

# extratime for Sport and Maths

## Introduction

Combining sports and maths can be a great way to engage children who have difficulty learning maths in a classroom. 'Shape', 'problem solving', 'probability' and 'data handling' are just some of the concepts that can be explored through fun games and sports. Providing opportunities for members to participate in physical activities that bring maths to life will not only improve their understanding of maths, but will also promote and encourage a healthy lifestyle.

A varied menu of after-school study support activities, including sport and maths clubs, is a key element of the 'core offer' of extended services that all schools are expected to provide by 2010. Evidence shows that participation in such activities can lead to improvements in young people's self-esteem, achievements, attitudes to learning, classroom behaviour, and school attendance.

For more information on the benefits of study support, visit [www.continyou.org.uk/studysupportetc](http://www.continyou.org.uk/studysupportetc).

## About this guide

This guide has been designed to offer advice and information to anyone who would like to set up an innovative and fun study support club that uses physical activity to link with, and reinforce, maths.



## Making your sport and maths club a success

Physical activity releases hormones in the brain that increase a child's capacity to learn. A study support club involving sport can provide a fun, non-threatening environment, in which students can learn effectively.

The benefits of approaching maths through sport have been evaluated and proven by the DfES Playing for Success (PFS) initiative. PFS centres across England use the environment and medium of sport to help motivate pupils identified by their schools as needing a boost in numeracy, literacy and ICT.

Many sports organisations are now developing resources to support PFS centres; schools can download these from the PFS website (see page 8).

### What can you achieve through your club?

As well as the general benefits of participating in study support clubs, sport and maths club members will benefit in more specific ways. For instance, they will:

- have the opportunity to access and explore maths in a variety of ways, and see how it is relevant to them
- have an increased enthusiasm for maths
- learn new skills, or further develop skills introduced in their normal PE lessons, such as 'spatial awareness', 'balance' and 'co-ordination'
- have greater opportunities for working as part of a team to achieve goals and to solve problems.

What your club achieves, and how your members benefit, depends on the activities you offer and whether or not you are targeting a particular group of young people.

To find out more about all these issues, and for advice on monitoring and evaluating the impact of your club, visit [www.continyou.org.uk/studysupportetc](http://www.continyou.org.uk/studysupportetc).

#### Top tip!

It is worth involving your members as much as possible in deciding on, organising and evaluating the activities. Not only will it give them a greater sense of ownership, but they will also have an increased commitment to making the club a success.

### What should your club 'feel' like?

Because participation in study support is voluntary, whether or not your sport and maths club is a success will depend on the culture you and your members create.

You should aim to develop a club where:

- the atmosphere is informal, fun and relaxed
- members are treated as individuals and feel that their voice is encouraged and listened to
- activities are different from lessons, and members have greater control over their own learning
- activities are non-threatening, that is, members who are less confident in maths or who find physical activity challenging are not made to feel uncomfortable.

By getting these elements right, you will have a sound basis for a successful club.

## How will you make your club different from PE/sport and maths lessons?

Although you may want to reinforce what is taught in the classroom, your club does not have to follow the curriculum, giving you the freedom to choose activities that you know will appeal to your members or target group. Depending on your group, you can use activities to reintroduce or reinforce basic concepts, or to extend and explore more advanced mathematical ideas.

As you will be running activities outside or in a gym, your club will naturally be different from a normal maths lesson. Developing activities around members' interests will help to ensure the games you organise are fun and inclusive, with the students taking a lead in their own learning.

## What activities should you provide, and how?

Activities need to be designed to be appropriate for students with differing levels of ability in both sport and maths.

Ideally, you will need to get all the members to participate, which could mean offering a selection of activities for students to choose from. Find out what interests them – it may be skateboarding, keep fit or more traditional sports. This information will be invaluable when designing the club to attract and retain a particular group of students. The tried and tested ideas on pages 5–6 will provide you with some starting points.

A sport and maths club is an ideal way for engaging the community in your school. Local people, businesses and services can really enrich your termly programme. Ways to encourage this wider involvement include:

- inviting your local sporting heroes or teams to talk to members about how they use maths to improve their performance
- contacting community coaches from local sports clubs to run specialist sessions
- asking local health professionals, such as a community dietitian or sports physiotherapist, for advice on calculating energy balance and muscle use.

Encouraging members to take responsibility for organising and researching the club programme will also help develop key skills and encourage independent learning.

### Top tip!

To shape your first term's activities, spend a session getting members to try out a range of different sports. Find out which they enjoyed most and why. Use your findings to shape the activities for the whole term.

### Case study

The basketball coach at Harrow High School and Sports College worked with the maths teacher to improve levels of achievement in pupils who were showing signs of disaffection in maths. By demonstrating how basketball relates to maths concepts the students became more engaged in their learning and showed a greater interest in the subject. Their classroom learning was reinforced further during basketball club sessions, when the coach used mathematical language to explain 'game play'.

