



# The Premier League Primary Stars Primary Science Project

Linking football, space and working scientifically...  
Sarah Eames shows you how!

**Keywords** Space, Materials, Sport

The Premier League Primary Stars Project is a collaboration between Leicester City Football Club's (LCFC) Community Trust, the National Space Centre (NSC) and the Primary Science Teaching Trust (PSTT). The project produced a series of lessons that link space, football and working scientifically.



These resources were presented at PSEC 2019 and are freely available to download and use in the classroom; they can be found on the PSTT website: [pstt.org.uk/resources/curriculum-materials/city-science-stars](http://pstt.org.uk/resources/curriculum-materials/city-science-stars)

The project created a series of lessons using football and space as a context to encourage children to be curious about the world around them. The lessons were designed so that they could be delivered by teachers or sports coaches to 9-11 year-old children. The project was also an opportunity to increase the confidence of class teachers and promote practical and active science lessons. Over 300 children from nine schools took part in the trial lessons; after each lesson, the children took part in surveys and interviews to help make improvements to the content.

## The lessons

Our first lesson was a trip to the stadium (this is a visit that schools can arrange by contacting their local football, cricket, rugby, hockey or other sports club). At the stadium, we looked at the materials that make up the stadium and asked questions such as: Why are these materials used? Could other materials be used? Following this initial discussion, the children were challenged to design a comfortable chair to sit on. The children recorded their ideas by annotating plans, and they were encouraged to justify their decisions.

One of the highlights of the visit to the football stadium was meeting the head groundsman, who explained how the pitch is grown and repaired after a match: this involves artificial lights, underground watering, artificial grass mixed with real grass and an amazing set of

mowers. The groundsman described how he lovingly ensures that the pitch is ready for a game and he wondered whether, in the future, it would be possible to grow a pitch on Mars. In the lesson *Pitch Perfect*, the children were given this very challenge. They were asked to research the conditions on Mars and to plan their own investigations based on what they had found out. We also developed a lesson where variables are controlled, data are recorded for several weeks, and comparisons are made about how plants grow. The children worked in small groups to investigate growing seeds in different conditions. Their questions included: What types of soil could best grow the seeds? Which type of seed grows into the strongest plants? How does a carbon dioxide-rich atmosphere affect the growth? All the results were then compiled into a class conclusion.



Children tracked how seeds grew in different conditions

The lesson *Be a Sport* includes defining what a sport is and developing a simple game with rules. This can be further developed by debating whether certain activities can be counted as sport. Darts, skateboarding, gaming – are these sports? The lesson looked at using a 'sorting tree' activity to classify and group sports. Children developed yes/no questions about sports and the resources needed to play them in order to classify them. For teachers, this is an imaginative and useful way of developing classifying skills and assessing children's understanding.

When planning the series of lessons, it was amazing to discover that a sports stadium is purposely built to echo sounds from the crowd. A crowd leaves the stadium after a match with a more positive view if they have heard the 'roar of the crowd'. Thunder clappers (pieces of concertinaed card) can enhance the spectator experience. *The Roar of the Crowd* lesson uses dataloggers to measure and analyse the sounds of the thunder clappers, plus clapping, stamping, cheering, chanting and singing. The children are encouraged to look at and interrogate the data collected.



Children used dataloggers to analyse sound

Yes, this is a noisy lesson and best done on a fine day outside. If the children do not have much experience of collecting data with dataloggers, the teacher may need to lead the children through the lesson. There are also some amazing videos of what happens to sound in a vacuum to link the lesson to Space, for example: <https://tinyurl.com/wvsabu8>

In the lesson *Feel the Pressure*, footballs are blown up to a range of different pressures. We discussed the term 'psi' (pounds per square inch), created a question to be answered and made a prediction. Then, in groups, children were tasked with collecting data that were accurate and reliable about how changing the pressure of the ball affected the ball's performance. Most groups chose to drop the ball and observe and measure the bounce; a few groups rolled the ball, and this made for interesting discussions about controlling variables.

The *Get a Grip* lesson explores friction, which the children measure using force meters. Children had to decide on one of two investigations: comparing the friction of different types of shoes on the same surface, or comparing the friction of the same shoe on different surfaces around the school. As with the *Feel the Pressure* lesson, children worked in small groups and were given time to prepare their conclusions for the lesson plenary. This generated a lot of discussion and debate about why different groups had come to different conclusions, and highlighted that, when groups agreed with each other, this improved the reliability of the results. The history of football boots provided another extremely interesting discussion point, not to mention the branding. This lesson provided a fascinating link to Space, as astronauts walking on the Moon need weights in their boots to ensure stability.



Children used force meters and different shoes to investigate friction

A large majority of children said the final lesson, *Kick Off, Lift Off*, was their favourite one. Making the wooden rocket launchers is well worth it; they are easy to construct, are cost-effective and last for years. The children explore how changing the rocket's launch angle affects how far and how high the rocket flies, something that can be likened to the trajectory of a kicked ball. This lends itself to a great deal of data collection (once the excitement of simply firing the rocket wears off!). The lesson supports the teaching of forces, and an added bonus is being able to make use of waste plastic bottles, at least until they crack and then they can be placed in the recycling bin! A short video was produced by LCFC to illustrate this lesson: [www.youtube.com/watch?v=F2KGIE4eQW8](http://www.youtube.com/watch?v=F2KGIE4eQW8)

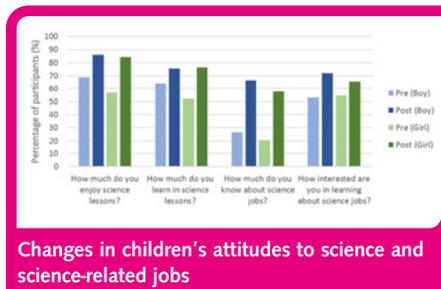
A STEM coach in Leicester (funded by PSTT) is continuing to develop the resource and to work with schools and teachers in the East Midlands area. Interestingly, they have also been able to work with small groups of children with additional needs to increase confidence and to develop a more positive attitude to science. The lessons have also been used in an after-school club.

# Project evaluation

We asked the children about their attitudes toward the lessons by rating each session out of 10. The scores that the children gave were all 8 and over. Interestingly, those that were more practical and outside (*Feel the Pressure, Kick Off, Lift Off* and the newest lesson, *On the Wing*) rated slightly higher than the indoor investigations.

This might be useful to bear in mind if you are a science lead trying to encourage teachers to take science outside.

After carrying out the series of lessons, the children also reported an increased enjoyment and engagement with science. Particularly notable was that the biggest change after the lessons was in the children's knowledge about science-related jobs.



Teachers are welcome to download the resources and use them with their classes. Science leads are encouraged to share them with other teachers, particularly those teaching 9-11 year-olds. The lessons ensure good coverage of working scientifically skills; they have been structured to support newly qualified teachers and teachers who are less confident with science; and they can also be adapted to suit the needs of the class or group. They work well as a series of after-school sessions or for small group interventions. The contexts of Space and

football clearly have a very wide appeal; the practical elements encourage development of skills, record-keeping and analysis, as well as working together as a team.

All ESA and NASA videos are copyright-free and available to use in the classroom, and there are some great videos of Tim Peake running a marathon in Space, and other astronauts on the International Space Station trying to play football.



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