

LOCATION:	TARGET AGE GROUP:
Classroom	KS2
TARGET GROUP SIZE:	DURATION:
10-20 (scale resources for larger group)	Min. 1 hour (ideally 1.5 hrs)

PLPS CITY SCIENCE STARS

Fixture 1: Pitch Perfect

SUMMARY:

Pupils will first consider the key steps of designing a scientific experiment. After a short 'Zoom Out' warm up activity featuring the King Power Stadium, the children are shown an interview with the LCFC Head Groundskeeper, who challenges the pupils to investigate the potential for growing a football pitch on Mars. This is a 6-8 week investigation into the growth of grass seeds under different conditions. Each group has a different question to answer that will contribute to a class conclusion during a later fixture.

LEARNING OBJECTIVES:

1. To identify the key steps of scientific experimentation and what is meant by a 'fair test'
2. To design, carry out and monitor their own long-term experiments
3. To draw evidence-based conclusions from their own observations
4. To learn about how the Martian environment might affect plant growth

PRIOR LEARNING AND LINKS TO KS2 NATIONAL CURRICULUM:

- ✓ Pupils should have learned about the requirements for keeping plants alive on Earth.
 - Important to ask the pupils what they already know about planting seeds, and what the seeds will need to grow strong and healthy.
- ✓ Pupils will be working scientifically and carrying out experiments.
- ✓ Pupils will be learning about the differences between Mars and Earth.

PREPARATION AND RESOURCES:

- ✓ This workshop works best with the use of a computer and projector or a computer-linked smartboard to display the 'PITCH PERFECT' PowerPoint slides. If none are available, printouts could be used instead, but these will be less engaging and less environmentally friendly.
- ✓ Each pupil will be issued an individual 'Lab Book' that contains any worksheets associated with the City Science Stars fixtures.
- ✓ As well as shared resources, each experiment has its own specific list of resources that can be found in the resource cards associated with this fixture.

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ACTIVITY PLAN:

Welcome to the programme

1. Introduce yourself and the City Science Stars programme, and outline the learning objectives for this fixture.
2. Provide pre-programme questionnaires if required. While they are filling these out, you can ask the pupils what they think a scientist looks like. You can then reveal that anyone can be a scientist and that they take many forms (e.g. not just old men with crazy hair wearing lab-coats).

Introductory activity (small groups of 3/4)

1. Provide the pupils with the 'experiment steps' cards and ask them to put them in the order that they think an experiment should be carried out. This serves as a good introduction to the programme and helps to gauge the pupils' level of understanding of the scientific method.
2. Walk around the groups and ask them about their order and their decisions.
3. After a few minutes, go through the correct order together with the pupils, providing an example experiment that includes each of the steps, e.g. the mystery of a bounce-less ball.
4. Continue to the 'zoom-out' activity by displaying the first image (magnified photo of a blade of grass) and asking the pupils what they think it is.
5. Keep zooming out and encouraging the pupils to 'rethink' based on the new evidence.
6. Reveal the final image of the King Power stadium.

Main activity (small groups of 3/4)

1. Explain the importance of the King Power pitch to the LCFC team, and introduce the interview with the Head Groundskeeper for LCFC.
2. Once the interview is complete, explain to the pupils that they will be designing and carrying out their own investigations into what growing a football pitch on Mars might be like.
3. Explain the variety of differences between Earth and Mars and how these can be recreated by the pupils, then either allow the pupils to choose their test variables or randomly assign them.
4. Ask the pupils to start filling in their lab book with their names, start date, experimental question and experimental variables. They can also draw and label their experiment setup.
5. Begin handing out the resources and assist the pupils in setting up their investigations. While pupils might be waiting for equipment, ask them to predict what differences they might see between their mini pitches.

Plenary activity

1. Once all experiments are set up, ask the children to decide on a suitable location for their pitches and to agree on a watering rota/schedule that ensures their plants will regularly get the amount of water specified by their lab book. This may mean there needs to be extra watering on a Friday to make up for the weekend.
2. Review the learning objectives and propose the take-home challenges.

TAKE HOME CHALLENGE IDEAS:

- Tell parents/family what they have learned today and discuss their predictions for their football pitches.
- Prompt children to find out about the current plans to send humans to Mars and the associated challenges.
- Prompt them to research about the achievements of George Washington Carver (prominent American botanist and agricultural scientist) with their parents/family.
- Prompt them to find out what it might be like to grow football pitches on planets other than Mars.

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TASK/ASSESSMENT DIFFERENTIATION:

✓ Minimum pupil goals:

- Produce one prediction that they can assess over time
- Successfully set up their mini football pitches (with support if required)

✓ Target pupil goals:

- Produce two or more predictions that they can assess over time
- Think critically about their results to draw conclusions and propose future improvements to the experimental design

✓ Further goals:

- Encourage tracking of weekly growth with a ruler and by counting number of blades
- Propose future experiments that could represent environmental conditions on other planets

PUPIL MONITORING AND EVALUATION:

- Ask for brief project updates at the start/end of future fixtures and ensure they are using their lab books.
- Encourage the pupils to ask each other about their projects and to report their findings to you.

DELIVERY NOTES AND ADDITIONAL SCIENTIFIC INFORMATION:

Setup guidance:

- Organise as much of the equipment prior to the session as possible to ensure the process of setting up the experiments runs quickly (e.g. separate the soil and seeds into separate bags per group).

Vocabulary:

- Oxygen, carbon dioxide, vacuum, nutrients, sensitivity, germination, climate, adaptation, acidity, photosynthesis, respiration, sensitivity.

Delivery notes and science information

- The atmosphere of Mars is mostly carbon dioxide compared to Earth, which is mostly nitrogen.
- Oxygen is required by plants for respiration, carbon dioxide is required for photosynthesis.