



Wheatcroft CP School

Beach School Handbook



May 2019

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Introduction

Our coastline is an important part of our locality and a wonderful natural learning resource. 'Locality' is one of the drivers of our curriculum, so it follows that the beach should be used as part of this.

Through working on the beach, children develop their sense of place and an appreciation of the natural environment on their doorstep.

Beach school is about connecting with the natural environment, learning on the beach and becoming immersed in that environment.

It's not just about environmental study. Beach activities can be designed to link with every aspect of the curriculum. Children are encouraged to be curious and explore the outdoor environment in many different ways.

Some thoughts about learning outside the classroom:

- Plato (the Ancient Greek philosopher) indicated that experience alone is not enough for learning to occur as knowledge is required to support observations and consequent understanding.
- Outdoor learning experiences should be relevant to and have impact on learning in the classroom.
- Outdoor learning sessions/field trips have most impact when
 - They are part of a planned sequence of learning
 - There is time spent on skill development and they involve active learning where children are able to practise skills
 - There is a clear definition of goals to be achieved.

Where all these practices are present, there is positive impact on social/emotional skills and academic performance.

- Isolated field trips without adequate preparation and/or follow up may not aid children's learning, with instruction during the trip having only a minor effect. Targeting learning outcomes through preparatory instruction and follow up obtains increased cognitive learning.
- The idea of 'novelty space' may need to be considered. Children's curiosity and exploratory behaviour may inhibit planned learning.

Positive benefits of beach school

- Connection with the natural environment – positive effect on mental health and wellbeing.
- More opportunity to explore learning independently. Development of problem solving skills.
- Reinforcement of classroom learning in a different context. Opportunity to engage in a different way with a linked learning theme.
- Embedding of character education principles eg development of resilience, courage, effective communication, citizenship.
- Development of interpersonal and social skills – lots of opportunities for teamwork, collaborative tasks, helping each other, being more aware of and valuing others.
- Development of self-awareness as learners.
- Inclusive of everyone. Hierarchy of ability within the class may be different when working on the beach, providing opportunity to see different strengths in each other.
- Engaging learning that enthuses the children.
- Ofsted (2008) note that learning outside the classroom contributes significantly to raising standards and improving pupils' personal, social and emotional development.



Beach school activities

There should be a variety of and progression of beach activities throughout children's Wheatcroft journey.

Agreed beach school bucket list, May 2019

EYFS	Dig in the sand	Walk near the sea
Year 1	Build a sandcastle	Watch the waves
Year 2	Create a sand sculpture	Observe the tides – is it going in or out?
Year 3	Balance a stone/ balance on a rock	Paddle in a pool
Year 4	Make a picture frame and create art using found materials	Dig until you find water
Year 5	Build a stone tower	Understand the tides
Year 6	Create a beach sculpture	Use a tide timetable Paddle in the sea



Curriculum linked ideas for each year group:

EYFS

Personal, social, emotional development	Working together on beach activities Listening to others' ideas
Physical development – moving and handling	Dig in the sand Collect shells and pebbles
Physical development – health and self-care	Beach safety, walking to the beach Walk near the sea
Literacy	Role play Toy explorers Writing in the sand
Maths	Counting Patterning, measurement, capacity
Knowledge and understanding of the world	Investigate features of the beach environment and environments on the way to the beach. Care for the environment/creatures.

Year 1

English - stories	Making characters Story maps Princess and Wizard
Maths – positional language	Direction, left, right, turns
Science – materials and their properties	Find materials with different properties – natural/manmade, rough/smooth, hard/soft etc Texture grids Floating and sinking – test objects from the beach Watch the waves
Art	Transient art
History – Scarborough castle	Design and build a sand castle
Geography – 4 compass directions	Use directions to make a beach trail

Year 2

English - stories	Story mapping Retell a story using natural materials/figures Poetry writing and performance
Science - habitats	Investigate living, dead, never been alive
Science – uses of different materials	Investigate uses of materials around the beach – sea walls, beach chalets, deck chairs/ beach equipment
Art	Sand sketching/painting Mosaics/patterns Sand sculptures

Geography – continents and oceans	Geographical vocabulary – beach, cliff, coast, sea, ocean. Name the North Sea. Observe the tides
Geography - maps	Make a beach map

Year 3

Science - rocks	Looking for different types of rocks Collecting and observing pebbles Stone balancing
Science – forces	Make a ball run
Science - shadows	Shadow pictures Construct a sundial/sun clock
Science – food and nutrition	Imaginary beach kitchen – design and make a balanced meal for an imaginary sea creature using beach materials. Pitch your meal to go on the menu of the ‘beach restaurant’.
DT – sandwich snacks	Take sandwiches for a picnic on the beach
	Paddle in a pool

Year 4

English	Litter picking → writing newspaper articles Beach poetry - colours
Maths	Measure a km (on the way to the beach)
Science – states of matter	Solids liquids and gases - investigate materials on the beach Learn about the water cycle on the beach. Draw a diagram in the sand. Dig until you find water
Science - habitats	Introduction to habitats – create a mini habitat for a ‘pebble creature’ Classification keys – observe seaweeds and make own classification keys
Art	Picture frames and beach art using found materials
Geography – physical and human features	Investigate physical and human geographical features of the locality – take photos

Year 5

Maths – problem solving	How much salt is in a litre of sea water?
Science - habitats	In depth study of seashore ecology – identification and interdependence of seashore organisms. Adaptation
Science - materials	Grouping materials on the beach Textures

