3rd ESO

UNIT 1. FITNESS

1.1. INTRODUCTION

All human beings are born with a series of attributes that help them develop as people; some are intellectual and psychomotor, while others are physical. The physical attributes make movements possible. As a person grows, these capacities also develop.

Doing regular physical exercise and sports helps to develop these attributes even further and this is beneficial for everyday life and for playing sports.

FITNESS *is the state of your body capacities.*	
2 kinds of FITNESS	
GENERAL FITNESS or HEALTH-RELATED FITNESS	**SPECIFIC FITNESS**
This is fitness related to your health and your everyday activities. Be fit or be in shape (according to H-R Fitness) means you are healthy, and you can do everyday activities without feeling too tired.	This is fitness related to play a sport. Be fit or be in shape (according to S-R Fitness) means to play a sport at a high level. This also needs a high level of health-related fitness. **You can achieve specific fitness only if you have a good level of general fitness to start with.**
TO BE FIT *just means you are able to do whatever you want or need to do, without getting tired too quickly.*	
+ BE FIT/IN SHAPE	**- NOT BE FIT/IN SHAPE**
	
If you want to be fit, you need to exercise.	
EXERCISE *is any physical activity that improves or maintains health and fitness.*	

Doing exercise is good for you - that's not exactly a surprise. What is surprising is just how many different ways it's good for you.

To stay healthy, you need to be Physically active. You can increase the amount of physical activity you do by just changing a few habits - like walking or cycling to school instead of getting the bus.

Exercising regularly can benefit you in the following ways:

- Improves your body shape.
- Helps to release stress and tension.
- Helps you to sleep better.
- Reduces the chances of getting illnesses and diseases.
- Gives you a physical challenge to aim for.
- Tones the body and the muscles, which can lead to better posture.
- Increases your basic levels of strength, stamina and flexibility.

EXERCISING HAS SOCIAL, PHYSICAL AND MENTAL BENEFITS

SOCIAL BENEFITS

1) FRIENDS - Doing physical activity can help you make friends with people of different ages and backgrounds. It might also just be a way of socializing with your current friends.
2) COOPERATION and TEAMWORK - By taking part in team activities like football, you have to learn how to cooperate and work with other people.

PHYSICAL BENEFITS

1) HEALTH - You can maintain or improve your health with regular physical activity. You reduce your chances of getting ill, and can increase your life expectancy.
2) FITNESS - You can increase or maintain your strength, endurance, flexibility and overall fitness.
3) PERFORMANCE - The more you do an activity, the better you'll get at it.

MENTAL BENEFITS

1) FEEL GOOD - As you do physical activity, your body releases more of a hormone called serotonin into your blood stream. Serotonin makes you feel happy - the higher your serotonin levels, the happier you feel.
2) STRESS RELIEF - Doing P.A. can help relieve stress and prevent stress-related illnesses.
3) SELF-ESTEEM - taking part in a P.A. can improve your self-image, self-esteem, confidence, and generally make you feel better about yourself.
4) COMPETITION and PHYSICAL CHALLENGE - Whether you're in a competition, or just trying to better your last performance - physical activity can challenge you and drive you to do the best you can. It can also improve how you think and act under pressure.
5) ENJOYMENT - you might choose to do a certain activity because you enjoy it, whether you find it exciting or relaxing or somewhere in between.

The amount of exercise you should carry out depends on your basic physical condition. It is easy to start some good exercise habits, such as:

- *Don't drive, or be driven, short distances but walk instead.*
- *Try to walk at least part of a journey - very easy to do if you travel by bus.*
- *Use a bicycle.*
- *Walk up stairs rather than use a lift.*
- *Do some simple stretching or flexibility exercises daily.*

You need to think about the amount of exercise you should be taking. The following are some general guides:

- Being slightly breathless after exercise is not a bad sing - but if you can't talk you have overdone it!.
- Try to exercise for periods of about 30 - 60 minutes three or four times a week.
- Exercise until you are pleasantly tired - do not overdo it.
- Go for all-round exercises such as swimming, which is particularly good as it includes some stretching movements.
- Try to make regular exercise a routine - joining a club can help with this.

