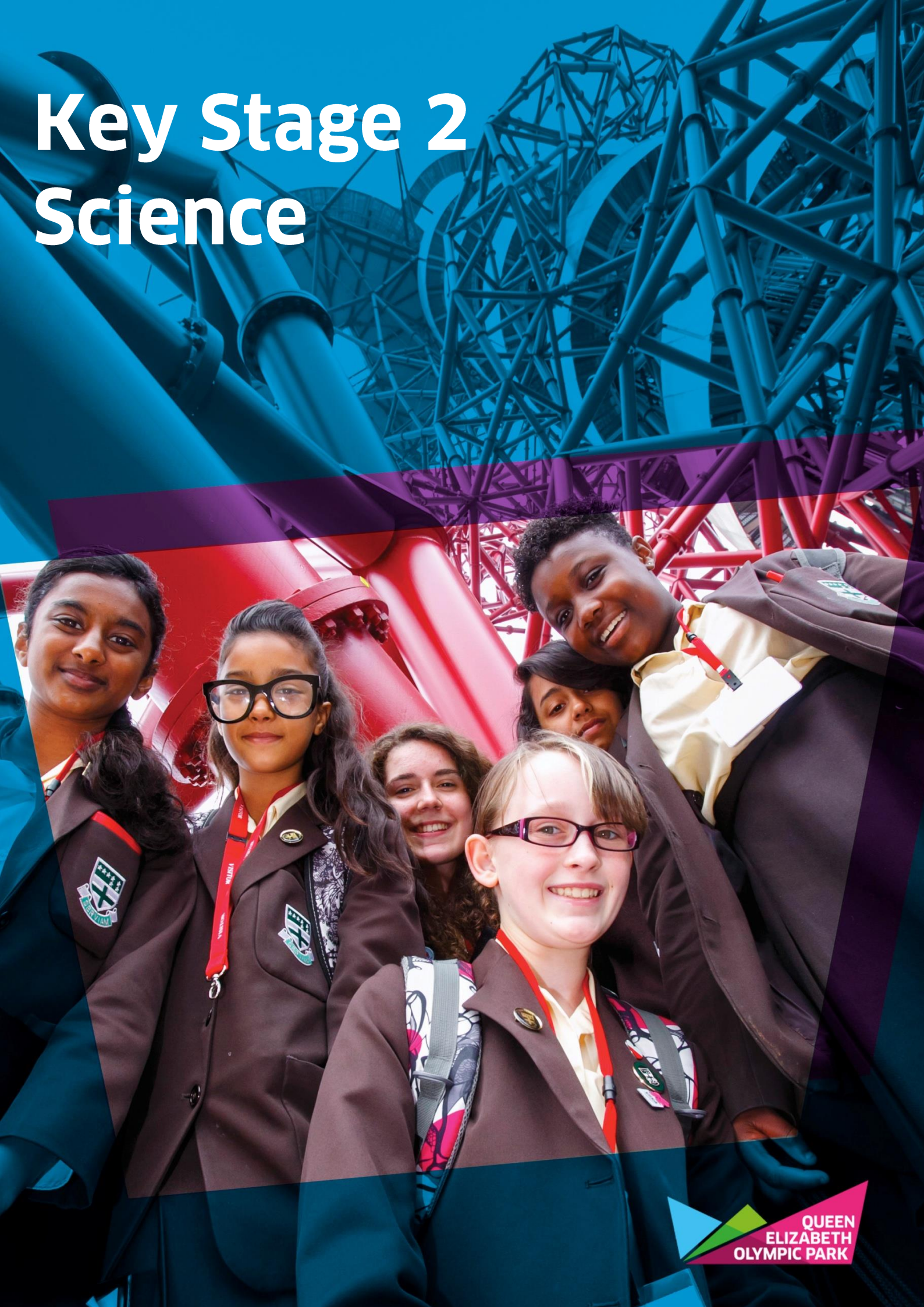
# Key Stage 2 Science



QUEEN ELIZABETH OLYMPIC PARK

# Welcome to London's newest outdoor classroom!

We have designed a suite of learning resources for schools to bring with them and use within Queen Elizabeth Olympic Park, London's newest outdoor classroom. It is our ambition for the Park to inspire, raise aspirations and raise educational attainment amongst schoolchildren and we have created lesson plans and worksheets that bring the national curriculum to life across a range of subjects and key stages.

These resources provide a quality learning experience for students through exploring the past, present and future of Queen Elizabeth Olympic Park through the spectacular parklands, venues and waterways. They have been designed to ensure your school group get the best learning experience out of your trip to the Park enabling you and your students to discover, share and enjoy Queen Elizabeth Olympic Park whilst learning. The resources cover the following subjects:

**Key Stage 3 and 4 – Geography, Science, Design Technology, Maths and PE**

**Key Stage 1 and 2 – Literacy, Numeracy, Science and Geography**

These resources provide a practical example of the London curriculum in action, using the unique backdrop of this new part of the capital to inspire learning.