	Take the salt from the sea – collect a sample of sea water. Separating mixtures – sand, sea water and stones
Science – Earth and space	Understand the tides – Space dome Solar system scale layout
Geography	Landforms and coastal processes Sand grain survey – beach transect
Art	Beach rainbow Pebble painting Ian Mitchell style digital art James Brunt beach art
Art - Lowry	South Bay in the style of Lowry Create a beach sculpture
History – Victorian Scarborough	Re-enactment of Victorian seaside Black and white photography

Year 6

Maths - statistics	Mean, mode, median – limpet height survey
English	Writing about coasts/seashore Seashore guide
Maths - measurement	Time/24 hour clock – use a tide timetable Capacity Length conversions Build a stone tower – measure its height
PE	Make your own games using materials found on the beach Paddle in the sea Hit the surf

Other activities for any year group:

Art: sketching

Draw in the sand

Investigate patterns and textures on the beach

English: use a stick to write in the sand

Take a toy person on a beach adventure – tell the story

Create a storyboard in the sand

Maths: make shapes

Measuring

Counting

Music: record the sounds of the sea

Sound mapping

Create musical sounds with beach materials – pebbles, shells etc.

Recreate the sounds of the sea

PE: Play beach games – Frisbee, boules, cricket, volleyball etc

Make up your own games

Mindfulness: Sit and listen to the sea

Bury your feet in the sand, create some new feet out of sand

Litter pick/beach clean

Take photographs

Collect shells

Eat seaweed (only if the adult leader knows what to look for!)

Go on a scavenger hunt

Make and play a board game in the sand

Planning a beach school session – risk assessment

Generic risk assessment for working on the beach:

ACTIVITY	Beach visits - generic
VENUES	Scarborough South Bay beach/Flamborough North Landing
HAZARDS	CONTROL MEASURES
<ul style="list-style-type: none"> • Uneven surfaces 	✓ Trouble spots on footpaths to be pointed out. Children to be aware and place feet carefully.
<ul style="list-style-type: none"> • Slippery rocks/seaweed 	✓ Children made aware of potential danger. No running on rocks. Work in pairs on groups so that they can help each other over slippery bits.
<ul style="list-style-type: none"> • Sharp items/dangerous materials 	✓ Discussion with children about what is appropriate to touch/handle and what is not – difference between glass and sea glass.
<ul style="list-style-type: none"> • Poisoning 	✓ Only eat items specified by the group leader. All children to wash hands on return to school.
<ul style="list-style-type: none"> • Nips and stings from rock pool creatures 	✓ Treat animals with respect.
<ul style="list-style-type: none"> • Dogs on the beach/members of the public 	✓ Adults (and children) to be vigilant. Members of the public and their dogs not to be approached by children.
<ul style="list-style-type: none"> • Large work area – lost children 	✓ On arrival at the beach, agree with children where the boundaries will be. Clear expectation for following instructions and staying in this area. Children wear high viz jackets.
<ul style="list-style-type: none"> • The sea - drowning 	✓ Don't go in the sea (not working in life-guarded area).
<ul style="list-style-type: none"> • Fast incoming tide 	✓ Check tide tables prior to visit. Adults to be vigilant. Leave beach early if necessary.
<ul style="list-style-type: none"> • High waves 	✓ Check weather forecast and surf report on morning of visit. Adjust boundaries of work area if needed or leave beach/postpone visit.
<ul style="list-style-type: none"> • Falling rocks from cliffs 	✓ Keep away from cliffs.
SAFETY EQUIPMENT – first aid kit, high viz jackets	

Risk benefit analysis for more specific activities:

- Risk assessment for different activities needs to be considered when planning a beach school session. These are just some examples.

Activity	Hazard /risk	Control measure	Risk benefit
Coastal walk	Eroding cliff paths, over hangs.	Keep away from edges, point out uneven parts/ trouble spots. Adjust route if necessary.	Children are able to observe coastal landforms and processes first hand. They gain a respect for a dynamic environment.
Stone balancing – making stone towers	Stones heavy to carry, towers toppling on feet.	Ensure children are sensible about which stones are appropriate for lifting. Keep feet as far away from towers as possible when placing stones. Children spot stones about to fall and warn the group.	Develops teamwork and problem solving skills. Opportunity to be responsible for their own safety.
Tying knots to make picture frames	Poking in the eye with sticks. Scissors with sharp blades.	Teach safe use of tools. Talk to children about dangers.	Develops resilience. Encourages children to help each other.
Collecting materials for beach artwork Scavenger hunts	Sharp/dangerous materials, slippery rocks and seaweed	Talk to children about what is appropriate to handle. No running on rocks. Help each other over slippery bits.	Encourages self-awareness and decision-making. Awareness of others and cooperation in helping partners over rocks.

