# Unit 1: Fitness for Sport and Exercise

**Guided learning hours:** 30

## Lesson 1: Introduce the unit

**Objectives:**
- Name the two main types of fitness
- Describe the six components of physical fitness
- Suggest sports performers who possess high levels of each component.

**Outline:**
- Introduce the unit to the whole class to see.
- Accept any descriptions that the students give, for example, they may say stamina instead of cardiovascular endurance but try to guide them towards the correct terminology when they have run out of ideas.

**Resources:**
- Pages 4–5 of the Student Book
- Worksheet 1.1

## Lesson 2: Introduce the six components of physical fitness

**Objectives:**
- Describe the six components of physical fitness.

**Outline:**
- Review the components of fitness listed by the students at the beginning of the previous lesson. Next, recap the components of physical fitness before focusing in on the skill-related components of fitness.

**Resources:**
- Pages 6–7 of the Student Book
- Worksheet 1.2

## Lesson 3: Introduce the skill-related components of fitness

**Objectives:**
- Be able to describe how the physical and skill-related components of fitness help a performer succeed.

**Outline:**
- Using the Student Book, recap the physical and skill-related components of fitness before moving on to discuss why they are important to sports performance.

**Resources:**
- Pages 4–7 of the Student Book
- Worksheets 1.1 and 1.2

## Lesson 4: Understand why fitness components are important for successful participation in sport

**Objectives:**
- Understand why fitness components are important for successful participation in sport.

**Outline:**
- Ask students what they think the term 'Maximum Heart Rate' means. Step by step, guide them towards the definition; the maximum number of times your heart can contract in one minute. Ask them to suggest factors that could influence this, before narrowing it down to the main factor: age.

**Resources:**
- Pages 8–9 of the Student Book
- Worksheet 1.4

## Lesson 5: Understand the importance of the principles of training represented by the acronym 'FITT' for SPORT followed by some R&R

**Objectives:**
- Understand the importance of the principles of training represented by the acronym 'FITT' for SPORT followed by some R&R.

**Outline:**
- As a class, briefly discuss how you can 'put a number' on the level of effort made during a sports performance. Then, ask students to break into small groups and come up with their own ideas of how to rate exertion. Each group should present their ideas to the class.

**Resources:**
- Page 9 of the Student Book
- Worksheet 13

## Lesson 6: Understand how each part of 'FITT' affects the planning of a training programme

**Objectives:**
- Know how each part of 'FITT' affects the planning of a training programme.

**Outline:**
- Ask students to guess what they think the acronym 'FITT' for SPORT followed by some R&R' could stand for. Explain that it is to do with the principles of training. When an appropriate period of time has passed, give students the answer, explaining that this lesson will focus on 'FITT' and the next lesson will focus on 'SPORT followed by some R&R'.

**Resources:**
- Page 10 of the Student Book
- Worksheet 14

## Lesson 7: Understand how each part of 'SPORT followed by some R&R' affects the planning of a training programme

**Objectives:**
- Know how each part of 'SPORT followed by some R&R' affects the planning of a training programme.

**Outline:**
- Recap the FITT principles of training and ask students to complete Worksheet 1.5.

**Resources:**
- Page 11 of the Student Book
- Worksheet 15
- Worksheet 16
### Lesson Objectives

By the end of the lesson, students should:

- Understand the importance of a warm-up and cool-down.
- Know how to perform a warm-up and cool-down.
- Be able to describe the benefits of doing a warm-up and cool-down.

#### Outline

1. **Lesson 1**
   - Begin with a warm-up activity, such as running or jumping jacks.
   - Explain the importance of warming up.
   - Ask students to describe a warm-up they performed recently.
2. **Lesson 2**
   - Use a cool-down activity, such as stretching or yoga.
   - Explain the importance of cooling down.
   - Ask students to describe a cool-down they performed recently.
3. **Lesson 3**
   - Lead a discussion on the benefits of both warm-ups and cool-downs.
   - Have students complete an activity on warm-ups and cool-downs in their Student Book.

#### Resources

- Student Book
- Sheets for warm-up and cool-down activities

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### Worksheet 1.11

Students are to complete one or more of the activities in the Student Book. Use your professional judgement and your students' target levels to guide each student to choose the correct level of work.

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### Concept Maps and Spider Diagrams

- Students should be given A3 paper, some colouring pencils, and access to a computer so that they can research the material.