The coach also attended some of the maths lessons as a learning mentor. This resulted in the pupils demonstrating the same discipline in the maths classroom that was required on the court. The class teacher noticed an immediate change in pupils' attitudes and behaviour. Having the opportunity to work with the basketball coach in this way provided the group with an excellent role model and an example of maths in action. They enjoyed exploring the links between maths and sport, and using their performances to illustrate calculations.

All pupils in the target group passed their maths GCSE.



## Tried and tested ideas

The ideas given below can form the basis of a term or half-term's work, or can be integrated into other clubs. The activities are not age-specific and can be adapted to suit whatever group of pupils you are hoping to attract.

### 1 Jogging circles

Multiplication, division and the difference between odd and even numbers can be illustrated simply by asking all members to jog around the club space. When you call out a number, members have to make a circle with that number of people. Ask the members to count how many circles have been made. Is anyone left over? Continue playing by asking students to jog around again, and calling out different numbers. Try to identify any patterns between the numbers that use everybody, and those that leave some members out.

### 2 Odds on

Members will enjoy the fun of betting challenges, while developing calculation skills and a practical understanding of probability. Encourage members to look at why some competitors have better 'odds' than others, calculating their own 'odds' for current or popular sporting events.

Start by outlining a situation, such as in cricket: 'the batsman has scored more than 50 runs in three out of his last five matches'. Then encourage members to use words such as 'certain', 'likely' or 'not likely' to predict the likelihood that his score will reach 50 in his next game. Does it make a difference whether the game is a one-day or test match? Extend this activity by looking at the whole team's probabilities, or by calculating the odds of individual performances.

### 3 Fizz buzz

Fizz buzz is a catchy game that encourages members to think about sequencing, multiplication and division. Start off by getting the students to clap slowly together to ensure everyone is concentrating. Then ask one player to start counting by shouting 'to my left, one'; the player to the left then shouts 'two', and so on. Keep going until a player arrives at:

- a multiple of three, or a number with a three in it – the student must then shout 'fizz' instead of the number, and reverse the counting direction
- a multiple of five, or a number with a five in it – the student must then shout 'buzz' instead of the number, and reverse the counting direction.

Remember that the number fifteen would be 'fizz buzz'! To extend the game, speed up the clapping or change the numbers – four and six work well.

### 4 Cone crazy

Put out a lot of cones in a large space. Under some of them, place a label with a number on it; under others, place one of the maths symbols  $+$ ,  $\times$ ,  $-$ , or  $\div$ . Divide the group into teams of three or four. Each team runs round and lifts a cone until they find that they have two numbers and one symbol. They then run back to base and write the sum and its answer down. How many different sums can they do in, say, fifteen minutes? How many have they got right?

### 5 Mysterious maths

Place a range of cards with numbers on them at various points around the school/ club site. Split the club members into pairs, and give each pair a map to follow so that they can collect and record the numbers. Set the pairs off at regular intervals, or at different parts of the course. When they are back at base, give the students a set of answers for which they need to find the sum, using the numbers they have collected.

## 6 Measuring up

Warming up with fun activities can be a good way to introduce the concepts of 'measurement', 'space' and 'shape'. For example, ask members to run around a badminton court, trying to keep the shuttlecock in the air by taking turns to hit it on both sides of the net. Ask someone to count the number of times members circuit the court – you will need this information later! Next, using a variety of equipment – such as a tape measure, trundle wheel or metre ruler – measure the court area and any other sports playing areas that are available, such as football pitches, netball and tennis courts or even a table tennis table. Use this information to set members new challenges to solve each week, for example:

- How far did each person run during the introductory exercise?
- Make a scale diagram of the various pitches – which is the biggest/smallest?
- How many times will a netball court fit into a football pitch, and so on?
- What shape do the areas all tend to be? What other shapes can you see?

## 7 Record breakers

Setting the challenge of racing against existing world records can really get the pulse racing and engage members in the concepts of 'speed' and 'timing' – for example:

- How fast does each person run the record distance?
- How far can they go before they slow down?
- Can the team get near the record? Can the team get closer to the record by running the race as a relay rather than individually?
- Without a stopwatch, how else could members measure time? (Perhaps members could make a timer out of two small plastic bottles and some sand.)
- What is the furthest anyone can run before the timer runs out?

## 8 Jump to it!

Look at world records for field events, such as Jonathan Edwards' triple jump record, and see how near your members can get to it. Get members, in teams of three, to measure and mark out the distance. Then ask them to take it in turns to practise a few jumps, with two people measuring and one jumping. Measure and record the best jumps and add the three jumps together.

- Have they beaten Jonathan? By how much? If not, how much further would they need to jump as a team or individually?
- Without a tape measure, how else could members measure the jump?

## 9 It's a knockout

Members generally respond well to competitions, such as league tables or a knockout competition. Discuss what 'systems' need to be involved to find a winner and how their achievements are recorded. For football, members could look at 'goal differences' and why this is important. Test students' answers by running competitions over a number of weeks, either in the field or with table-top games/fantasy football for the less athletic!

