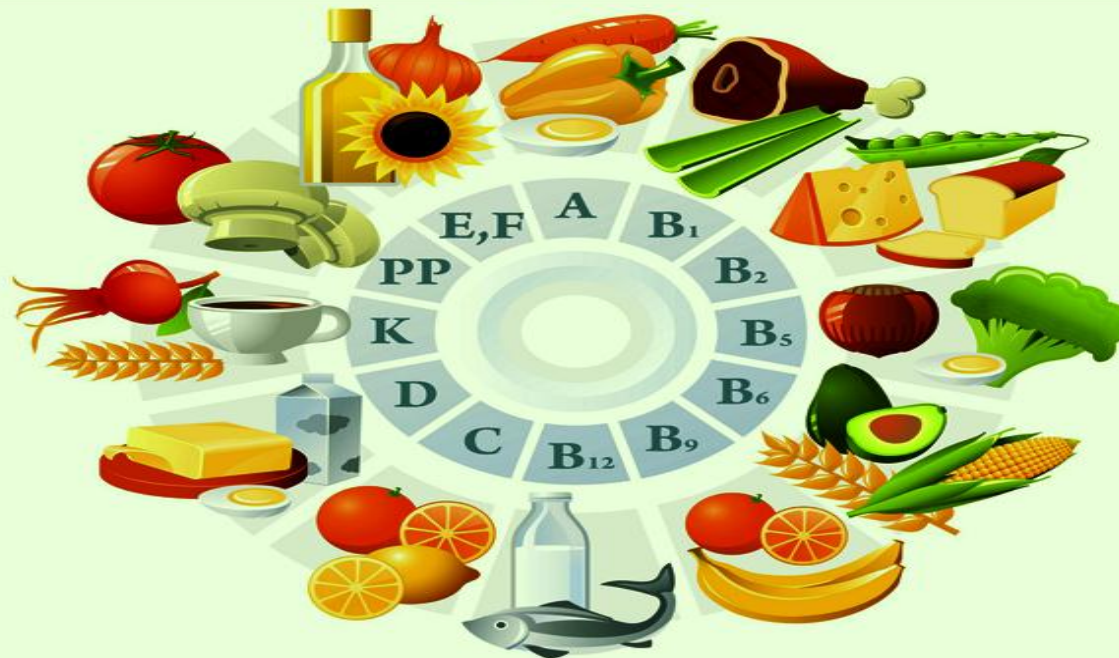
Proteins: made from amino acids and essential in building cells, making blood and regenerating muscles tissue. Amino acids are contained in meat, fish, eggs and cheese.



VITAMINS

Vitamins: trace substances in food, which are necessary for the normal efficient functioning of the body. One of their roles is to regulate chemical reactions in the body.

Vitamin Types & Sources



MINERALS

Minerals: very small quantities of chemical substances in food. Calcium in milk; iron in meat, liver and green vegetables are examples of minerals

MINERALS



FIBRE

Fibre: found in wholemeal bread, vegetables, fruit and cereals. Fibre does not contain nutrients but provides bulk for food and is essential to digestion.