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### Useful Websites

- [www.bbc.co.uk/schools/gcsebitesize/pe](http://www.bbc.co.uk/schools/gcsebitesize/pe): Lots of quizzes and extra information on fitness testing.
- [www.brianmac.co.uk](http://www.brianmac.co.uk): Contains details of procedures for all the fitness tests, including ideas about the validity and reliability of the tests.
- [www.pponline.co.uk](http://www.pponline.co.uk): Contains details of lots of fitness tests, including alternatives to those listed in the Student Book.
- [www.pearsonschoolsandfecolleges.co.uk/FEAndVocational/SportsStudies/BTEC/Level2BTECFirstSport/Samples/StudentBook/Level2BTECFirstSport(2010)-SampleUnit1Fitnesstestingandtraining.pdf](http://www.pearsonschoolsandfecolleges.co.uk/FEAndVocational/SportsStudies/BTEC/Level2BTECFirstSport/Samples/StudentBook/Level2BTECFirstSport(2010)-SampleUnit1Fitnesstestingandtraining.pdf): Tables for calculating maximal aerobic power for the Forestry step test.

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### Exam Preparation

- Students should be encouraged to use colour to help develop memory pathways for each section in a topic. This will help them to form associations and recall the material at exam time.

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### External Exam

- Students will be assessed on their understanding of the material covered in the course.
- The exam will consist of short answer questions and multiple choice questions.

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### Conclusion

- The lesson concludes with a recap of the key points covered in the lesson.
- Students are encouraged to ask any questions they may have.
Components of physical fitness for a specific sport

Choose a sport and then complete the diagram below, explaining how each component of physical fitness applies to the chosen sport.

- Body composition
- Aerobic endurance
- Muscular endurance
- Muscular strength
- Flexibility
- Speed

Physical fitness

Components of skill-related fitness for a specific sport

Choose a sport and then complete the diagram below, explaining how each component of skill-related fitness applies to the chosen sport.

- Agility
- Coordination
- Reaction time
- Balance
- Power

Skill-related fitness
Unit 1: Fitness for Sport and Exercise
Worksheet 1.3

The Borg Rating of Perceived Exertion (RPE)
Fifteen Point Scale

Look at the Borg RPE Fifteen Point Scale.

1. In the space available, write down an activity that you would perform at this RPE.
2. Describe how you would feel when working at this RPE.

1. Activity: _______________
   Feelings: _______________

30% effort: very, very light intensity
40% effort
50% effort: very light intensity
55% effort
60% effort: fairly light intensity
65% effort
70% effort: somewhat hard intensity
75% effort
80% effort: hard intensity
85% effort
90% effort: very hard intensity
95% effort
100% effort: very, very hard intensity
Exhaustion

Unit 1: Fitness for Sport and Exercise
Worksheet 1.4

Principles of training: FITT

Fill in the missing words.

F__________
   How __________ you train.
   One way you can increase f__________ is by taking part in more training sessions.

I__________
   How __________ you train.
   You can increase i__________ by training __________

T__________
   How __________ you train for in each individual session.
   This can be increased by training for a __________ period of time.

T__________
   This refers to what __________ of exercise you do.
   This needs to match the activity that you are training for.
Unit 1: Fitness for Sport and Exercise
Worksheet 1.5

A quick quiz about FITT

1. What does the F in FITT stand for?

2. What does the I in FITT stand for?

3. What does the first T in FITT stand for?

4. What does the second T in FITT stand for?

5. Which of the FITT principles tells us that training should be relevant to the sport that you play?

6. If a performer increases their training from twice a week to three times a week, which FITT principle is affected?

7. Which FITT principle is affected by how long you train for?

8. Which FITT principle relates to how hard you train?

Applying the principles of training

Develop a training programme for an elite marathon runner and a first-time marathon runner, taking their different training needs into account. Use the table below to help you organize your thoughts.