1.2. FITNESS COMPONENTS

FITNESS COMPONENTS *can be divided into 2 categories*	
BASIC PHYSICAL CAPACITIES	**SKILL-RELATES CAPACITIES**
1. **STAMINA** is the ability to do a physical exercise for an extended period of time. 2. **FLEXIBILITY** is the ability to perform movements with the greatest range of motion possible. 3. **SPEED** is the ability to complete one or several movements in the shortest time possible. 4. **STRENGTH** is the body's ability to oppose or overcome a resistance **YOU PROBABLY NEED ELEMENTS OF ALL THESE COMPONENTS TO BE SUCCESSFUL IN SPORTS, ALTHOUGH SOME MAY BE MORE IMPORTANT THAN OTHERS.**	1. **BALANCE** is the ability to hold our bodies in a position that is country to gravity (standing, running, skating, etc.) 2. **COORDINATION** is the ability to control the body's movements. It help you to move accurately and smoothly. 3. **AGILITY** is the ability to change direction quickly. 4. **TIMING** is the ability to do something at exactly the right time. **YOU MAY FIND THAN YOU NEED TO CONCENTRATE ON PARTICULAR COMPONENTS FOR PARTICULAR SPORTS OR ACTIVITIES.**
ENDURANCE is the most important ability for your health.	

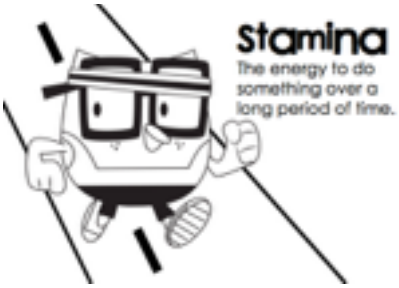
You might have to train to develop all these factors, or you might decide to concentrate on some more than other. It will depend on the activity you are undertaking.

Don't forget - physical health and fitness are only one bit of health. Health also includes your social and mental well-being. It doesn't matter how physically fit you are - if you're permanently unhappy, you're not healthy.

WE USE PHYSICAL CONDITIONING TESTS TO CHECK IF YOU ARE FIT OR NOT, such as:

- Cooper Test
- Course Navette
- Vertical Jump
- Sit-ups in 1'
- ...

STAMINA



WHAT IS IT?	**STAMINA/ENDURANCE** is the ability to do a physical exercise for an extended period of time.
TYPES	AEROBIC STAMINA: this is the capacity to maintain a continuous exercise over a long period of time at a gentle rhythm in which the muscles receive enough oxygen to do exercise. The amount of oxygen that you breathe is equal to or greater than the amount of oxygen that you need. - Example: when you have to run for more than 20 minutes, you need to maintain a constant, gentle rhythm to be able to finish the test (50 km walk, marathon, triathlon, …) ANAEROBIC STAMINA: this is the capacity to maintain exercises at an intense rhythm as long as possible. In these exercises the muscles receive less oxygen than they need to do the exercise. The amount of oxygen that you breathe is less than the amount of oxygen that you need. - Example: when you are chased for a long time during a game of tag, after a while you will notice that you begin to run more slowly, that it is hard to breathe and that your legs feel heavy until, finally, you are caught (400 m, 800m…)
WHO USES IT?	Having a good level of stamina is the same as being in a good physical condition. It means that daily activity can be completed efficiently without feeling tired (students, teachers, builders…). But it also helps to improve sports performance. It helps to: - stay in the game until the end of the match; - reach a finishing line in the shortest time possible; - use the interval in a match to recover more energy. Stamina has other advantages. Daily stamina training can help to control weight, improve blood circulation and, above all, protect your overall health. Having a physical fit body means it is possible to enjoy lots of different activities like hiking, playing with friends, dancing, etc. Stamina work is essential for sportspeople during training sessions. So, for example, basketball or football teams run long distances an do exercises that includes changes of rhythm in their preseason training. This training is used to improve stamina, which is necessary to perform 100% in sports such as: - Aerobics - Races in athletics - Team sports (rugby, hockey, etc.) - Road bicycle racing - Hiking - Long distance swimming - Cross-country skiing
EVOLUTION	As our age progresses increased resistance occurs as long as a suitable job for its development is performed. Around age 30 it reached its peak, then decays gradually.
HOW DO YOU TRAIN?	There are lots of ways to improve stamina, but every type of training session must have the following characteristics: - Sessions must be at least fifteen to thirty minutes long. - They must be done regularly. - The whole body must be exercised. - Exercise should be done at a gentle rhythm. Eg: bicycle rides, roller blading, playing cops and robbers, etc.