We'd like to extend a special thank you to the Fields Studies Council who were commissioned to develop the learning resources and to all the schools involved in helping to input, shape and test the resources.

We hope that you enjoy them and we welcome your feedback.

# Key Stage 2 – Science
Information for teachers

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# Activities – information for teachers

The following pages describe various activities that are related to the subject covered in this pack. Pupil worksheets for each of these activities can be found in the following section.

Suggested locations to carry out the activity are also shown, these relate to the map on the following page.

Activities are shown in a circular route from Stratford station, however they can be used in any order and you can take any safe route through Queen Elizabeth Olympic Park.

Each activity is designed to take about 20 minutes.

Activities are designed to require no additional resources or equipment.

Worksheets can be printed in black and white or colour.

## Further information

Key facts and useful information can be found on pupil worksheets in boxes like this.

These include information about the venues and the parklands, as well as background about the area around Queen Elizabeth Olympic Park.

## Map

The worksheets can be carried out at sites across Queen Elizabeth Olympic Park. We have suggested a location that we believe is most suitable for each activity. They are identified on the map below.

| Location | Activity | Description |
|---|---|---|
| **London Aquatics Centre** | Marvellous materials (2) | *To discuss the properties for materials.*<br><br>Students make observations about materials used in the construction of London Aquatics Centre. They consider the properties of each of these materials and then give reasons for their use. |
| **South of the Park** | Impact on the environment | *To consider the impact of people on the environment.*<br><br>Students make observations about the users of the south of the Park. They then consider positive and negative impacts they are having on the area. |
| **ArcelorMittal Orbit** | Shadows | *To use shadows and relate them to times of the day.*<br><br>Students use the shadow created by the sculpture and think about how it changes during the day. |
| **The Stadium** | Shapes, symmetry and angles | *To identify lines of symmetry, observed shapes.*<br><br>Students observe the shapes used in the Stadium and comment on them. |
| **River Lea** | Living Things on the River Lea | *To identify living things in their local environment.*<br><br>Students make observations of living things in their local environment. They draw images and describe what they find and relate them to their location. |
| **North of the Park** | Nature bingo (2) | *To identify some of the plants and animals found in Queen Elizabeth Olympic Park.*<br><br>Students walk around the north of the Park, looking for items on the bingo list which are ticked off as they spot them. |

## Curriculum links

| | | |
|---|---|---|
| KS2 | Science | • Develop scientific knowledge and conceptual understanding through the disciplines of biology, chemistry and physics<br>• Develop understanding of the nature, processes and methods of science through enquiry<br>  • Ask relevant questions<br>  • Making systematic and careful observations<br>  • Gathering, recording and presenting data in a variety of ways to help answer questions<br>  • Record findings using scientific language<br>  • Use results to draw simple conclusions<br><br>• Programme of Study<br>  • Light<br>  • Recognise shadows form when light is blocked by a solid object<br>  • Look for changes in shadows when the light source moves<br>  • Explain why shadows have the same shape as objects that cast them<br>  • Living things and their habitats<br>  • Explore living things in a local environment<br>  • Positive and negative impact of human activity on environments<br>  • Make a guide to living things<br>  • Observe seasonal changes in the local environment<br>  • Properties and changes of materials<br>  • Give reasons based on observation for the use of everyday materials |

# Key Stage 2 – Science
Pupil worksheets

QUEEN ELIZABETH OLYMPIC PARK

# Marvellous materials! (2)

There are two 50 metre swimming pools and one 25 metre diving pool. During the London 2012 Olympic and Paralympic Games, the capacity was 17,500 people.

This was achieved using two side extensions which have now been removed. Capacity is now 2,500 people (expandable to 3,500).

Here is a picture of London Aquatics Centre. Look at the building and the picture, label the materials that have been used. Here are some ideas: glass, metal, wood, plastic, add your own!

For each of the materials you have spotted, think about their properties. In the table below, tick the correct properties for each material. Use the extra column for a material you have spotted.

| | Glass | Metal | Plastic | Wood | |
|---|---|---|---|---|---|
| Soft | | | | | |
| Hard | | | | | |
| Bendy | | | | | |
| Soluble | | | | | |
| Absorbent | | | | | |
| Transparent | | | | | |
| Opaque | | | | | |
| Conductive | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

In groups discuss why each material was used in the building. For example, the windows are made from glass because it is transparent.

# Which habitats are there?

Queen Elizabeth Olympic Park is made up of more than 22 miles of interlinking pathways, waterways and cycle paths. There are 250 benches and lots of seating built into the parklands, so people are never more than a 50 metre walk from a seat.