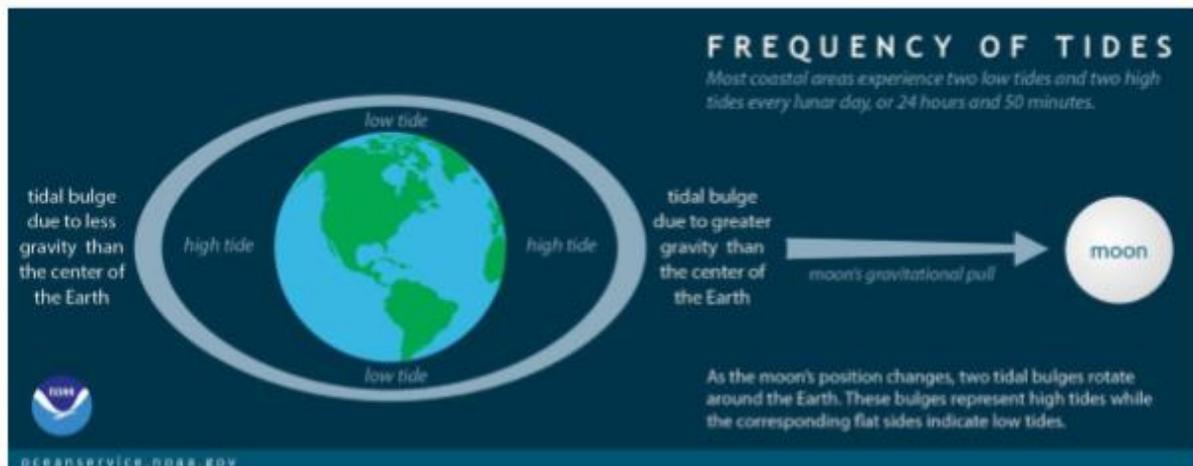
Rock pooling	Slippery rocks/seaweed, falling in water, nips and stings from rock pool animals.	Ensure children follow instructions and don't run. Treat rock pool organisms with respect.	Able to learn about a habitat first hand. Creates real data for science investigations – more motivating learning
Litter picking	Sharp or harmful litter, dog dirt bags.	Children wear gloves and use litter pickers to pick up rubbish. Everyone briefed on what not to pick up. Adults vigilant to what their group is doing. Groups stick together.	Self-regulation. Develops awareness of responsibility to look after the environment.
Building sand castles	Careless use of spades – flicking sand in people's faces	Clear briefing to be aware of others, work in a space and use spades sensibly.	Develops social skills, teamwork and decision making – design and build together.
Eating seaweed	Poisoning	Only eat what is specified by the group leader.	Promotes understanding of what is safe or not and respect for nature.

Planning a beach school session – environmental impact

When planning a beach school session, impact on the environment should be considered and the principles of 'leave no trace' followed. For example:

Activity	Risk	Impact	Action
Coastal walk	Walking through wild habitats	Loss of flora/fauna erosion	Clear briefing so that children look at vegetation and don't pick it. Stick to footpaths where possible.
Beach scavenger hunt	Collecting living things	Damage to flora, fauna and habitats	Leave things that are attached to rocks. Replace other living things and rocks where they were found.
Beach art using found materials	Collecting materials	Damage to flora, fauna and habitats. Removal of material from the beach	Leave things that are attached to rocks. Encourage children to leave what they find on the beach at the end of the session.
Rock pooling	Disturbance of organisms in rock pools	Damage to flora, fauna and habitats	Observe in situ where possible. Replace seaweed canopy when moved. Put things back where you found them.
Fossil hunting	Breaking rocks	Damage to the environment, accelerated erosion	Avoid use of geological hammers.
Picnic	Wrappers, packaging, left over food	Litter, food waste left in environment – unsightly and harmful to wildlife	Take litter and left overs away.

Planning a beach school session - tides



<http://www.noaa.gov/resource-collections/tides>

There are many different websites which offer tidal forecasts. At both Scarborough South Bay and Flamborough there is no exposed beach at high tide and so planning a visit when the tide is lower is essential to being able to conduct a beach school session at all. Knowing whether the tide is on its way in or out is also important for the safety of the group. Planning a session when enough beach is exposed and the tide is going out is the most desirable scenario but if this is not possible within timetable constraints then knowing how much time either side of high or low tide is safe to be doing beach activities is important. When exploring the ecology of the intertidal zone, it would be best to plan a visit around a low spring tide so that flora and fauna of the lower shore could be investigated more fully. In such a case, it would be important to know exactly when the tide is on the turn as a spring tide will come in more quickly than a neap and it would be easy to get caught on a rock as the tide begins to come in.

Tide times and height data do vary according to different forecasts.

Visit my harbour.com free tide tables <http://www.visitmyharbour.com/tides/125/uk-tables/scarborough-tide-tables> provide high and low water times and heights for the whole year. As the movement of the Earth, sun and moon and their gravitational forces are well known, it is possible to fairly accurately predict the times of high and low water well in advance. These tables are useful as visits to the beach need to be planned in advance. However, other factors such as weather patterns and atmospheric pressure will not be known this far ahead and so height data in particular may not be as reliable. From these advance predictions though, you can see from the pattern of height data when the spring and neap tides will be, also useful when planning a beach school session. Times are GMT so must be adjusted accordingly in summer time.

Met office tide tables <https://www.metoffice.gov.uk/public/weather/tide-times/> provide a tidal forecast up to 5 days ahead with accompanying weather forecast. It provides information on times of high and low water, expected weather conditions, wind speed and direction and on/offshore wind direction. As these predictions are produced alongside the weather forecast and not as far in advance, they are likely to be more accurate. Predictions for barometric pressure will be known and this makes

a difference to sea level as well as onshore/offshore winds. Tidal forecasts on this website are also for specific beaches eg Scarborough North Bay, Scarborough South Bay, Cayton bay, which also suggests a greater degree of accuracy than on visit my harbour or the BBC where the predictions are for Scarborough.

BBC tide tables https://www.bbc.co.uk/weather/coast_and_sea/tide_tables, like most forecasts, provide information for the week ahead. Again, high and low water times are given alongside height data. The rise and fall of the tides is also shown graphically which makes it easier to see how water level changes in between high and low tide than when just a list of high and low water times is given. Predictions are for Scarborough in general, so perhaps not as accurate as the Met Office although margins of error may cancel out the added accuracy anyway.

