

# 2 Warm-Up





# Picture

Warm-up is a set of exercises or games performed at the beginning of any training session, Physical Education class or even a competition. It is done in such a way that the body moves from a state of relative rest to a particular state of activity. It prepares the body for subsequent demanding efforts, promotes performance, prevents possible injury and provides maximum energy for use by the body and ensures total enjoyment of the activity.

The primary objective of warm-up is to gradually involve the athlete or student in the activity to be performed at a desired level, to allow the heart and respiratory tract to adjust, exercise the tendons and muscles and also ensures proper blood circulation. Warm-up raises the temperature of the muscles and tendons, improves the neuromuscular unit, increases local blood flow, metabolic exchange, improves the enzyme activity and decreases muscle viscosity.

If at some point we raised the issue of why we should warm up, the answers would be many: first of all, to avoid injuries of the locomotor system, such as sprains, contractures, fibril breaks, etc., and secondly, to avoid injuries of the respiratory system, because by slightly increasing the heart rate and blood circulation, the body prepares for greater effort. It also improves performance by improving physical abilities and qualities and finally, it improves concentration and motivation of the athlete or the student by encouraging knowledge of the body and surrounding environment, etc. A proper warm-up should respect a generic phase of between 10 and 15 minutes, in which the most important muscle groups of our body are moved, and a specific phase where exercises directly related to the sport or activity to be carried out are performed.

There is no specific time duration for warm-up but we can generally say that it lasts between 10 and 40 minutes. Obviously, the greater the effort to be made, the longer the time that must be devoted to warm-up. Also, we need to spend more time warming up the injured and those who have not been performing physical activities for a long time.

Warm-up must be personal, since it is directly influenced by factors such as age, physical condition of each person, ambient temperature or even the time of the day that it is done.

The exercises during warm-up must be progressive and start from approximately 50% up to a total of 90% of efforts, but under no circumstances must we reach oxygen debt or lack oxygen.

In addition to physical warm-up, we can speak of the psychological warm-up which comprises motivation, concentration and the knowledge of the outcome of the event to be carried out as well as the goals to be achieved by the athlete. This is mainly used in competitive sports but it is also used as motivation to excel at any level.

We conclude this section by emphasizing that many injuries are unpredictable, but several others could be avoided by adequate warm-up exercises related to the activity to be developed. This principle is fundamental to the practice of any physical activity because as mentioned earlier, it prepares the body before it performs greater dynamic exercises. Therefore, warm-up should never be omitted.



## 1 INTRODUCTION

Before starting any sporting activity it is always necessary to do a warm-up. However, though it is an essential part prior to any Physical Education, training or competition session, on several occasions, students and athletes do not give it the attention it deserves.

Its name is due to the most obvious effect produced by doing it because it increases body temperature. But that is not the only thing. Warm-up produces many changes in the body that are used as preparation for subsequent efforts.

## 2 THE CONCEPT OF WARM-UP

A complete definition of warm-up must include five important distinctions. Warm-up is:

**A series of simple physical exercises carried out in a smooth and progressive way before starting any sporting activity to tone the muscles and prepare them for further intensive effort.**

## 3 WHAT IS THE PURPOSE OF WARM-UP?

There are three basic objectives to be achieved by warming up: prepare:

- To reduce the risk of injuries; when the muscle is cold, it is much easier to break.
- To improve performance in physical activity to be carried out subsequently as it prepares all the respiratory, muscular, cardiovascular and nervous systems...
- To prepare the student or athlete psychologically for training, competition or the main part of the class.



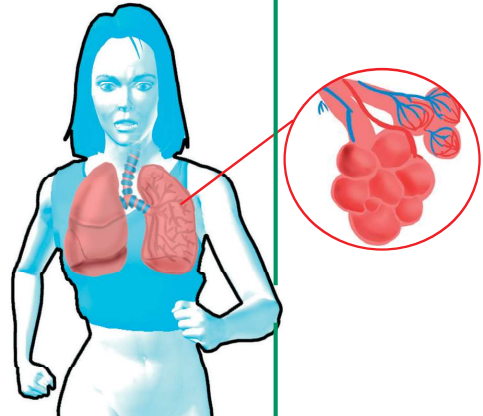
#### 4 EFFECTS OF WARM-UP

Warm-up has numerous effects on the various body systems. The most important are summarised below:

##### Respiratory system

The respiratory rate increases while at rest. It takes between 6 and 8 litres of air per minute and in some areas, air hardly enters the lungs. During exercises, the body increases the respiratory rate because it needs greater amounts of oxygen and it reaches values up to 100 litres of air per minute.