<table>
<thead>
<tr>
<th>Training programme</th>
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<tr>
<td>Elite marathon runner</td>
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<tr>
<td>First-time marathon runner</td>
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</table>
Flexibility training

Most sports performers undertake flexibility training as part of their regular training programme. Some, such as dancers and gymnasts, do so in order to enable them to stretch further and perform more complex and difficult actions. Others, such as footballers, use flexibility training as a way of preventing injuries, such as torn muscles and ligaments. There are three types of flexibility training:

- Static stretching (active stretching and passive stretching)
- Ballistic stretching
- Proprioceptive Neuromuscular Facilitation (PNF) stretching

You are going to take part in a flexibility training session. After the session, summarize it in the space below:

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Strength, muscular endurance, and power training

Circuit training, free weights and plyometric training can all be modified to develop strength, muscular endurance, or power.

Strength is developed by moving a heavy load for a low number of repetitions. Muscular endurance is developed by moving lighter weights for a higher number of repetitions. Power is developed by performing strength exercises at speed.

You are going to take part in a strength, muscular endurance, and power training session. After the session, summarize it in the space below:

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Aerobic endurance training

Aerobic endurance training requires the sports performer to work for an extended period of time, often longer than the actual event for which he or she is training. For example, Paula Radcliffe will often train upwards of four hours at a time, even though her event (the marathon) is usually over in less than two-and-a-half hours. Aerobic endurance training should take place largely in the aerobic training zone of the training pyramid and the work-to-rest ratio should be in the region of 3:1. This means that if you work for 30 minutes you should follow it with a ten-minute rest and then repeat the session again. There are four types of endurance training:

- Continuous training
- Fartlek training
- Interval training
- Circuit training

You are going to take part in an aerobic endurance training session. After the session, summarize it in the space below:

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Speed training

Speed training is a way of developing a performer’s speed over short distances. This is useful in almost all sports because speed can often be the difference between winning and losing. For example, footballers need to be able to cover a distance quickly to beat an opponent to the ball and tennis players need to be quick to reach the ball during a rally. Speed training should always be carried out in the speed zone of the training pyramid. It is of a very high intensity, so work periods should be short and frequent, and interspersed with lots of short rest periods. This makes speed training a type of interval training. It is generally accepted that a work-to-rest ratio of 1:6 is desirable. This means that a performer should work at a maximum level for a very short period, usually up to about 15 seconds, and then follow this with a rest period that is six times longer, repeating the sequence several times. There are three types of speed training:

- Hollow sprints
- Acceleration sprints
- Interval training

You are going to take part in a speed training session. After the session, summarize it in the space below:

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Sit and reach test

What does flexibility measure?
Flexibility

What do you need?
A box and a measuring tape or a sit and reach table

How do you do the test?
• Sit comfortably on the floor with your legs straight out in front of you.
• Place the measuring tape, with 0cm level with your feet, parallel with your legs. If you are using a sit and reach table, the measurements are already marked.
• Put the soles of your feet, shoulder width apart, against the box/table.
• Make sure your knees are locked/straight, as this is what determines hamstring flexibility. If your knees bend during the test, the results will be inaccurate.
• With your hands stretched towards your feet, lean forward and reach as far as possible with your fingertips. If possible, reach beyond the end of your toes and over the top of the box. You must make sure, however, that there are no jerky movements while doing this and that you are able to hold the reach for at least two seconds.
• You get three chances to stretch forward and then the fourth is measured.
• The distance that your fingers touch on the measuring tape/sit and reach table will be your score. If you don't make it to your toes then you will get a negative score, showing the distance you were from 0cm.

The sit and reach test can be measured in centimetres or inches.

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<tr>
<th>Name</th>
<th>Distance</th>
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Comment on the reliability and validity of this test:

Grip dynamometer

What does it measure?
Strength

What do you need?
A grip dynamometer

How do you do the test?
• Use a grip dynamometer to measure grip strength.
• Record the maximum reading from three attempts using the dominant hand. Allow a one-minute recovery between each attempt.
• Grip strength can be measured in kg or kgW, depending on the grip dynamometer used.

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<thead>
<tr>
<th>Name</th>
<th>Weight</th>
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Comment on the reliability and validity of this test:

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Multistage fitness test

What does it measure?
Aerobic endurance

What do you need?
• A multistage fitness test CD
• A CD player
• Cones
• A 15–20-metre marked area

How do you do the test?
• The test involves continuous running between two lines, 15–20 metres apart, between recorded bleeps (played from the CD). The time between the bleeps decreases each minute or level. There are several versions of the test but one commonly used version has an initial running velocity of 8.5km per hour, which increases by 0.5km per hour each minute.
• You must always ensure that you have one foot on or beyond the 15–20-metre marker at the end of each shuttle run.
• If you reach the marker before the next bleep, you should wait there until you hear it before resuming running.
• If you do not manage to reach the end of the shuttle run before the bleep sounds then you are given two or three more attempts to catch up with the pace before being stopped.