Magic Seaweed <https://magicseaweed.com/> provides surf reports for the week ahead. Tidal data and graphical representation of this are provided, similar to the BBC. However, much more detailed information about wind and waves, on a 3 hourly basis, is also provided as this service is aimed at surfers. This is useful for checking immediately prior to a beach school session for more precise information. High waves would make activities on the beach more hazardous. Magic Seaweed aim at a 10 minute margin of error in predicting tide times and the table above shows that all the predicted times for low tide on 22nd October lie within a 10 minute period. Although a difference of 10 minutes is not likely to make a difference to a beach school session, it would be sensible to expect some degree of inaccuracy in any tidal predictions, especially if planning to study the lower shore.

Planning a beach school session – seasons

Seasonal changes in geomorphology/coastal processes

Ongoing coastal processes mean that the coastal environment is constantly changing. Seasonal differences in the balance between erosion and deposition alter the composition of the beach. For example, at Scarborough, the predominance of erosion during the winter months when there is likely to be more stormy weather can remove significant amounts of sand from the beach. This needs to be considered when planning a beach school session, particularly in spring if it involves use of sandy parts of the beach, as the best places for delivering such a session will likely have changed over winter. Throughout the summer months, sand may build up again at the back of the beach and once again the best places for beach activities will have changed.

Seasonal changes in ecology

Seasonal variations in species abundance and distribution affect ecological investigations on the rocky shore. Daily changes in temperature within rock pools and the amount of desiccation on the exposed shore will both be less in winter when the weather is not as warm and dry, but wave action will be greater. Rock pooling in winter may well result in a larger variation of species, but Hartnoll and Hawkins (1980) note that dog whelks (*Nucella lapillus*) may be harder to find in winter because they hide in crevices and serrated wrack (*Fucus serratus*) loses fronds in winter followed by regrowth in spring and summer leading to seasonal cycles of abundance. Such ecological changes are not likely to significantly affect beach school activities for primary age children but may become more of a consideration for older students doing a more in depth study of the rocky shore.

Seasonal weather changes

Seasonal weather patterns have the most impact on planning and delivery of beach school sessions. Winter weather tends to be less favourable for doing outdoor activities due to cold temperatures, greater likelihood of rain and stronger winds. This needs more careful planning in term of suitable clothing, waterproofs etc and plans for the beach school session are more likely to be changed or abandoned in winter due to inclement weather. Weather also affects tides which have an impact on planning and delivery of beach school sessions. Summer weather brings different considerations for risk assessment such as exposure to the sun. Due to changes in the intensity of solar energy caused by the tilt of the Earth towards or away from the sun at different times of year, a bright sunny day in the middle of winter may be bitterly cold, while the same weather in summer can be too hot to safely work outdoors without any shade.

Appendices – information for teachers about the coastal environment

Coastal Geomorphology (geology, landforms and coastal processes)

1. Scarborough South Bay – Spa and Holbeck end

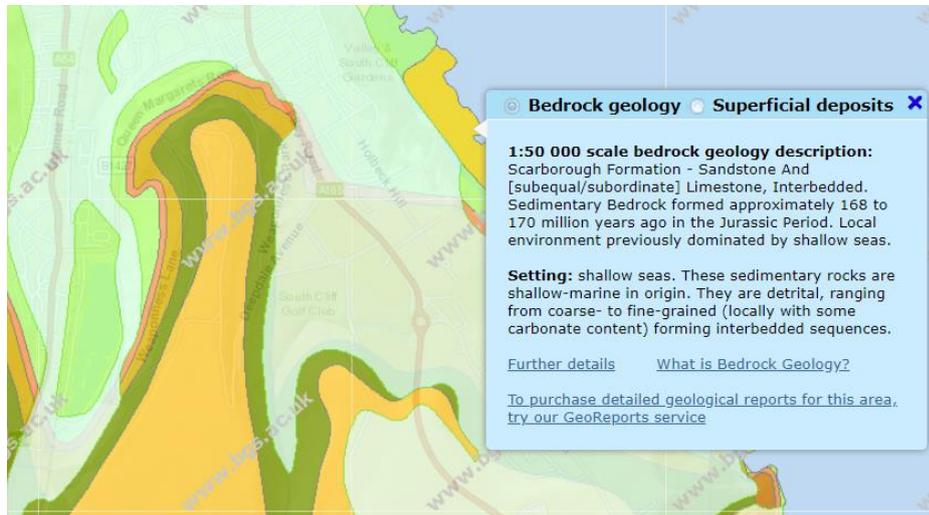
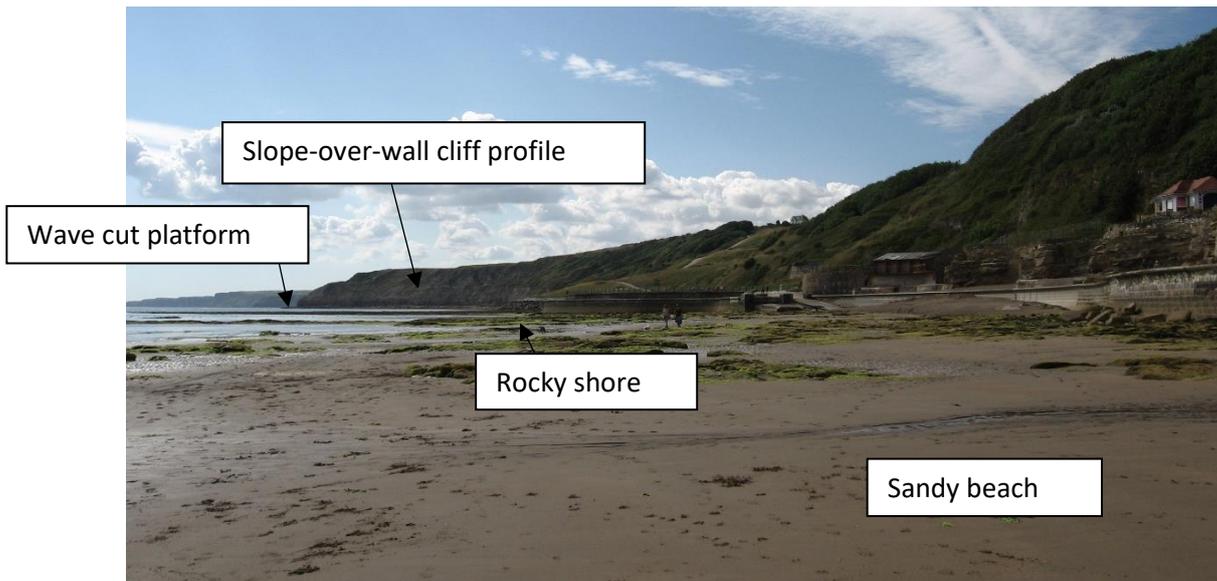


