# Great Sports Share

**A whole-school framework for asking-investigating and sharing scientific questions**

Great Science Share for SCHOOLS

## Context

Pupils ask and investigate scientific questions to enable them to better understand how human bodies function and perform differently in sporting activities. The excitement and engagement created by the Olympic Games is an ideal context for pupils to share their investigations. This Guided Enquiry provides ample opportunities to explore progression in working scientifically from EYFS to 14 years years of age. In particular, focus is paid to developing predictions and analysing and interpreting evidence that has been gathered. Pattern seeking is very likely to occur as humans are involved in the data gathering process.

This enquiry links to SDG3 Good Health and Well-being as pupils are encouraged to actively explore physical activities linked with competitive sport which keeps their minds and bodies healthy.

**3 GOOD HEALTH AND WELL-BEING**

## What affects our performance during sport?

### For example

Do people with longer legs jump further?

Do people with longer arms throw further?

Do people with shorter hair swim faster?

Are there any patterns between height and running speed?

Are there any patterns between foot/shoe size and jump height?

How does a javelin fly?

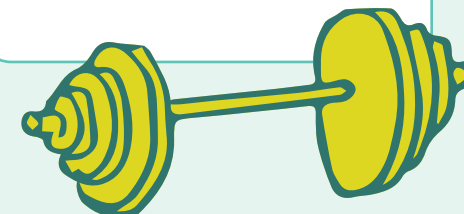Which food groups are best at providing slow release energy?

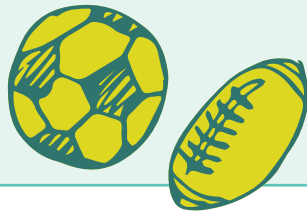## Learning Outcomes

**Pupils will be able to:**

- develop a prediction linked to their enquiry question

- gather and analyse evidence using tables and graphs

- draw a conclusion that relates to their predictions and evidence
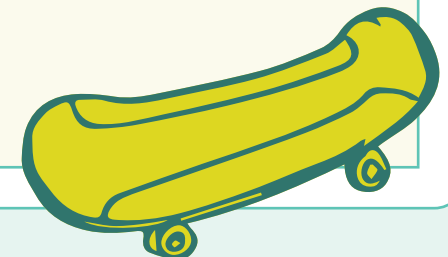
**Teachers will be able to:**

- describe progression in scientific enquiry skills from EYFS-age 11-14

- provide feedback to pupils, aligned to prior and future learning outcomes

# Curriculum Links

| 3-5 years | 5-7 years | 7-11 years | 11-14 years |
|---|---|---|---|
| **Pupils are working scientifically by:** | | | |
| **ELG: Listening, Attention and Understanding**<br><br>• make comments about what they have heard and ask questions to clarify their understanding<br><br>**ELG: Gross Motor Skills**<br><br>• move energetically, such as running, jumping, dancing, hopping, skipping and climbing<br><br>**Characteristics of Effective Learning**<br><br>**Finding out and exploring**<br>• Showing curiosity about objects, events and people<br><br>**Being willing to "have a go"**<br>• Showing a 'can do' attitude<br>• Taking a risk, engaging in new experiences, and learning by trial and error | • asking simple questions and recognise that they can be answered in different ways<br>• performing simple tests<br>• gathering and recording data to help answer questions<br>• using non-standard units or cm/m (dependent on confidence of learners) | • asking relevant questions and using different types of scientific enquiries to answer them<br>• taking accurate measurements using standard units<br>• recording data and results of increasing complexity using tables and scatter graphs<br>• reporting and presenting findings from enquiries, including conclusions and causal relationships<br>• using results to draw conclusions | • asking questions and developing a line of enquiry based on observations of the real world alongside prior knowledge and understanding<br>• making predictions using scientific knowledge and understanding<br>• making and recording observations and measurements using a range of methods<br>• presenting observations and data using appropriate methods, including tables and graphs<br>• interpreting observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including explaining data in relation to predictions and hypotheses |
| **Pupils are drawing on substantive knowledge by:** | | | |
| **Development Matters:**<br>Mathematics<br><br>• Compare length using the key vocabulary - 'longer/shorter'<br>• Notice patterns<br><br>**Physical Development**<br><br>• Further develop and refine a range of ball skills including: throwing, catching, passing<br>• Revise and refine the fundamental movement skills such as walking, jumping, running | • describing the importance of exercise for humans<br>• identifying, naming, drawing and labeling the basic parts of the human body | • identifying that humans and some other animals have skeletons and muscles for support, protection and movement<br>• recognising the impact of exercise and lifestyle on the way their bodies function | • identifying the structure and functions of the human skeleton, to include support, protection and movement<br>• recognising the function of muscles and give examples of antagonistic muscles |