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<thead>
<tr>
<th>Name</th>
<th>Highest level achieved</th>
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Comment on the reliability and validity of this test:

Forestry step test

What does it measure?
Speed

What do you need?
• Step (40cm for males, 33cm for females)
• Heart-rate monitor
• Metronome
• Published table for calculating maximal aerobic power

How do you do the test?
• Record your body weight in the clothing you will be wearing for the test.
• Set the metronome at 90 beats per minute, to mark out a stepping rate of 22.5 steps per minute.
• Following the stepping rate set by the metronome, step up with the right leg and down with the right leg, then up with the left leg and down with the left leg. This is one step. Continue stepping for five minutes.
• After five minutes of stepping, sit down and measure your heart rate.
• Use your age, post-exercise heart rate, and body weight to calculate the maximal aerobic power using a published table.

<table>
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<tr>
<th>Name</th>
<th>Maximal aerobic power</th>
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Comment on the reliability and validity of this test:
Unit 1: Fitness for Sport and Exercise Worksheet 1.15

35-metre sprint

What does it measure?
Speed

What do you need?
• 35-metre marked section in a straight line, preferably on a running track
• Starting blocks
• Stopwatch
• Assistant

How do you do the test?
• Sprint 35 metres from a standing start/sprint start using the blocks.
• Allow a 30-second recovery while walking back to the start.
• Repeat the sprint five times, completing a total of six sprints.
• Record the time for each sprint, which is usually measured in seconds (s).

<table>
<thead>
<tr>
<th>Name</th>
<th>Time difference between first sprint and last sprint</th>
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Comment on the reliability and validity of this test:


Unit 1: Fitness for Sport and Exercise Worksheet 1.16

Illinois agility run test

What does it measure?
Speed and agility

What do you need?
• Flat non-slip surface
• 8 cones
• Stopwatch
• Assistant

How do you do the test?
• Set up the course, as shown in the diagram.
• Warm up before beginning the test.
• Lie face down on the floor at the ‘Start’ cone.
• When your assistant gives the command ‘Go’ and starts the stopwatch, jump to your feet and run around the cones in the correct order to the finish.
• Your assistant should stop the stopwatch and record your time when you pass the ‘Finish’ cone.

<table>
<thead>
<tr>
<th>Name</th>
<th>Seconds</th>
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Comment on the reliability and validity of this test:


Vertical jump test

What does it measure?
Anaerobic power

What do you need?
• Wall
• Chalk
• Measuring tape
• Partner
• Weighing scales

How do you do the test?
• Stand side-on to a wall and reach up with the hand closest to the wall. Keeping your feet flat on the ground, the point of the fingertips is marked or recorded by a partner. This is called the standing reach.
• Stand away from the wall and jump vertically as high as possible using both your arms and your legs to help you project your body upwards. Touch the wall at the highest point of the jump and have this marked or recorded.
• The difference in distance between the standing reach height and the jump height is the score. The best of three attempts is plotted on the Lewis nomogram on line 'D'.
• Weigh yourself and record your weight in kilograms on the nomogram on line 'Wt'.
• Use a ruler and a sharp pencil to join up the two plots. The line you have drawn will cross the power line ('P') on the nomogram. Read your power in kilograms per second (kgm/s).

<table>
<thead>
<tr>
<th>Height difference between standing reach and jump height</th>
<th>D</th>
<th>P</th>
<th>Wt</th>
</tr>
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<tbody>
<tr>
<td>80 cm</td>
<td>200 kgm/s</td>
<td>100 kg</td>
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<tr>
<td>70 cm</td>
<td>150 kgm/s</td>
<td>90 kg</td>
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<td>60 cm</td>
<td>120 kgm/s</td>
<td>80 kg</td>
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<td>50 cm</td>
<td>100 kgm/s</td>
<td>70 kg</td>
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<td>40 cm</td>
<td>80 kgm/s</td>
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<td>30 cm</td>
<td>60 kgm/s</td>
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<td>20 cm</td>
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<td>10 cm</td>
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<tr>
<td>10 cm</td>
<td>25 kgm/s</td>
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Comment on the reliability and validity of this test:

One-minute press-up test

What does it measure?
Muscular endurance

What do you need?
Stopwatch
Partner

How do you do the test?
• Take up the starting position, with your arms straight, elbows locked, body straight, hands placed slightly wider than shoulder-width apart (with fingers pointing forward), and both feet on the floor.
• From the starting position, on the command 'Go', start the press-up by bending your elbows and lowering your body until the shoulders drop below the level of the elbows. Then return to the starting position. Pausing to rest is permitted only in the starting position.
• Your partner should count how many full press-ups are completed in one minute or up to the point where the performer retires from the test.

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<thead>
<tr>
<th>Name</th>
<th>Number of press-ups</th>
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Comment on the reliability and validity of this test:
One-minute sit-up test

What does it measure?
Muscular endurance

What do you need?
• Stopwatch
• Partner

How do you do the test?
• Lie on a carpeted or cushioned floor with your knees bent at approximately right angles and your feet flat on the ground. Your hands should be resting on your thighs.
• Squeeze your stomach, push your lower back flat, and raise your upper body high enough for your hands to slide along your thighs to touch the tops of your knees. Don’t pull with your neck or head, and keep your lower back on the floor. Then return to the starting position.
• Your partner should count how many full sit-ups are completed in one minute or up to the point where the performer retires from the test.

Name	Number of sit-ups

Comment on the reliability and validity of this test:

Jackson-Pollock nomogram method for prediction of percent body fat

What does it measure?
Body composition

What do you need?
• Skinfold callipers
• Partner

How do you do the test?
• Measurements should be taken on dry skin on the right side of the body and the subject should stay relaxed during the test.
• Mark the mid point of each skinfold site with a pen.
• Grasp the skinfold firmly between your thumb and index finger and pull away from the body. The skinfold should be gripped about one centimetre away from the mid point.
• Maintaining your grip, place the callipers midway between the base and tip of the skinfold with the dial facing upwards and allow the callipers to release fully so that full tension is placed on the skinfold.
• Read the dial of the skinfold callipers to the nearest 0.5mm shortly after you have released the callipers. Continue to grasp the skinfold throughout testing.
• Take a minimum of two measurements at each site and calculate the average of the two readings.
• Add up the results for each of your three skinfold measurements and work out your percentage body fat result by plotting your age in years and the sum of the three skinfolds on the nomogram.
• Use a ruler and sharp pencil to join up the two plots. The line you have drawn will cross the percent body fat scale. Read your percent body fat result to the closest 0.5% according to your gender.

Name	Gender	First skinfold site measurement (mm)	Second skinfold site measurement (mm)	Third skinfold site measurement (mm)	Percent body fat

Comment on the reliability and validity of this test:

Body Mass Index

What does it measure?
Body composition

What do you need?
- Weighing scales marked in kilograms
- Measuring tape
- Calculator
- Partner

How do you do the test?
- Measure your weight in kilograms.
- Measure your height in metres (so 182 cm is actually 1.82 m).
- Calculate your BMI using the formula below.

\[
\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m)} \times \text{height (m)}}
\]

NHS Direct (UK) provides the following assessment of BMI measurements. If your BMI is:
- Less than 18.5 kg/m\(^2\) you are underweight for your height.
- 18.5 to 24.9 kg/m\(^2\) you are an ideal weight for your height.
- 25 to 29.9 kg/m\(^2\) you are over the ideal weight for your height.
- 30 to 39.9 kg/m\(^2\) you are obese.
- Over 39.9 kg/m\(^2\) you are very obese.

It is important to remember, however, that muscle weighs more than fat, so bodybuilders and trained athletes will often have a BMI in excess of 25 kg/m\(^2\) without being overweight.

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<thead>
<tr>
<th>Name</th>
<th>Weight (kg)</th>
<th>Height (m)</th>
<th>BMI</th>
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Comment on the reliability and validity of this test:

1. Which components of fitness are important for your sport?

2. Do you score below the national average for any of the tests that measure the components of fitness that you identified for Activity 1? If so, which ones? If not, which component of fitness needs most improvement?

3. Write a mini training programme that will help you develop your areas of weakness. Include details of the training methods you will use. Use the space below and then continue on the back of this sheet.