Figure 1: Geological map showing bedrock geology of Scarborough South Bay
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Scarborough South Bay is a large bay to the South of Scarborough castle headland. It is a predominantly sandy beach although to the southern end there is a large area of rocky shoreline. The underlying geology is of interbedded sedimentary sandstone and limestone formed in the Jurassic period (British Geological Survey, see Fig. 1). Towards the Holbeck end of the beach these sandstones are visible in exposed parts of the cliff and on the cliff tops there are also superficial deposits of glacial till. This formation of less resistant till over sandstone causes a 'slope-over-wall' type cliff profile. Erosion of the sandstone, and quartz containing materials from glacial deposits likely to be offshore provide material for the sandy beach. This is a receding coastline and, looking to the south, the wave cut platform is evident at low tide. The beach itself is also in a constant state of change. It demonstrates a typical summer-swell and winter-storm type behaviour (North East Coast Observatory 2011) where there can be significant loss of sand from the back of the beach during winter storm surges, but more deposition during summer. Erosion and deposition along this stretch of beach is also significantly affected by human intervention in the form of sea walls near the Spa and granite rock armour used to stabilise the cliffs to the southern end following the Holbeck Hall landslide in 1993. For example, a much bigger area of sand can be found at the northern side of this rock armour than was there a decade ago, possibly due to the protruding area of land caused by the landslide being prevented from further erosion therefore providing an unnatural mini headland. This, coupled with the structure of the rock armour reducing the energy of the waves could interrupt the prevailing southerly longshore drift at the top end of the beach and lead to an area of deposition which may not otherwise exist.



Andrews, S. (2018) Image: Scarborough South Bay beach, Holbeck end

2. Selwicks Bay – Flamborough Head

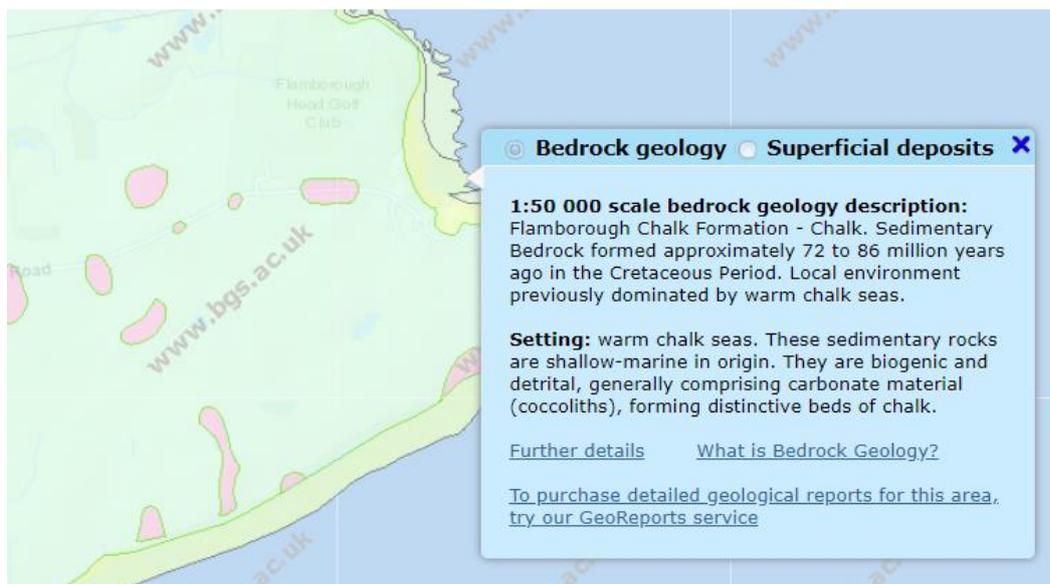
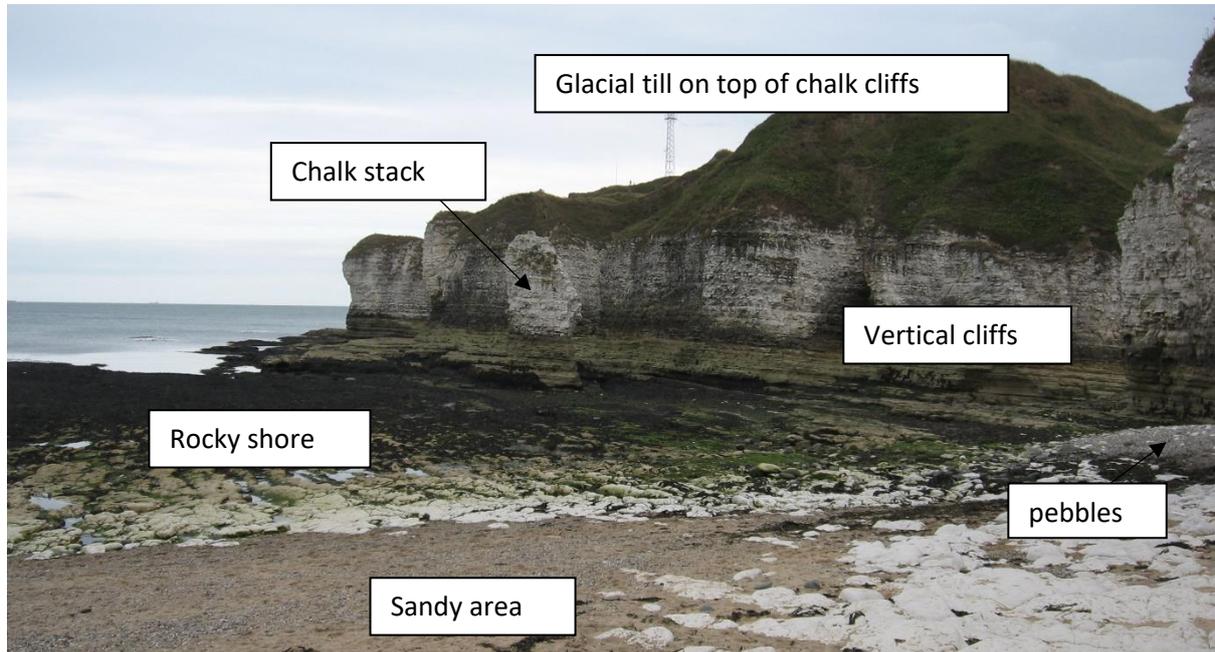