# Resources

| 3-5 years | 5-7 years | 7-11 years | 11-14 years |
|---|---|---|---|
| • School device to take photos to record results | • Measuring equipment – e.g. metre sticks, rulers, measuring tape (non standard units of measuring can also be used as appropriate to learners)<br><br>• 5-7 Great Science Prediction Prompt | • Measuring equipment - eg. metre sticks, rulers, measuring tape<br><br>• 7-11 Great Science Prediction Prompt<br><br>• 7-11 Great Science Conclusion Creator | • Measuring equipment - eg. metre sticks, rulers, measuring tape<br><br>• 11-14 Great Science Prediction Prompt<br><br>• 11-14 Great Science Conclusion Creator |



**Find all of the GSSfS Toolkit in one place**

Great Science Toolkit

# Step-by-Step Guide

## 1



Engage the pupils in watching **Markus Rehm smashes long jump world record** from the Olympics.com website. Introduce the current key Olympic records for long jump; 8.90m for men set by Bob Beamon in 1968 and 7.40m for women set by Jackie Joyner-Kersee in 1988 noting how these demonstrate how amazing the human body is. Explain that the body is a system of parts that work together to enable movement, growth and learning. Exercise and training of any skill can improve the way our bodies perform. The Olympics is a global occasion that showcases various sports and how performance differs between athletes from around the world.

### Olympic Games website

**Summer, Winter Olympics, YOG & Paralympics**

There is a wide range of information about sports and sports people for you to explore.

## 2

Explain that pupils will have the opportunity to ask-investigate and share an enquiry question that they are interested in. The overarching question:

## What affects our performance during sport?

Expand on the key term – 'performance'. What definitions do the pupils have for this term?

Clarify that 'performance' is a term that can describe:

- **something that happens in a theatre**
- **the way we do something**
- **how successfully we do something**

Now, ask the pupils to talk and list different factors they think can affect someone's performance when doing sports. Collate these as you think best. Ideas could include – someone's health, how much training they've done, what they're wearing, the temperature around them, what food they've eaten, time of day, physical characteristics/features etc.

Video source ©: International Olympic Committee

# Step-by-Step Guide



**Great Sports Share Ideas for Questions**

### 3

**Use Great Science Question Makers to inspire pupils to generate different scientific questions that they could investigate.**

If inspiration or support is required, the **Great Sports Share Ideas for Questions** is offered as a stimulus. Encourage pupils to think about factors affecting performance during sport. You may wish to use the terms variables, causes, effects, independent or dependent, and to discuss their meaning.

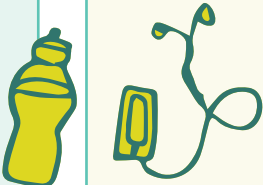Decide on the enquiry questions to investigate in pairs, groups or as a whole class.

## Progression in asking scientific questions

| 3-5 years | 5-7 years | 7-11 years | 11-14 years |
|---|---|---|---|
| **Explore through play:**<br><br>Ask the pupils to move in different ways – you could try jumping, running, dancing, hopping, skipping, climbing.<br><br>Now challenge the pupils to choose one type of movement (e.g. jumping) and see if they can do this in different ways (e.g. jumping up and down, jumping moving forwards/backwards, two feet to two feet, striding etc). | Ask simple questions and recognising that they can be answered in different ways<br><br>**Identify:**<br><br>• *What are we changing?*<br>• *What are we measuring?*<br>• *What are we trying to keep the same?*<br><br>**You may wish to use ' 5-7 Asking Scientific Questions' Skills Starter video to support** | Ask relevant questions and use different types of scientific enquiries to answer them<br><br>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br><br>**Identify with support:**<br><br>• *What is the independent variable?*<br>• *What is the dependent variable?*<br>• *What are the control variables?*<br><br>**You may wish to use '7-11 Planning Enquiries' Skills Starter video to support** | Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience<br><br>Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables<br><br>**Independently identify:**<br><br>• *What is the independent variable?*<br>• *What is the dependent variable?*<br>• *What are the control variables?* |