The set of respiratory changes that occur during physical activity is known as **respiratory adaptation to exercise**.

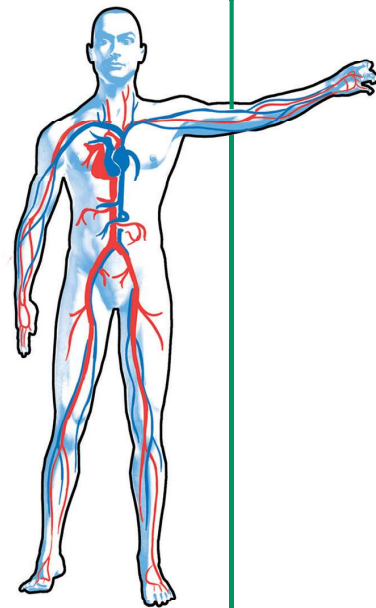


##### Cardiovascular system

It activates the heart's workload. While resting the heart pumps about 50 cubic centimetres of blood with each contraction, warm-up causes the heart to enlarge to allow more blood to enter the cavities, thus making it pump up to about 180 cubic centimetres of blood per contraction.

In addition, the heart beats faster to supply more food and oxygen to the muscles so that the latter can step up their efforts. It also increases arterial blood pressure which facilitates blood circulation.

All these sets of changes are referred to as **cardiovascular adaptation to exercise**.



##### Muscular system

When the muscles are at rest, the temperature varies between 36.5 and

37 degrees, and with warm-up, the temperature increases to about 38.5 degrees, thus, allowing the muscles to increase their strength, speed and resistance.

It also improves elasticity of the muscles, favouring the speed of muscle contraction and relaxation as well as muscle coordination, allowing for better movements that require precision.

All these changes are referred to as **muscular adaptation to exercise**.

### Nervous System

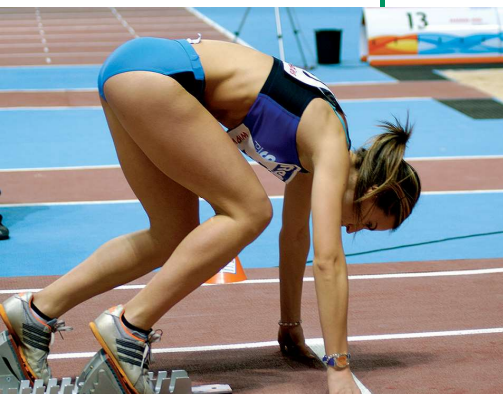
By increasing the body temperature, all the nervous processes are accelerated. This causes an increase in the speed of perception of stimuli and that of transmission of information which in turn reduce the reaction time. These changes make the performance of exercises faster and more accurate.

All these processes are known as **nervous adaptation to exercise**.

### Dermal-Perspirant System

Increased body temperature can be dangerous if it is excessive. For this reason, it is necessary to reduce body heat which is achieved through sweating. Sweat plays a key role in the human organism by avoiding excess heat in the body.

Sweat removes water and toxins, mainly lactic acid, generated by muscle fatigue. As the loss of water can lead to progressive dehydration, it is important to replenish with liquids lost regularly during physical activities



### Psychological Level

Warm-up facilitates the passage from a state of rest to another state of physical activity, while enhancing attention span, causing attention to be focused on the activity to be performed later.

It also increases the motivation of the athlete to perform the subsequent activity, whether it is a class, training, competition, etc. In addition, when warm-up is done prior to a competition, it helps to reduce the state of anxiety (nervousness, fear...) involved in many cases

## 5 TYPES OF WARM-UP

There are two basic types of warm-up: general and specific.

### General Warm-Up

It is the type in which the exercises performed affect all the major muscle groups of the body. It must always be performed since it is independent of the subsequent activity which must be carried out. It is suitable for all types of physical activities.



General warm-up normally includes various movement exercises: movement of legs, trunk and arms, strength and stretching...