Figure 2: Geological map showing bedrock geology of Selwicks Bay
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Selwicks Bay is located on the north edge of Flamborough Head. The bedrock in this area is cretaceous chalk (British Geological Survey, see Fig. 2), which is generally horizontally bedded, leading to the formation of near vertical cliffs and the path to access the beach from nearby Flamborough lighthouse is very steep. The top of the Flamborough Head cliffs has some superficial deposits of glacial till. The beach below these cliffs is a small bay with an area of rocky shore on the wave cut platform, some pebbled areas near the cliffs and some deposition of sand at the top of the beach. The beach slopes more steeply than average and therefore wave action is fairly strong. Erosion of the cliffs by the sea around the headland has led to the formation of landforms associated with chalk coast, notably caves (when the sea erodes into the cliff), arches (when a rocky

promontory is eroded all the way through at the base to form an arch shape) and stacks (when the top of the arch collapses). There is a stack on the beach itself. Debris from the cliffs provides material for the white pebbles found on the beach.



Andrews, S. (2018) Image: Selwicks Bay, Flamborough Head



Andrews, S. (2018) Image: Arch and cave on Flamborough Head cliffs.

Comparison on the ecology of the two beaches between four tidal zones

Scarborough South Bay (Holbeck end) and Selwicks Bay at Flamborough Head - geomorphology described above.

Splash zone

At the Holbeck end of Scarborough South Bay, the splash zone has been taken over by the human environment and therefore the natural flora and fauna usually associated with this zone is largely absent. Nevertheless, species such as sea slaters can sometimes be spotted on the sea walls by the Spa car park. At Flamborough, the edge of the beach meets a more natural environment and salt tolerant plant species associated with coastal environments, such as sea plantain and thrift, can be easily found as the footpath begins to climb from the beach. The beach at Flamborough is largely enclosed by steep cliffs and it is generally on these cliffs that other organisms of the splash zone, such as lichens, can be found at high tide level.

Upper shore

The lichens that live on the cliffs between the splash zone and upper shore at Flamborough have already been mentioned. Other than that, both of these beaches are similar in that they do not have a clearly identifiable upper shore and are limited for studying the ecology of this zone. The entire beach at Scarborough and the majority of the Flamborough beach are covered even by a neap tide and, on both beaches, the deposition of sand at the top of the beach covers the rocky shore environment which is more interesting to study as the organisms of a sandy shore all tend to be buried whenever their environment is accessible. Also, as both beaches are frequently visited by people, the sandy areas are disturbed on a daily basis by dog walkers, sandcastle builders etc.. However, it is possible to spot beach-hoppers near the strandline at Flamborough. The rocky shore organisms found nearest the top of both beaches – acorn barnacles, common limpets and green seaweeds - are really part of the mid shore environment.