***Note:*** *That in a Pattern Seeking enquiry pupils cannot change or control the variables as easily as in a comparative fair test. In this case, they should be encouraged to look for differences in the measurements and look for any patterns.*
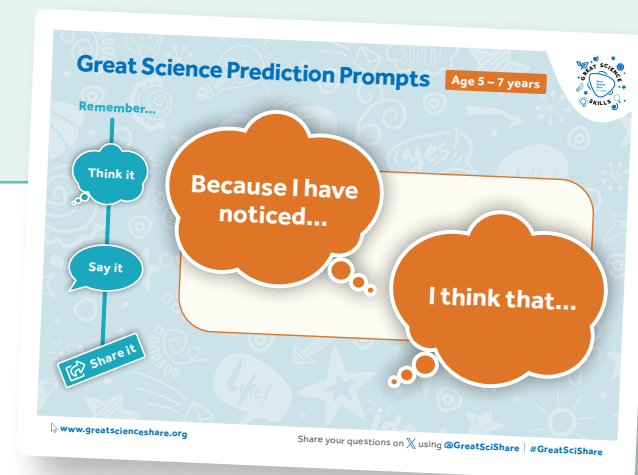
# Step-by-Step Guide



## Great Science Prediction Prompts — Age 5 – 7 years

Remember…

Think it

Say it

Share it

**Because I have noticed…**

**I think that…**

www.greatscienceshare.org

Share your questions on X using @GreatSciShare | #GreatSciShare

**4** Ask the pupils to make a prediction. What do they think will happen in the investigation?

Clarify that a prediction is a statement that describes what they think will happen.

Use the **Great Science Prediction Prompts** to support.

## Progression in making predictions

| 3-5 years | 5-7 years | 7-11 years | 11-14 years |
|---|---|---|---|
| Answer 'Yes' or 'No' to simple questions<br><br>*Do you think the tallest people in our class will perform the longest jumps?* | Pupils will be making predictions.<br><br>*Because I have noticed that some people have longer legs than me I think that they will be able to jump further than me.* | Use a sentence that includes 'because'<br><br>*We predict that people with longer legs will jump further because they will be able to stretch their legs further in front of themselves compared to people with shorter legs.* | Make a prediction based on a **hypothesis**<br><br>A **hypothesis** is an idea about how something works that can be tested using investigations.<br>*E.g. The length of a person's legs affects how far they can jump.*<br><br>A **prediction** says what will happen in an investigation if the hypothesis is correct.<br>*E.g. I predict that the longer a person's legs are, the further they will be able to jump because they will be able to stretch their legs further in front of themselves when they land.'* |
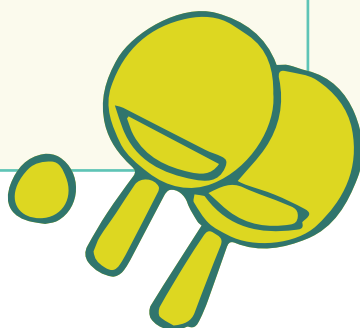
# Step-by-Step Guide

**5** **Give time and access to resources for pupils to carry out their planned investigation.**

Older pupils should select the resources they need. In groups of 3-4, pupils should take measurements in a systematic way, relative to age expectations.

| Progression in taking measurements | | | |
|---|---|---|---|
| **3-5 years** | **5-7 years** | **7-11 years** | **11-14 years** |
| Use non-standard units of measure or simply describe what they find.<br><br>*E.g. the jump was as long as 5 hand lengths; Kamal's jump was longer than Alex's.*<br>*Use of photos or chalk markings on outside spaces are visual ways to chart results.* | Measure using either non-standard or standard units of measure.<br><br>Each group can record results. Use ranks to sort measurements from longest to shortest etc.<br><br>Teacher can then collate class results by asking each group, 'Did the person with the longest legs jump furthest in your group?' A Yes/No tally chart can be created on the board.<br><br>**'5-7 Gathering Evidence' Skills Starter video support can be used to support** | Measure accurately using standard units.<br><br>Independently choose the most appropriate piece of equipment to measure.<br><br>Design their own table to record results e.g. distance of each jump for every member of their group.<br><br>Apply age-related maths by using repeat readings and calculate a mean of their results.<br><br>**'7-11 Measuring Accurately' Skills Starter video can be used to support** | Measure distances accurately and with precision to within 0.5cm.<br><br>Present observations and data using appropriate methods, including tables and graphs.<br><br>Calculate mean distances. |
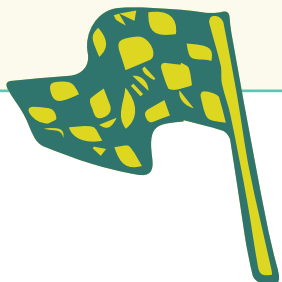
# Step-by-Step Guide

**6** **To analyse and interpret the measurements gathered, encourage pupils to collate and create ways to show their results in an ordered way to others.**

This may include images, tables and graphs. Teachers should model this process according to pupils' confidence. They may collate multiple data sets together across the class based on the same question. Encourage them to spot and explain patterns they find.