## Essential checklist

Here is a summary of all the main questions you'll need to ask as you plan your sport and maths club. Taking the time to get everything right before you start will really help to sustain your club.

### Find out what's needed

- What gaps are there in your existing study support programme that could be filled by staff with special skills, or an interest, in sport and maths?
- What do you want to achieve through your club?

### Find the right time for your club

- If you are introducing a new club, when is the best day/time of day and what is the best frequency to attract members?
- What might affect pupils' ability to come to your club, for example, transport, other clubs, and community commitments?

### Find the right staff

- Who is the best person to run your club, and how many staff will you need for each activity?
- Can you use older pupils to help run activities?

### Involve others

- What existing/new partners could support your club?
- How will you approach them?

### Cover the costs

- What resources (money and otherwise) will you need to provide your planned activities?
- What funding are you eligible to apply for and how long will the application process take?

### Keep it safe

- What are the health and safety considerations of your provision, including any training and checks for staff and insurance cover for activities?
- Do you need to undertake a risk assessment for your planned activities, including off-site visits?

### Get pupils involved

- How can you involve pupils in developing and running new activities?
- Have you asked pupils what they are interested in?

### Decide which pupils to target

- How will you identify which groups or individuals will benefit from your club?
- How will you encourage them to take part?

### Promote your club

- How can you give your club its own identity within the school?
- How can you turn sport and maths activities into publicity opportunities for the school?

### Keep it going

- How will you review the success of your club and decide what you need to change in order to improve it?
- Who will you ask for their views on your sport and maths activities, and what will you ask them?

## Useful resources

### Websites

**Counton** – [www.counton.org/resources/top-jobs/real-lives](http://www.counton.org/resources/top-jobs/real-lives)  
Full of maths-related resources, guidance, games and activities, including sporting celebrity testimonies of how maths has affected their careers.

**Golf Foundation** – [www.golf-foundation.org.uk](http://www.golf-foundation.org.uk)  
Tri-golf is a 'mini' version of golf specifically for use by young children in primary and junior schools. Additional resources include ideas for games and activities that can be linked with the PE and educational curriculum, such as *The Numeracy Activity Book* (call the Golf Foundation on 01920 876200 for more information).

**HOWZAT!** – [www.howzat.org.uk](http://www.howzat.org.uk)  
This cross-curricular resource for cricket includes lesson planning, cricket teaching methods, and suggested PE activities that introduce cricket into mainstream subjects, such as maths.

**Learning FC** – [www.dfes.gov.uk/playingforsuccess/index.cfm?SectionID=1&CategoryID=8](http://www.dfes.gov.uk/playingforsuccess/index.cfm?SectionID=1&CategoryID=8)  
A Key Stage 2 and 3 curriculum resource pack containing literacy, numeracy and ICT exercises on the theme of football.

**Motivate Video Conferences for schools** – [www.motivate.maths.org](http://www.motivate.maths.org)  
A real-time videoconferencing project for students aged 5–18, focusing on the maths of various sports/the Olympics. It offers students opportunities to work with professional mathematicians and scientists, and with other school students their own age, both in the UK and internationally.

**Playground fun** – [www.playgroundfun.org.uk/TeachersAndFamily/TeachingMaterials/default.aspx](http://www.playgroundfun.org.uk/TeachersAndFamily/TeachingMaterials/default.aspx)  
Teaching materials and ideas that bring together traditional and modern playground and street games for children aged 7–9, and link them to curriculum subjects including maths.

**Playing for Success** – [www.dfes.gov.uk/playingforsuccess](http://www.dfes.gov.uk/playingforsuccess)  
Promotes the development of literacy, numeracy and ICT study support centres within top football clubs, and other sports club grounds and venues.

**Schools Fantasy League** – [www.schoolsfl.com](http://www.schoolsfl.com)  
Fantasy Football League for students, helping to develop ICT, maths, science, English, citizenship and business studies skills.

**Tackle learning** – [www.dfes.gov.uk/playingforsuccess/index.cfm?SectionID=1&CategoryID=5](http://www.dfes.gov.uk/playingforsuccess/index.cfm?SectionID=1&CategoryID=5)  
A cross-curricular resource for rugby designed to encourage an effective working partnership between PfS study support centres, schools and rugby clubs for pupils in Key Stages 2 and 3. Promotes the development of literacy, numeracy and ICT skills.

### Publications

Eastaway, R and Haigh, J (2002) *How to take a penalty: the mathematical curiosities of sport*, David Fulton Publishers. (ISBN 1861058365)

Humble, S (2002) *The experimenter's A–Z of mathematics: maths activities with computer support*, David Fulton Publishers. (ISBN 1853468177)

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This Extra Time Sport and Maths Mini Guide is one of six **free** guides to setting up and running study support clubs:

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