SPEED

WHAT IS IT?	**SPEED** is the ability to complete one or several movements in the shortest time possible.
TYPES	MOVEMENT SPEED is the ability of complete a movement in the shortest time possible. Hitting a ball with a baseball bat, trowing a shot-put in athletics, shooting a goal in football, and other similar movements must be perform very quickly in order to be successful. This type of speed is called movement speed. TRAVEL SPEED is the ability to cover a distance in the shortest time possible. The speed of a basketball player when he counter-attacks or a winger in football when he or she runs towards the corner hoping to be passed the ball are examples of a type of speed called travel speed. REACTION SPEED OR SPEED OF REACTION is the capacity of a muscle to contract in response to a stimulus. There two types: - Simple reaction time when only one response is possible. Eg: at the start of a speed race. - Discrimination reaction time when the person has to choose between various types of responses, depending on the type of stimulus. Eg: handball goalkeeper.
WHO USES IT?	Whether they do sport or not, everybody needs speed because movements have to be performed a the appropriate speed in order to be successful. Some examples are: - catching a falling object so that it does not break; - stepping on a piece of paper if it is being blown by the wind; - raising your hand to stop a passing taxi; - a driver that need to stop as quickly as possible when the car in front brakes; - a person dashing so as not to mess the bus. These are everyday situations, but speed also has very important role in sports. Can you imagine CR9 kicking the ball really slowly? Or the tennis player Rafa Nadal smashing the ball really gently? Sportspeople use movement speed and travel speed in every action they perform. - Movement speed is used by: water polo goalkeepers to stop the ball, table-tennis players to hit a forehand, karate experts to dodge a blow, etc. - Travel speed is used by: - basketball players to escape their defender, rugby players to score a try, athletes that run 100m sprint, etc.
EVOLUTION	The speed is increased along with the development of the person. While strength is improving, the speed also increases. The maximum speed is reached about 20-25 years and then will gradually decrease as the nervous and muscular systems deteriorate.
HOW DO YOU TRAIN?	There are lots of ways to improve speed and each athlete should do a different type of speed training depending on their sport (runner tries different than tennis player). However, there certain exercises and games that improve speed in general, for instance: rally races, the chain, tag game, etc. * Before speed training, it is very important to do warm-up exercises using the muscles that are going to be worked. * After speed training, it is essential to stretch the muscles that have been exercised.

STRENGTH

WHAT IS IT?	**STRENGTH** is the body's ability to oppose or overcome a resistance
TYPES	MAXIMUM STRENGTH is the ability to create maximum muscles tension by contracting muscles. This is the maximum strength that the muscles are capable of producing. Eg: one of the most popular sports in the Basque Country is lifting the heaviest stones possible; or the sport of weightlifting. EXPLOSIVE STRENGTH is the ability to overcome medium resistance or loads at maximum speed. It is also called **POWER**. Eg: An athlete that competes in the long jump. STRENGTH ENDURANCE is the ability to perform an action that requires strength for a specific period of time and to overcome the tiredness that it causes. Eg: White-water rafting is an activity that requires rowing a boat in a fast-flowing river.
WHO USES IT?	Whether they do sport or not, everybody needs a minimum amount of strength to be in good physical condition so they can perform everyday tasks, for instance: moving big objets, going up the stairs, changing the wheel of a car, etc. This is why strength is one of a human being's most important attributes, as well as having lots of benefits for the body, such as: - helping to maintain good posture and - increasing muscle tone. There also people who do strength training to have a body with lots of muscles, such as bodybuilders. Strength is also frequently used in sports to jump, throw, fight, kick, etc. Therefore, strength training is very important for every sportsperson. Having an specific amount of strength is one of the aims of sportspeople that enter professional competitions. Eg: - basketball players when they jump to catch a rebound; - high-jumpers; - rowers; - wrestling experts during a fight.
EVOLUTION	The strength development is gradual and progressive. The largest increase is achieved between 12 and 18 years. The maximum level is achieved between 25 and 35 years old. Then it will gradually decrease.
HOW DO YOU TRAIN?	Increasing levels of strength is very important. Below are some exercises that can be used to develop and increase it. • Individually: - Sit-ups - Press-ups/Push-ups - Jumps with knees touching your chest - Squats • In pairs: - Carrying a classmate. - Gypsy arm wrestle - Wheelbarrow

FLEXIBILITY

WHAT IS IT?	**FLEXIBILITY** is the ability to perform movements with the greatest range of motion possible. Two important body structures are used in these movements: JOINTS and MUSCLES. - Joints are where two or more bones meet and they allow the body to move different ways. They are not all the same; some allows lots of different movements, for example, the shoulder joint, but others do not move at all, such as the skull. - Muscles. They move your joints when they contract. So, flexibility depends on: - Joint mobility: the ability to move each of the joints of the human body. - Muscle Elasticity: the property of the muscles that allow them to stretch to a certain position and then return to your starting position. And it is what makes human movements different from the movement of a robot.
TYPES	STATIC FLEXIBILITY. There is no movement, instead a position is held and the muscle used in the position is stretched for fifteen to twenty seconds. It is what we work with **stretches**. DYNAMIC FLEXIBILITY. This involves the joint's maximum range of movement and the stretches of the muscles as it moves. This it what we work with the **joint mobility**.
WHO USES IT?	Flexibility is a physical capacity that is important for everyday life and not just for sports. All of our movements need certain degree of range to be useful. You need flexibility to: - take something that fell under the closet; - scratch your back; - tie your shoe laces; - Get a book from a shelf. In the world os physical activity and sports, it is even more important because flexibility, not only allows you to improve technical skills, but also it helps to **prevent muscles injury**. 
EVOLUTION	Flexibility is an involution capacity, it go worse with age. In the first years of life have our highest level and as we age it decreases until reaching the age where most movements are very limited. Continued work favors this involution is done more slowly and therefore the loss of flexibility is not as pronounced.
HOW DO YOU TRAIN?	Flexibility training is necessary whenever any physical activity or sport is practiced. Dynamic flexibility is practiced in the second phase of the warm-up, when joints should progress from the smallest range to the greatest range. This helps to warm up the muscles that are attached to the joint. Eg: ankle rotation, shoulder rotation… Static Flexibility should be practiced during the third phase of the warm-up, stretches (depending on the following activity, you can decide not to do this phase). And at the end of a class or training session. It is important to try to stretch the muscles that have been worked. To improve static flexibility, follow these steps: 1. Find the right position so you can feel the muscle tense. 2. Hold the muscle tense for 15" to 20" seconds. 3. Relax the muscle for 5" to 7". 4. Repeat the stretch but force the muscle a little more for 15" to 20". Remember that these exercises must follow a certain order, either moving from the head to the feet or from the feet to the head.

COORDINATION

WHAT IS IT?	**COORDINATION** - It is the ability to control the body's movements. It help you to move accurately and smoothly.
TYPES	GENERAL DYNAMIC COORDINATION: • GLOBAL GDC refers to actions or movements that involve a lot of parts or sections of the body. They are movements difficult to perform and require a lot of concentration. Eg: when doing a cartwheel, we use our legs to propel us, our arms to support us on the ground, our abdominal and lumbar muscles to maintain the correct body position and, finally, our legs to return to the starting position. • SEGMENTAL GDC is necessary when the movements involve only a few parts or sections of the body. They are movements easy to perform and they achieve a very specific final results. Eg: the exercise where you move your right arm forward in a circular motion and, at the same time, you move your left arm backward. SPECIFIC DYNAMIC COORDINATION: it is between the view and some body parts. • HAND-EYE SDC. It is involved in all throwing and receiving in sports. • HEAD-EYE SDC. Used in headers in football and sometimes saving a goal in handball. • FOOT-EYE SDC. It is used to control the ball and shoot, for instance.
WHO USES IT?	Everybody needs to have a minimum level of coordination to be able to complete their daily activities properly: walking, running, driving a car, dancing and riding a bike. In sports, coordination is essential, although some sports requires a higher level of coordination than others. Running requires less coordination than playing tennis, but playing tennis requires less coordination than gymnastics. Well-developed CDC and SDC leads to better performance in sports.
EVOLUTION	In the first years of life, coordination can handle one's body and objects around us in a very basic way. As we know and experimenting more with our bodies and the environment, our coordination increases. Between 8 and 12 years or so, the maturation of the nervous system is determined, therefore they are the most conducive to develop coordination. In some cases a stagnation of coordination is observed from these years. This occurs especially in cases where the growth is sometimes excessive, which can lead to difficulties in coordinating complex movements. With the development of strength and speed, these problems are solved.
HOW DO YOU TRAIN?	Coordination is an ability that is acquired over time, by accumulating a collection of movements and specific techniques. This is called **motor experience**. In PE class, two girls have to do a handstand for the first time. On finishing the progression exercises, the first girl tries to do it, but after trying lots of times, she does not succeed. However, her friend now knows how to do it. The girl who managed to do the handstand will have developed a lot of **basic motor skills** during her life (crawling, rolling, falling, running, propelling, etc.) and was able to adapt all this knowledge to learn the handstand. The following exercises can help to improve coordination: - running and doing a forward roll every four steps; - running with one leg tied to a class,mate's leg; - bounce two basketball at the same time; - do kick-ups without letting the ball touch the ground; - Jumping rope.