### Great Idea!

Challenge pupils to work in cross-age groups to create a giant whole school scattergraph on the playground using chalk. Suggest everyone records their longest jump or furthest throw.

| Progression in analysing evidence gathered | | | |
|---|---|---|---|
| **3-5 years** | **5-7 years** | **7-11 years** | **11-14 years** |
| Looking at and talking about the measurement, in-person or using photographs of the results. Group discussion. | Draw a **block diagram or pictogram** to represent measurements taken. | **Draw block diagrams or scattergraphs** to represent measurements taken. | Pupils decide which type of graph would be best to represent the data they have collected. Consider if using an average may be appropriate. |

**Use the Great Science Skills Starters videos:**

5-7 INTERPRETING TABLES & CHARTS

7-11 INTERPRETING DATA
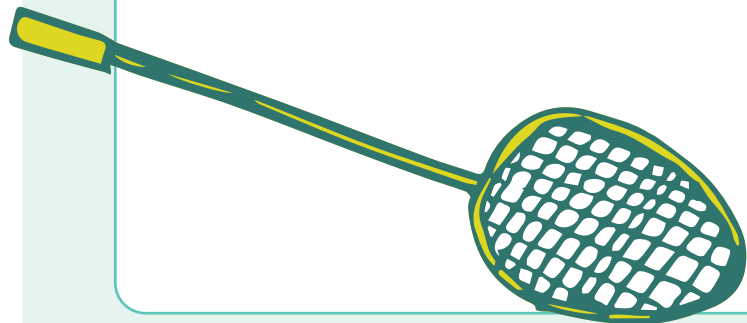
# Step-by-Step Guide
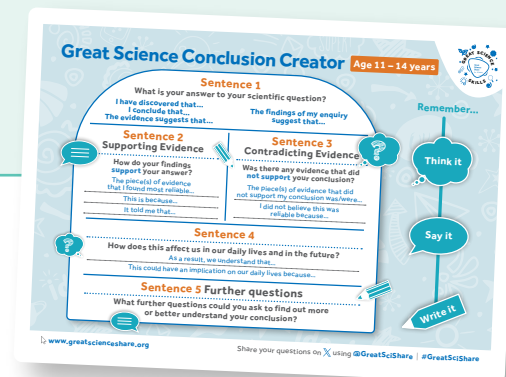
**7** Support the pupils to draw conclusions from their investigations by revisiting their predictions.
The Great Science Conclusion Creators are helpful in structuring conclusions.

## Progression in drawing conclusions

| 3-5 years | 5-7 years | 7-11 years | 11-14 years |
|---|---|---|---|
| Simple noticing differences between people's results. *E.g. Zak jumped far. They are tall...* | Use vocabulary to make comparisons, e.g. longest, shortest, furthest based on patterns in the data. | Identify patterns and relationships between the possible cause and effect, e.g. leg length and length of jump. | Identify patterns and relationships between the cause and effect, introducing the terms 'correlation'. |
| Pupils share what they have found out and answer the enquiry question, where appropriate. | Draw a conclusion making links to the original prediction. | Consider how the measurements could be: | Correlation is when there is a relationship between two variables. |
| Discussions around whether what they have found out was what they expected. | *I have discovered that most people with longer legs can/cannot jump further than people with shorter legs...* | • more reliable, e.g. repeat readings and/or • more valid, e.g. improving measuring techniques. Revisit predictions and whether the conclusion supports the prediction or not. *E.g. We predicted that people with longer legs would jump further than people with shorter legs. My measurements support this prediction. This can be explained by people with longer legs being able to stretch their legs further in front of themselves more when landing.* | *E.g. Most people with longer legs did jump further, showing a direct correlation between leg length and length of jump. Participant C and F's results show some correlation but not as much as others. Participant G's results do not fit the pattern at all. This is an anomalous result.* *We predicted that a person's leg length affects how far they can jump which is supported by the majority of the data gathered.* *Ask pupils if they feel they have gathered enough evidence to consider their results reliable. e.g. repeat readings would improve the reliability of the data.* |

**8** Share conclusions from the enquiry.
This could be a whole-school science assembly, where the wider community is invited. Posters could alternatively be made and be put out in line with a Sports Day event.

www.greatscienceshare.org