Mid shore

The mid shore is the widest of the intertidal zones and the most interesting for ecological investigation. The beach at Scarborough is more gently sloping than at Flamborough and therefore the mid shore zone is wider. On both beaches, there are a variety of rock pools. At Flamborough, these are formed in the grooves between the chalk rocks of the wave cut platform and tend to be all fairly similar and at right angles to the incoming tide, whereas at Scarborough there is more variation in size, shape and depth of different rock pools over a wider area and consequently there is more diversity of life in the mid shore zone here. A transect down the beach would also show variation in distribution of different flora and fauna within this zone. Green seaweeds such as sea lettuce and *Enteromorpha sp.* are found more abundantly at the top end of the mid shore zone where there is more light for photosynthesis. Further down this zone, the brown seaweeds, such as bladder wrack and serrated wrack, take over as the dominant flora on both beaches. At Scarborough, red seaweeds, which require less light to survive, are also abundant under the 'canopy' of the wracks and in rock pools, while at Flamborough there are less red seaweeds in this area. Here the red seaweed species associated with the lower shore are more evident. Perhaps the muddy deposits on some of the rocks on Flamborough beach, coupled with increased wave action due to a steeper beach make it more difficult for smaller red seaweeds to attach further up the shore. There are also variations in fauna of the mid shore zone. At Flamborough, the main animals evident are common limpets and some beadlet anemones with some acorn barnacles growing on the cliffs at the side of the beach. These are all attached and therefore more resistant to wave action. At

Scarborough however, it is easier to find a range of rocky shore animals in and around the rock pools. Shelled species such as limpets, barnacles and periwinkles can be found further up the mid tide zone as their shells make them more resistant to desiccation. These are all grazers or filter feeders. Further down the beach, where conditions become more favourable and there is more food, these become more abundant and carnivores such as dogwhelks become more numerous. Sheltered conditions in the rock pools with plenty of seaweed cover to hide in also provide intertidal habitat for animals that are not attached including various crabs and small fish.

Lower shore

At Flamborough, it is easier to find the large brown seaweeds associated with the lower shore such as kelp and thongweed at the edge of the wave cut platform. Kelp can also easily be found washed up on the beach so that the whole structure can be examined more closely. At Scarborough however, it needs a low spring tide to be able to see the kelp beds clearly. Higher productivity of these seaweeds and a more constant environment means that more herbivores should be able to survive in the lower shore, although on both beaches, these species, such as blue rayed limpets, are difficult to spot as they tend to remain underwater.

Flora and fauna – identification guide

(just some examples – not complete)

Name:	Description:	Tidal zone/ facts/ folklore:
<p>Name: Sea Plantain <i>Plantago maritima</i></p> 	<p>Small perennial Linear leaves Brown flower spikes</p>	<p>Splash zone Salt tolerant plant</p>
<p>Name: Black tar lichen <i>Verrucaria maura</i></p> 	<p>Encrustacean on rocks. Black colour. Covered with network of cracks. Looks like oil.</p>	<p>Upper shore/splash zone around high water mark. Tolerates salt spray and some immersion Symbiotic partnership between fungus and photosynthesising algae</p>
<p>Name: Sea lettuce <i>Ulva lactuca</i></p> 	<p>Thin membranous green seaweed. Lettuce like fronds in broad flat sheets with irregular outline.</p>	<p>Upper and middle shore, often in rock pools. Green seaweeds need lots of light.</p>

<p>Name: <i>Ulva compressa</i> (formerly <i>Enteromorpha</i> sp.)</p> 	<p>Long, thin, green fronds. Oxygen bubbles produced by photosynthesis can be seen.</p>	<p>Upper shore in pools and on sandy rocks.</p> <p>Tolerant of a wide variation in salinity.</p> <p>Can be used in cooking.</p>
<p>Name: Bladder wrack <i>Fucus vesiculosus</i></p> 	<p>Brown seaweed. Flattened fronds with pairs of air bladders. Fronds divide dichotomously.</p>	<p>Mid shore</p> <p>Be careful not to confuse pairs of air bladders with reproductive structures on the ends of fronds.</p> <p>Air bladders help fronds to float to gain more light.</p>
<p>Name: Serrated wrack <i>Fucus serratus</i></p> 	<p>Brown seaweed. Flattened fronds with serrated edges. Fronds have obvious midrib.</p>	<p>Lower mid shore</p> <p>Brown seaweeds need less light than green seaweeds.</p>
<p>Name: Coral weed <i>Corallina officinalis</i></p> 	<p>Red seaweed with calcification. Can be bleached. Fern like structure.</p>	<p>Mid to lower shore and in rock pools.</p> <p>Calcification makes it more unpalatable to grazers.</p>

<p>Name: Pepper dulce <i>Osmundea pinnatifida</i></p> 	<p>Red seaweed. Flattened and branched, tough cartilaginous fronds</p>	<p>Mid to lower shore Edible Red seaweeds can live in very low light. Often found under wracks.</p>
<p>Name: Kelp <i>Laminaria digitata</i></p>  <p>washed up specimen</p>	<p>Large brown seaweed. Smooth flat strap like fronds. Long stipe to reach up towards light. Large branched holdfast.</p>	<p>Lower shore. Fronds visible floating at low spring tide. Forms dense beds. Intolerant of desiccation so only grows at low shore and flexible stipe allows the plant to go limp at low tide so that remaining water covers the fronds.</p>
<p>Name: Thongweed <i>Himantalia elongata</i></p> 	<p>Brown seaweed. Long narrow fronds. Attached to rocks, growing from button-like structures.</p>	<p>Lower shore</p>

<p>Name: Sea slater <i>Ligia oceanica</i></p> 	<p>Large woodlouse like crustacean. Long antennae. Conspicuous appendages at tail end.</p>	<p>Splash zone Usually found on sea walls and rocks. Active at night.</p>
<p>Name: Acorn barnacle <i>Semibalanus balanoides</i></p> 	<p>Flattened conical shape. Diamond-shaped aperture.</p>	<p>Mid shore On rocks and sometimes other shells e.g. limpets. Aperture opens underwater. Filter feeder.</p>
<p>Name: Common Limpet <i>Patella vulgaris</i></p> 	<p>Conical shell. Ridged from apex to base. Height of limpet shells varies according to variations in wave action – between different beaches and in different zones on same beach.</p>	<p>Mid shore. Grazes on seaweeds. Returns to same place and clamps to rock at low tide. Wears a circle in the rock – home scar.</p>
<p>Name: Common periwinkle <i>Littorina littorea</i></p> 	<p>Ovoid with pointed spire. Usually dark coloured.</p>	<p>Across intertidal zones on sheltered shores.</p>

<p>Name: Dog whelk <i>Nucella lapillus</i></p> 	<p>Oval shell with pointed spire. Spirally ridged whorls.</p>	<p>Mid shore</p> <p>Feeds on barnacles and mussels.</p> <p>Shell colour can be influenced by food.</p> <p>Lays clusters of yellowish egg capsules on rocks in spring.</p>
<p>Name: Shore crab <i>Carcinus maenas</i></p> 	<p>Angled oval carapace. Marbled green, can vary to brown/reddish colour.</p> <p>Carapace grows to 10cm wide.</p>	<p>Mid shore</p> <p>Females carry bright orange egg mass on underside of abdomen.</p>
<p>Name: Hermit crab <i>Pagurus bernhardus</i></p> 	<p>Soft bodied crab that lives in a discarded mollusc shell, commonly periwinkles or whelks. Head end, legs and pincers are all that is seen outside the shell.</p>	<p>Small individuals in rock pools on mid to lower shore.</p> <p>Crabs move to a bigger shell as they grow. They have been known to fight for an already occupied shell if others aren't readily available.</p> <p>Has asymmetric pincers. When alarmed they retreat into the shell and seal the entrance with the large pincer.</p> <p>Strong walking legs carry the weight of the crab and shell.</p>

<p>Name: Edible crab <i>Cancer pagurus</i></p> 	<p>Oval carapace with edge that looks like a piecrust. Large black-tipped pincers.</p> <p>Carapace grows to 20cm wide.</p>	<p>Lower shore. Smaller crabs found under seaweed and rocks in lower shore pools, larger specimens stay in deeper water.</p>
<p>Name: Beadlet anemone <i>Actinia equina</i></p> 	<p>Soft red body with blue margin. Tentacles come out when underwater to feed.</p> <p>Pulls tentacles in and looks like a dark red blob when out of water.</p>	<p>Mid to lower shore.</p> <p>Filter feeder.</p>
<p>Name: Lug worm <i>Arenicola marina</i></p>  <p>(cast)</p>	<p>Presence of lug worms seen in the form of sand casts at rear end of U-shaped burrows.</p> <p>Segmented worm that lives in burrows in sand. Actual worm rarely seen – requires very fast digging with a large spade!</p>	<p>Mid shore/intertidal zone on sandy beaches.</p> <p>The worm ingests sand, takes out nutrition and excretes it from the other end to form the cast.</p>
<p>Name: Common seal <i>Phoca vitulina</i></p> 	<p>Grey/brown mottled coat.</p> <p>Clawed front flippers.</p> <p>Distinguished from grey seal by shape of nose. Common seals have blunt muzzle and puppy-dog like shape. Grey seals have longer 'Roman nose'.</p>	<p>Hauls out on lowest exposed parts of beach.</p> <p>Powerful flippers good for swimming.</p> <p>Physiological dive response allows prolonged underwater swimming.</p>

(Kelp beds visible in background)		
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Images: Andrews, S (2018) Flora and Fauna on Scarborough South Bay beach or Selwicks Bay, Flamborough Head.

Some information: Sherry and Cleave (2012)

References

British Geological Survey. Interactive maps [online] Available at:

<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

BBC tide tables [online] Available at: https://www.bbc.co.uk/weather/coast_and_sea/tide_tables

Hartnoll and Hawkins, 1980. Monitoring rocky shore communities: a critical look at spatial and temporal variation [pdf] Available at:

<https://hmr.biomedcentral.com/track/pdf/10.1007/BF02414773>

Leave No Trace, 2012 [online] Available at: <https://lnt.org/>

Magic Seaweed surf reports [online] Available at: <https://magicseaweed.com/>

Met Office tide tables [online] Available at: <https://www.metoffice.gov.uk/public/weather/tide-times/>

Natural England, 2016. The Countryside Code [pdf] Available at:

<https://www.gov.uk/government/publications/the-countryside-code>

North East Coast Observatory, 2011. Cell 1 Regional Coastal Monitoring Programme Overview Report (2008 - 2011) [pdf] Available at:

http://www.northeastcoastalobservatory.org.uk/data/Reports/index.php?link=&dla=download&id=117&cat=37/Overview_Report_2011_Final.pdf

North Yorkshire County Council, 2013. CYPs HANDBOOK for Educational Off-site Visits and all Adventurous Activities [pdf] Available at:

http://www.outdoored.co.uk/content/uploads/2014/04/Handbook_for_Educational_Off-site_Visits_and_Adventurous_Activities_September_2013.pdf

Sherry and Cleave, 2012. Collins Complete Guide to British Coastal Wildlife. Collins.

Ofsted, 2008. Learning outside the classroom – how far should I go? [pdf] Available at:

<https://www.lotc.org.uk/wp-content/uploads/2010/12/Ofsted-Report-Oct-2008.pdf>

Visit my harbour Free tide tables [online] Available at:

<http://www.visitmyharbour.com/tides/125/uk-tables/scarborough-tide-tables>