BALANCE

WHAT IS IT?	**BALANCE** is the ability to hold our bodies in a position that is country to gravity (standing, running, skating, etc.**)** Some of the factors that determine the balance of a person are: - The width of the support base. - The height at which is the center of gravity. - The position and movements of the head. - The difficulty of the activity performed. - The degree of stability of the ground or surface. - The ability to focus that we have. **Three organs regulate balance**: the eyes, the labyrinth (located in the inner-ear, it tells us the position of the head) and the proprioceptive system (it tell us the position of the different parts of the body).
TYPES	STATIC BALANCE: when there is little movement/no movement of the center of gravity, for example, a golfer. DYNAMIC BALANCE: when there is visible displacement of the center of gravity in space, such as skaters.
WHO USES IT?	Everybody needs balance. In fact, thinking about the first steps taken by a baby shows that the movement of the body in no more than a succession of efforts to control imbalance.
EVOLUTION	The development of balance is an increasing alongside the development of the person. Young children may seem "clumsy" at first. In old age, due to the deterioration of the nervous system and the musculoskeletal system, the balance is lost and you need help using elements like the stick.
HOW DO YOU TRAIN?	There many exercises to develop balance, such as: - Standing on one foot. - Handstand. - Cycling. - Walking along a narrow.

1.3. TRAINING SYSTEMS

If you want to develop fitness components, you need to train. Getting the best out of your training requires a little planning.

The *key principles when planning* a program are:

1. Specificity – training must be matched to the needs of the sporting activity to improve fitness in the body parts the sport uses.
2. Overload - fitness can only be improved by training more than you normally do. You must work hard.
3. Progression – start slowly and gradually increase the amount of exercise and keep overloading.
4. Reversibility – any adaptation that takes place as a result of training will be reversed when you stop training. If you take a break or don't train often enough you will lose fitness.

- By using the principles of training as a framework we can plan a personal training program that uses scientific principles to improve performance, skill, game ability and physical fitness.

- A successful training program will meet individual needs which are personal fitness needs based on age, gender, fitness level and the sport for which we are training.

- A successful training program will also include exercise in the correct heart-rate target zone.

In planning a program, use the *FITT principles* to add the detail:

- Frequency - decide how often to train.
- Intensity - choose how hard to train.
- Time - decide for *how long* to train.
- Type - decide which methods of training to use.

You should also consider the *principle of moderation*. It is important to have rest periods, which allow the body to adapt. Too much training (overtraining) can lead to injury.

BPC		TRAINING SYSTEMS
STAMINA	CONTINUOUS	**Continuous training.** This involves exercising (running, cycling, swimming, hiking, etc.): - without resting; - at low intensity; - constant rate; - for 20 minutes or longer; - and with a heart rate between 60% and 80% (140 -150 beats per minute). - It is only made up for aerobic activity.
		Fartlek. This is a game of pace. It can be made easy or hard to suit your fitness and can be adapted to fit any continuous exercise (e.g. running, cycling, swimming, rowing). It involves exercising (mainly running): - without resting; - with variations in pace and terrain covered/type of exercise; - and a heart rate between 60% in gentle pace and 95% during the intense ones (140 - 180 beats per minute) - It is a mix of aerobic and anaerobic activity, so it is good training for activities that need different paces, like football and basketball.
		Total Training. This is a special sort of trail that combines running and exercising. It main characteristics are: - no resting; - combine running and exercises such as: jumping, climbing, crawling, turning, etc. - E.g.: assault course
	INTERVAL	**Interval training**. This involves repeating exercises at sub-maximal intensity (75-90%) which are separated by a break to rest. But the recovery is not complete (heart rate lowers to 120 b.p.m.).
		Repetitions. These are exercises which are repeated at maximum or sub-maximal (95-100%) intensity and are separated by a break to rest. In this case, the heart rate and breathing recover completely (heart rate lowers to 90 b.p.m.).
	COMBINED	**Circuit training**. It combines continuous and interval training. It involves a certain number of activities at various locations, called stations. You being at an specific station and finish training when you have completed the activities of each one. The activity at each station is repeated a number of times. The number of repetitions can be fixed or variable, depending on the type of circuit: circuit with a fix number of repetitions or circuit with a set length of time at each station in which yo do the greatest number of repetitions possible during an established time.

FLEXIBILITY

Static Stretching. It involves gradually stretching a muscle, and the holding the stretch position for a few seconds before relaxing it. It could be:
- Active: you use your own muscle to hold the stretch position. E.g. our everyday quads stretch.
- Passive: you use some else or a piece of equipment to help you hold the stretch position. E.g. stretching hamstring using wall bars.

Dynamic Stretch. It means slowly increasing the range of a movement that stretches the muscle. E.g. swinging one leg forwards and backwards, making it swing higher each time.

PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION (PNF). This system is practiced in three phases:
Stretching the muscle group to its limit for 10-30 seconds.
Isometric contraction of the muscle, creating tension, for 10 seconds.
Relax and re-stretching the muscle to its limit for 15-30 seconds

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