WATER

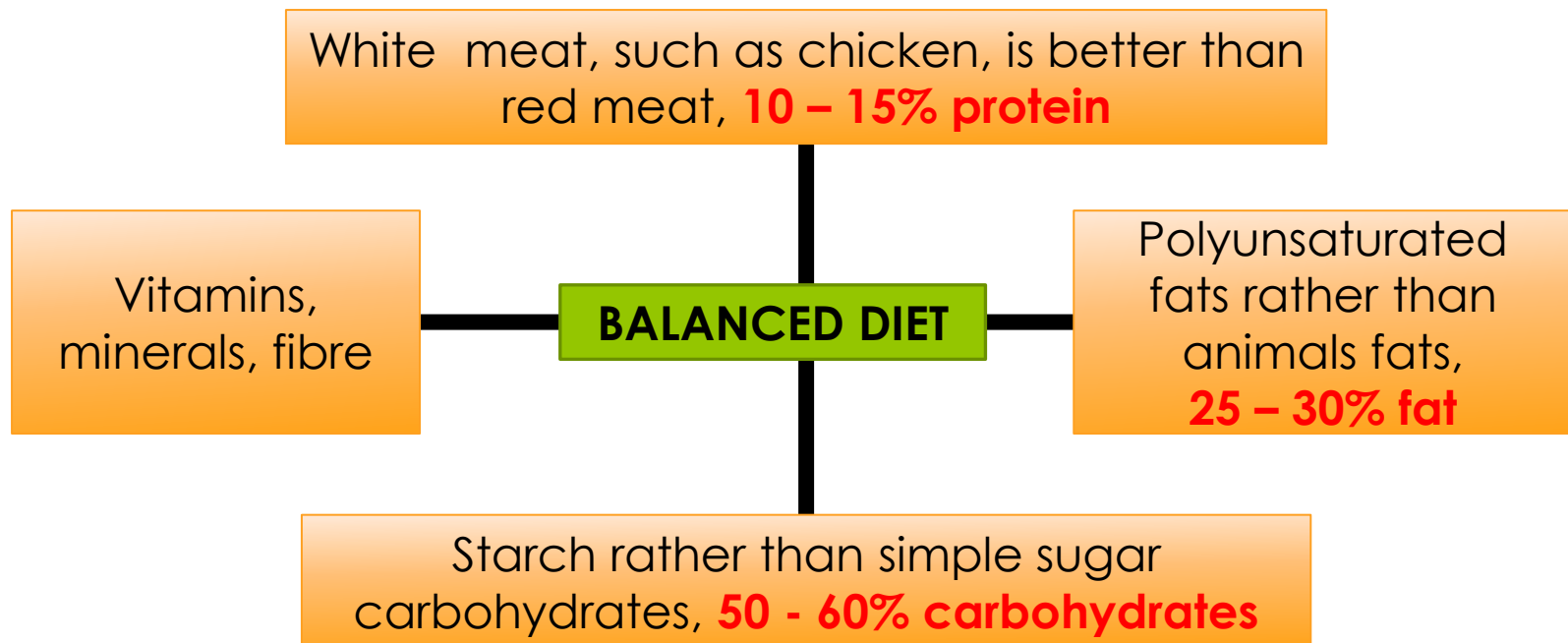
Water: makes up two thirds of the body's contents.



BALANCED DIET

The body needs to take in the correct proportions of different foods, so that essential elements are included.

A good balanced diet should look something like this:



DIETARY PROBLEMS

Having too much or too little of one type of food or the wrong type of food can lead to dietary problems. Eating more food than is required will cause an increase in weight, as the body will store up the excess as fat.

If this is excessive, then **obesity** occurs.

Insufficient food intake is also a health risk and this can occur when a person suffers from **anorexia**, a mental illness affecting the appetite.

DIET AND ENERGY

Food provides energy.
Different amounts of energy are necessary for different activities

BASAL METABOLIC RATE (BMR)

This is the lowest level energy required by the body for normal healthy living and is determined by age, sex, body size and body composition

PHYSICAL ACTIVITY LEVEL (PAL)

The amount of energy required to perform an activity. The higher the activity level, the higher the energy input and output needed

The total energy needed = BMR + PAL

DIET AND ENERGY

Energy is measured in **joules** or **kilojoules**, typical examples of energy needed each day are shown in the table below:

Age and activity	Male	Female
8 years	8200 kj	7300 kj
15 years	11500 kj	8800 kj
Adult office worker	10500 kj	9000 kj
Adult manual worker	14000 kj	10500 kj
Retired adult	9000 kj	7000 kj

DIET AND SPORT

Sports with high activity levels need considerable amounts of energy

Much of this energy will come from **glycogen** stored in the muscles. There is a limited amount, but it can be increased by eating extra carbohydrates, which are then converted in glycogen.

Energy is also taken from **fat** stored in the body during aerobic exercise when there is plenty of oxygen available to release energy from fat.

Activity	Energy used/ hr	Activity	Energy used/ hr
Rugby	1130 kj	Walking	380 kj
Squash	1254 kj	Golf	5560 kj
Jogging	1320 kj	Badminton	710 kj
Cycling	1380 kj	Tennis	1000 kjs
Swimming	1500 kj		

BEFORE EXERCISE

A planned diet is essential. In events, such as boxing or judo, where weight is critical, diet be exact. Sportspersons involved in long-distances events need to increase the amount of carbohydrate they eat.

Carbohydrate loading will increase the amount of glycogen available. Eating immediately before an event is unwise as the digestive system requires increased blood supply and a full stomach will put further strain on the abdominal muscles.

A light meal two hours before the event should include starches, but not simple sugars, as they increase insulin levels and can be lead to tiredness.



DURING EXERCISE

Fluids need to be taken during extended activities, such as marathons and long-distances cycling, to prevent dehydration. Drink containing glucose are beneficial as they help conserve glycogen stores.



AFTER EXERCISE

Isotonic drinks help with rehydration and restoration of glycogen levels.