### Specific Warm-Up

This should be done when going to play a sport. It affects the body parts that are going to participate in the sport that is going to be performed. It is necessary to always do general warm-up first.

Specific warm-up should be similar to the activities to be carried out during the particular sport; for example, backhand swings (tennis), short sprints (athletics), passes (handball), serves (volley ball), basketball layouts (basketball).

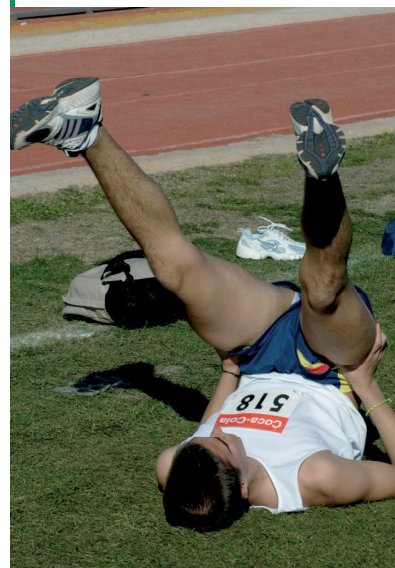
## 6 PERFORMING WARM-UP

To warm-up properly, a set of rules must be followed:

- It must be progressive, from a slow start to high intensity, without causing fatigue.
- Start with light and gentle jogging.
- Exercises should be simple and familiar and performed in the right way.
- It is necessary to workout all the muscle groups of the body.
- It should be done from bottom to top, in succession of muscle groups.
- Dynamic exercises must be performed rather than static ones.
- More intense exercises must be performed at the end.
- After warm-up, pulse should range between 100 and 130 per minute
- After warm-up, it is advisable to start the physical activity to be performed not later than 5 minutes.

## 7 DURATION OF WARM-UP

Warm-up does not have a specific time. Its duration depends on whether it is performed before a Physical Education class, training session, or game...



Warm-up for a Physical Education class should not be too short or long. Any duration between 5 and 10 minutes is considered as normal.

Warm-up before a training session or a game should last longer. It should normally be between 20 and 40 minutes. Then, after the general warm-up it's necessary to perform a specific warm-up related to that particular sporting activity.

## 8 FACTORS THAT INFLUENCE WARM-UP

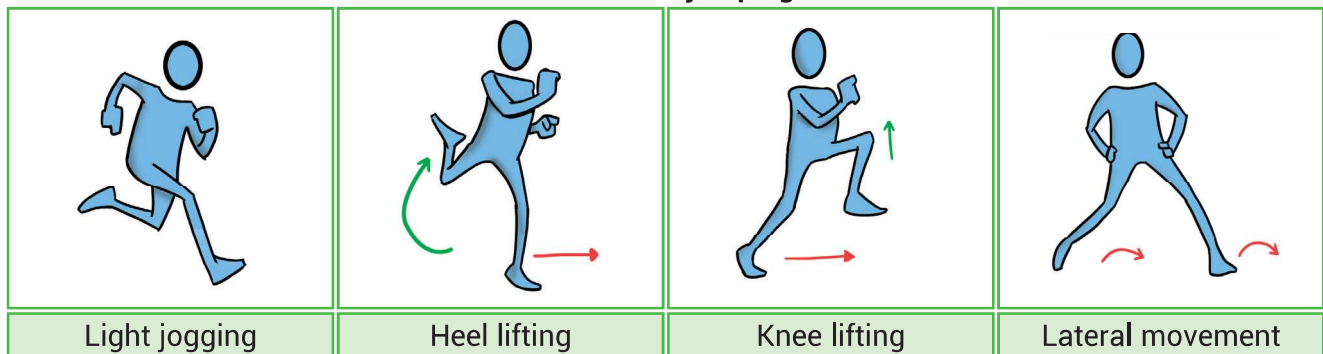
We can distinguish between two types of factors that influence warm up: External and internal.

External factors	Internal factors
These refer to environmental factors as well as those related to the activity to be carried out.	These are those of the person performing warm-up
<b>Ambient temperature:</b> in cold weather, warm-up must last longer and vice versa.	<b>Level of training:</b> a person who does little training gets tired easily and must not warm-up for too long nor should it be intense.
<b>Time of the day:</b> warm-up in the morning must be longer and more progressive than the afternoon because the body needs more time to adapt to the effort.	<b>Age:</b> children and young people require less warm-up than adults, because with age, the muscles and joints need more time to adjust to the effort.
<b>Activity to be performed later:</b> the more intense it is, the longer the warm-up time.	<b>Food:</b> never do intense physical exercise after eating, because at that time, there is a large supply of blood to the digestive system and warm-up may cut it.

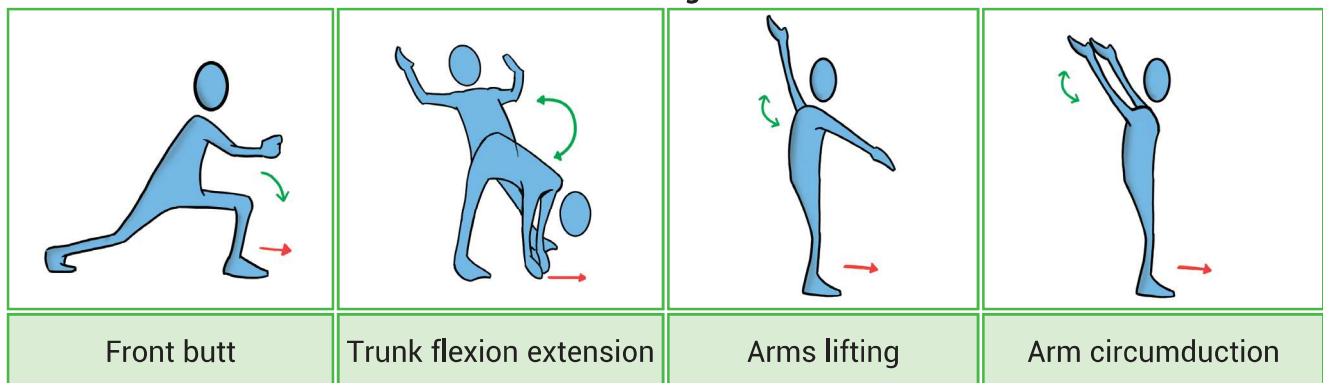
## 9 EXAMPLE OF GENERAL WARM-UP

Following the basic rules mentioned before a warm-up, many different ones can be performed. The following is just one possibility.

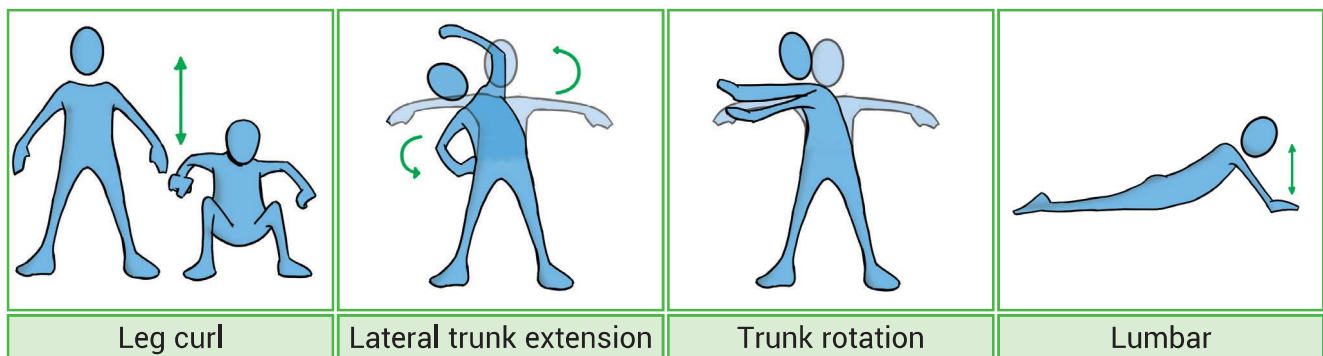
## Alternate jumping drills



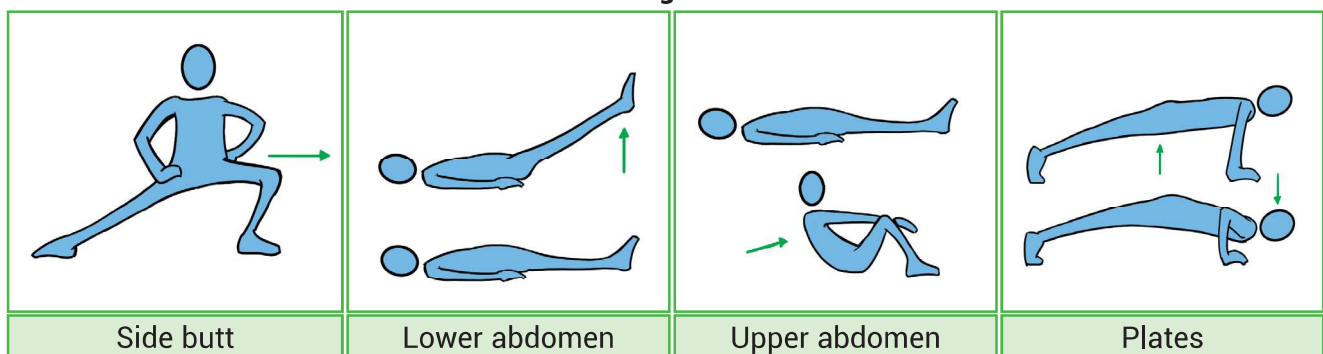
## Walking exercises



## Static exercises



## Strength exercises





## Warm-Up

# EXERCISES

- 1** Explain the basic objectives to be achieved by warming up.
- 2** State the difference between the cardiovascular system at rest and after warming up.
- 3** Define the term warm-up.
- 4** Explain what is meant by respiratory adaptation to exercise.
- 5** List four rules to follow for proper warm-up.
- 6** Indicate some situations where it is necessary to perform specific warm-up.
- 7** Describe the external factors that influence warm-up.
- 8** Give examples of five exercises that can be performed during warm-up.
- 9** Explain the sentence, “more intense exercises are performed at the end”.
- 10** Indicate how warm-up influences the athlete psychologically.

## FOR FURTHER INFORMATION



**Warm-Up. A Path to Self-Mangement of Physical Activity.** Author: Blázquez Sánchez, Domingo. Publisher: INDE. Barcelona, 2004.



**Warm-Up. Motivating Games and Exercises to Start Classes and Training Sessions.** Authors: Suárez Rivera, Rafael and Suárez Rivera, Francisco. Publisher: Gymnos. Madrid, 1999.

## Warm-Up

# IF I DO NOT READ IT, I DO NOT BELIEVE IT

We must bear in mind that the primary objective for warming up is to raise temperature.



Bats lose so much heat through their wings that when they are asleep, they stay completely cold, so when they wake up, they have to perform some warm-up exercises before they fly.

Dragonflies need to warm up before they fly either by staying in the sun or performing some exercises. The biggest species cannot take off flight till they reach 20° C.

**Red alert:** the earth's temperature continues to rise. The current climate is the result of the link between several factors: atmosphere, oceans, sheets of ice (cryosphere), living organisms (biosphere) and soils, sediments and rocks (geosphere). For several years scientists have been warning governments that this balance is crumbling. What are the causes of climate change? Greenhouse gas concentrations (carbon dioxide, methane, nitrous oxides and chlorofluorocarbons), which are causing an increase in the earth's temperature and changes in global rainfall patterns.

The lowest temperature on the earth is  $-89.2^{\circ}\text{C}$ . It was recorded at **Vostok Station** (Antarctica) on 21 July 1983.

The coldest place on the universe is **Boomerang Nebula**. It is an authentic cosmic freezer, with a temperature of  $-272^{\circ}\text{C}$ . This immense cloud of gas and dust is considered as the coldest place in the universe.

The high levels of sunlight can increase the risk of developing cataracts in the lens cortex by 2.5 and even quadruples the possibilities of developing mixed cataracts. If you want to continue to preserve your sight, do not train during the hottest hours of the day and protect your eyes with proper goggles.



What heat !! The body temperature of animals varies from one to the other. So, monotremes have a body temperature of  $30^{\circ}\text{C}$ , armadillos  $32^{\circ}\text{C}$ , marsupials  $35^{\circ}\text{C}$ , man  $37^{\circ}\text{C}$  and cats  $39^{\circ}\text{C}$ .