

Rhythms of the Bay

Living things and their habitats

Primary Science

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Specialist knowledge for teachers

The knowledge at the core of this theme connects the basics of planetary movements to the rhythm of the tides and the characteristics of the tidal environment in Morecambe Bay. Understanding is needed of the fundamentals of how the rhythms of the tides are made by the gravitational effect of the moon on the earth, with their timing and variation at a particular place such as Morecambe Bay related to the movement of the moon around the earth and the rotation of the earth. The NASA website has an excellent resource that explains this in a clear structure. science.nasa.gov/moon/tides

Whilst further knowledge could be useful on how the position of the sun also contributes to the creation of tidal variation and how bay morphology shapes the tidal range in particular places, this is likely to become too complex for Key Stage 2 Science.

This fundamental knowledge is then translated and localised into tide timetables and the shifting of tide times from day to day. On-line tide tables for MB are readily available (see example).

The concept of the intertidal zone and its distinctive rhythm of alternating between being submerged in the water and exposed to air is central to the outdoor field activity. Becoming familiar with this in a particular setting such as at Sunderland Point is needed, with the visible 'trash line' marking out the boundary of the higher tides.

The organisms that inhabit the mudflats of the intertidal zone have the collective name of 'infauna' but particular species are more prevalent in the Morecambe Bay area. Becoming familiar with these is built into the field activity.

The techniques involve taking mud from a hole, sieving this using seawater and identifying and recording species. This requires some practical but easily obtained experience (see step by step guidance on MBC Moodle). Being very aware of safety issues in undertaking this activity is essential, including its timing in relation to the tides and to weather forecasts. This is also part of the learning for the students.

Following the connection between the inhabiting organisms of the mudflats and what they provide as a food source for wading birds is part of the learning. Wading birds show very visible adaptations to their environment and the rhythms of their feeding habits e.g. in the form of longer legs and different lengths and shapes of beaks. Knowledge on key wading bird species to be found in Morecambe Bay will help with identification; there is a range of resources available online to assist with this.

Tide	Time (GMT) & Date	Height
High Tide	00:14 AM (Wed 27 March)	8.72m (28.61 ft)
Low Tide	06:45 AM (Wed 27 March)	0.8m (2.62 ft)
High Tide	12:27 PM (Wed 27 March)	9.0m (29.53 ft)
Low Tide	07:03 PM (Wed 27 March)	0.74m (2.43 ft)



What lives in the mud on the beach?

National curriculum learning objectives

Y4 Living things and their habitats

- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that environments can change and that this can sometimes pose dangers to living things

Equipment

Spades, trowels, spoons, buckets, jugs, large bowls, containers for water, various sieves, camera/ iPad, identification sheet, (see MBC Moodle for more supporting materials)

Key Vocabulary

Classification, classification keys, environment, habitat, vertebrate, invertebrate, ragworm, lugworm, amphipod, mud snail, blue mussel, common cockle, Baltic tellin, wrinkle, brown shrimp.

How the children will be working scientifically

- Observe animals in their habitat and use recordings to compare and contrast the living things observed.
- Explore and use classification keys to help group, identify and name a variety of living things in their local environment.
- Classify living things found in different habitats based on their features.
- Create a simple identification key based on observable features.

IN THE CLASSROOM LEARNING

Today we are environmental scientists!

Recap previous learning on classification and habitats

- Introduce the tides. Show video of timelapse tide coming in/out.
- Discuss what is happening in the video. What did the children notice? Where is this happening? What kind of habitat is this? What living things can they see? Are there living things in this habitat? What kind of animals might live there? How does this habitat change (possible opportunity for research into tidal habitats and the things that live there)?
- Share pictures of the creatures that live in the mud of the tidal zone. What features do the children need to look for to help them identify the creatures? What are the similarities and differences? Can they be grouped/classified in certain ways?
- Introduce BIG question – What lives in the mud at the beach?
- Have the equipment ready for the children to see and handle.
- In groups use a template to design/ plan investigation.