Draw a sketch of the south of the Park, then answer the questions below.

| | |
|---|---|
| Who is using the space? | |
| What are they using the space for? | |
| Why are they using this space? | |
| What facilities have been provided for them? | |

What impact do people have on the south of the Park?

| Positive impacts | Negative impacts |
|---|---|
| | |

Overall are people having a positive or negative impact on the environment?.....

Why? .....

.....

# Shadows

The ArcelorMittal Orbit is a tourist attraction. It is the UK's tallest sculpture at 114.5m and is held together with 35,000 bolts. On a good day, you can see 20 miles from the top.

Is the Stadium east or west of the ArcelorMittal Orbit?

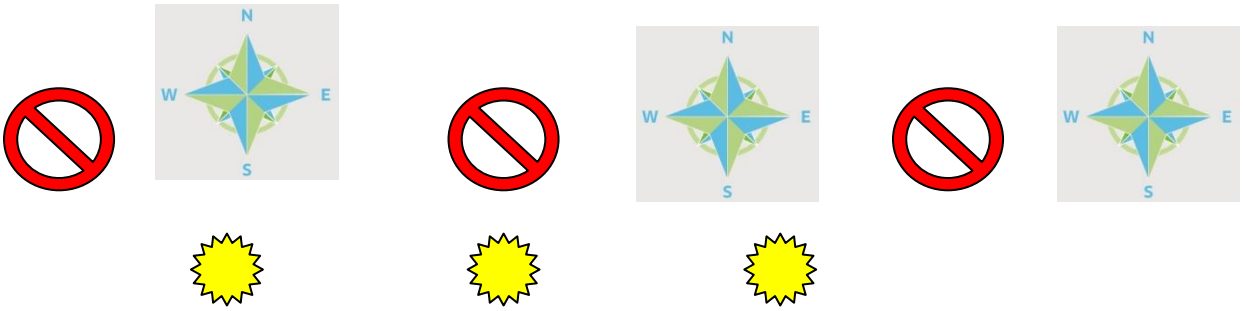
Is London Aquatics Centre east or west of the ArcelorMittal Orbit?

Walk around the ArcelorMittal Orbit and find the shadow. Draw the shadow on the map in the correct place.

Will the shadow change position during the day?

The sun rises in the east and sets in the west.

In the diagrams below, which way would the shadow of the ArcelorMittal Orbit fall? Draw the shadow on each diagram.


In each of the diagrams above, what time of day is it?

The ArcelorMittal Orbit is 114.5m tall – the tallest sculpture in the UK! If the loops were flattened out, it would be 506m long. It is made from 1,500 tonnes of steel, of which 60% is recycled. It is made up of 35,000 bolts and 19,000 litres of red paint.

# Shapes, symmetry and angles

During the London 2012 Olympic and Paralympic Games, the Stadium hosted the opening and closing ceremonies as well as the Athletics, track and field events. The capacity was 80,000 spectators.

Finish the picture of the Stadium in the box below. Can you draw on any lines of symmetry?

Draw the eight shapes below. Look at the Stadium. Tick the shapes you can see.

| | | | |
|---|---|---|---|
| Square | Rectangle | Circle | Triangle |
| Pentagon | Hexagon | Octagon | Triangle |

Which shape can you see most of? .....

Why is this shape used a lot? .....

How many regular triangles can you see? .....

How many irregular triangles can you see? .....

In the future, it will seat up to 60,000 people. The football pitch will be 105m x 69m which is equivalent to Emirates Stadium and it will meet UEFA Category 4 classification and will be a fully compliant IAAF Category 1 athletics facility. It will also be used for live concerts and entertainment events.

# Living things on the River Lea

There are 6.5km of waterways in Queen Elizabeth Olympic Park. Work has been carried out to improve them including removing rubbish. New habitats include reed beds and wetland areas. The north parklands are designed to flood when the water level rises.

A guide is used to help people find out more about a topic. You are going to make your own guide to the plants and animals that live on the River Lea.

In each of the boxes below draw a picture of a plant or animal (or bird) that you can see. Draw an arrow from the box to the place you saw the animal or plant. Write some words that help you identify the plant or animal e.g. colour, size, shape.

# Nature bingo (2)

Queen Elizabeth Olympic Park has 102 hectares of open space and 6.5km of rivers and canals. The parklands include 45 hectares of bio diverse landscape which is a haven for local wildlife, including reed beds, grasslands, ponds and woodlands, with 525 bird boxes and 150 bat boxes.

Walk through the north of the Park. As you walk around, tick the plants and animals you spot.

| Trees | Birds | Plants | Animals |
|---|---|---|---|
| Silver Birch  | Swan  | Grass  | Ladybird  |
| English Oak  | Moorhen  | Reeds  | Spider  |
| Lime  | Coot  | Buttercup  | Beetle  |
| Field Maple  | Gull  | Rose  | Butterfly  |

What did you spot the most of?.....

What did you spot the least of or didn't see? .....

Why didn't you find everything on the list?.....