Place based learning

- Using investigations planned in the classroom, visit Morecambe Bay coastal habitat to investigate the organisms that live there.
- Discuss safety while working in this environment. Adult to venture onto mudflat and collect the mud for investigation (explain the hazards of the mudflats i.e. sinking sand, never venturing onto mudflats without an adult). Children to do their investigations from the shoreline.
- Model and support the use of the tools for sifting through the mud.
- Support and encourage the children to use identification keys and the key vocabulary and record what they find in sketches, photographs, recording data in tables.



Lugworm



Ragworm



Amphipod

Follow-up in the classroom

Review findings from fieldwork activities

Each group to present their findings:

- What did they want to find out?
- How did they investigate the habitat?
- What did they find, how did they identify/classify what they found?
- What did they find the most of what did they find the least of?
- Groups could present their findings in a variety of ways – powerpoints, posters, information booklets, video presentations.

Assessment Indicators

- Not yet met: Children can identify various living creatures by obvious differences and begin to suggest methods of grouping them.
- Meeting: Children identify that animals and plants can be classified in a number of possible ways including vertebrates and invertebrates.
- Possible ways of going further: All groups are sorted by the same characteristic and some groups may be subdivided. Connections are made between types of living creatures found in each group.

Curriculum aims and objectives

Scientific strand

- Living things and their habitats Year 4
- Earth and Space Year 5

Aims

To enable children to understand how the movement of planets creates local tides and that the tides are important to living things they can identify in their local area (with a link to the rhythm theme of Eden Project Morecambe). To nurture a deeper connection to living things in their local area (focused on tidal environments) and empower them to be agents for change by:

- Understanding what living things need to thrive
- What impacts upon living things and their habitats
- How we can best support and encourage the habitats they need

Links to National Curriculum

Year 4 - Living things and their habitats:

- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that environments can change and that this can sometimes pose dangers to living things

Year 5 - Earth and Space

- Describe the movement of the Earth and other planets relative to the sun in the solar system
- Describe the movement of the Moon relative to the Earth

Benefits of place-based learning approach

Head

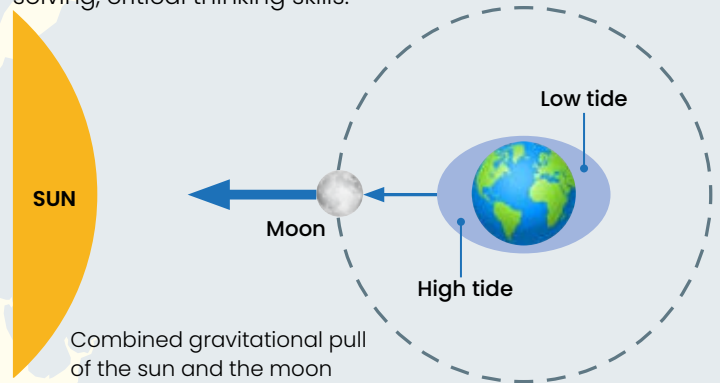
Observing, identifying and naming local flora and fauna, understanding the rhythms and cycles of local habitats, the effects of seasonal change, effects of the tide, what impacts upon these habitats.

Heart

Learning outdoors, hands on experiences, developing love and respect for living things in the local area, becoming advocates for change in protecting local habitats.

Hands

Asking questions, creative approaches to problem solving, critical thinking skills.



Visualisation of Eden Project Morecambe's Realm of the Moon which will explore the rhythms of Morecambe Bay

Adaptations to extend impact

- The content of this theme could be adapted to fit with elements of the Geography National Curriculum content focused on the natural world and fieldwork in physical geography
- This resource can be adapted to meet the objectives for Living things and their habitats within Key Stage 1 and in Year 6. This resource could also be used and adapted to cover some of the learning objectives within the Year 6 evolution and inheritance unit, exploring how coastal birds are so well adapted to thrive in their habitat
- Different age groups could deepen the knowledge and understanding involved, for example about the range of factors that contribute to making the rhythms of spring and neap tides and tidal ranges in different coastal locations
- More rigorous and systematic approaches to gathering and analysing data on mudflat organisms could be incorporated, including use of statistical techniques and presentations of data
- Adaptation could also extend to climate change themes and how the intertidal zone ecology will be affected by changes in marine and weather rhythms through rising sea levels, more extreme storms and increased marine temperatures
- In different coastal environments investigating the intertidal zone could focus on rockpools and the organisms they contain rather than on mudflats



This work aligns with SDGs:

