young archaeologists' club

CITiZAN

Coastal and intertidal archaeology activities

Prepared for the Young Archaeologists' Club
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Workbook written by Megan Clement

Activities by the Coastal and Intertidal Zone Archaeological Network (CITiZAN)

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Council for British Archaeology

www.yac-uk.org

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Intertidal zone and tides

People have been populating and using the coast and intertidal zone as a resource since prehistoric times. As a consequence, there are many different kinds of archaeological features to explore in the intertidal and coastal zone.

Unlike terrestrial sites, the archaeology in the intertidal zone is not made up of layers; features from prehistory and the modern day can be found on the same horizon, adjacent to each other but separated by thousands of years in date. In addition, the anaerobic conditions created in the intertidal zone mean that finds and features which usually don't survive, frequently do survive, such as Bronze Age sewn-plank boats and wooden trackways.

This booklet of information and activity ideas has been created by Megan Clement from the Heritage Lottery Funded Coastal and Intertidal Zone Archaeological Network (www.citizan.org.uk) to support the 2017 Young Archaeologists' Club Leaders' Weekend. It provides inspiration to help you explore the rich archaeology of the coastal and intertidal zone with groups of young people.

Intertidal zone

The intertidal zone is the part of the foreshore which gets covered by the sea at high tide and is uncovered at low tide. The area which makes up the intertidal zone can vary dramatically in size. The height of the tide varies too. The Severn Estuary for instance has the largest tidal range in the UK (and the second largest in the world) at 14m. The tidal range is the name given to the difference in the height of the water between low tide and high tide. The Mersey has the second largest tidal range in the UK with a difference of 6.45m, and then Morecambe Bay with a tidal range of 6.3m.

There are many different archaeological features found in the intertidal zone. Some of these features were deliberately built in the intertidal zone to exploit the unique conditions, such as fishtraps which trapped fish that were caught between high tide and low tide. Other features now found in the intertidal zone, like pillboxes for instance, were not originally built there; pillboxes were often constructed on clifftops but due to rising sea levels and cliff erosions, can sometimes be found in the intertidal zone nowadays.

Further information:

The BBC Nature website: www.bbc.co.uk/nature/habitats/Intertidal_zone

The government's *Severn Tidal Power Feasibility Study: Conclusions and Summary Report* (www.gov.uk/government/uploads/system/uploads/attachment_data/file/50064/1._Feasibility_Study_Conclusions_and_Summary_Report_-_15_Oct.pdf) describes tidal ranges in the UK (see pp13-14).

Tides

Tides come in and go out twice a day and the timings of these vary. Tides also vary in time around the country. The easiest way to find out when the tides are going to be high or low is to use a tide timetable; you can purchase these as booklets from the local area, or use the internet to find them. Tide times are only measured at certain areas around the coast, so you will need to find the tide times for the nearest location to where you will be. For instance, if you are in Lytham in Lancashire, the closest tide timetable would be for Blackpool. The first formally recorded time tables in Britain were made for Liverpool Bay.

It is important to always check tide times before going out onto the foreshore. There are other hazards that must also be taken into account too. In some areas the incoming tide can be faster than a human running. The speed of the incoming tides can vary along the coast, but the Severn Estuary and Morecambe Bay are considered two of the most dangerous areas. You must also check where your access to the beach is, in order to not get cut off.

Tides can also vary in height; this can result in what are known as *spring tides*. These occur twice every lunar month, during full and new moons. This is when the tides are higher and lower than usual. Spring tides are useful for intertidal archaeologists as they provide an opportunity to find archaeology not usually uncovered at low tides. Conversely, there are *neap tides*, which are known as moderate tides, where high tides are a little lower and low tides are a little higher; the difference between high and low tides is not as great during neap tides. You will often see tides marked on maps as mean high water (or MHW) and mean low water (or MLW). Most tide timetables are in Greenwich Mean Time (GMT) and will need to be adjusted where appropriate to take British Summertime (BST) into account.

Further information:

The Tides4fishing website (www.tides4fishing.com/uk) has a tide timetable for the UK, which is automatically corrected for BST

The BBC website provides tide timetables (www.bbc.co.uk/weather/coast_and_sea/tide_tables). However, this website doesn't take into account British Summertime, so adjust if necessary.

The US National Ocean Service website (http://oceanservice.noaa.gov/facts/springtide.html) explains a bit more about spring and neap tides.

Remember if you do ever get into trouble on the foreshore and need assistance, dial 999 and ask for the Coastguard.

Submerged forests

Submerged forests have existed for thousands of years and are dotted all along the UK coastline. They are mostly found in the intertidal zone. They were noticed by Gerald of Wales in the 12th century, whilst recruiting for the Crusades. Gerald attributed these forests to the wrath of God and the Great Flood and were known as “Noah’s Woods”. Samuel Pepys also describes a submerged forest, in his diary entry for the 22nd September 1665, in which he discussed a conversation he had with a shipbuilder, who was building a new dock on the Thames. The first systemic research into submerged forests was done by geologist Clement Reid in 1913. Since then more and more research has been done on these sites.

The forests are usually made up of tree stumps and fallen trunks, which are preserved in the anaerobic conditions of the intertidal zone, which enables good preservation of the wood. They can consist of many different species of tree, including: oak, alder, hazel, willow, and birch. To identify what type of trees are present in a submerged forest, samples of the wood must be taken. The samples are viewed under a microscope to examine the cell structure, which enables researchers to determine what type of species the samples are from. Oak is the only species that can be determined by eye. There can be other indications as to what types of tree may have been in a submerged forest; for instance, the remains of acorns or hazels nuts, or distinctive bark such as that from the birch tree. Dates of submerged forests are usually determined by radiocarbon dating. Oak trees can also be dated using dendrochronology (tree ring dating).

The remains of a tree stumps (left) and tree trunks (right) provide evidence for submerged forests, like these examples from Hightown in Merseyside

Further information:

Dyfed Archaeology's Lost Landscapes website has a section on submerged forests in Wales (www.dyfedarchaeology.org.uk/lostlandscapes/submergedforests.html)

The Thames Discovery Programme's Frog Blog describes a submerged forest at Erith in Bexley on the River Thames (www.thamesdiscovery.org/frog-blog/a-very-muddy-trip-to-erith)

A submerged forest site at Sheabie, Berneray in the Western Isles is described in a blog post (https://scharpblog.wordpress.com/2016/07/08/submerged-forests-and-fishing-heritage-in-the-western-isles/) from the Scotland's Coastal Heritage at Risk Project blog.

Peat

Peat is partially decomposed organic matter, such as leaves and twigs. Peat is found in wet and boggy conditions. Due to these anaerobic or waterlogged conditions, other organic material can be preserved within the peat, such as tree stumps and trunks, wooden artefacts, as well as pollen and remains of insects.

In coastal areas, peat can be indicative of old land surfaces. Peat preserves the remains of ancient landscapes which were present before sea level rise. Peat in the intertidal zone can date from the medieval back to the Mesolithic and older; the further out into the intertidal zone the peat is, usually the older it is.

Peat can be very useful in informing archaeologists about past climates; pollen and micro-fauna analysis can give indications about temperature and weather conditions because different plants and insects thrive in different climates. Artefacts, such as flint implements, found within the peat can be examined to help date the deposits. Organic finds from within the peat can be scientifically dated using radiocarbon dating or dendrochronology.

Peat shelves are fairly common on the coast, like this one at Cleethorpes in Lincolnshire

Further information:

Historic England maintains an intertidal and coastal peat database which provides basic information on location, date of recording and if any paeolo-environmental analysis or dating has been done (https://historicengland.org.uk/research/current-research/heritage-science/intertidal-peat-database/)

The International Union for Conservation of Nature's *Peatlands and the Historic Environment* (2010) report has some nice photos of artefacts found in peat and waterlogged deposits (www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/images/Review%20Peatland%20Historic%20Environment,%20June%202011%20Final.pdf)

The "Day of Archaeology" website includes blog posts about excavating sites in peat lands (www.dayofarchaeology.com/tag/peat/)

Trackways

Prehistoric timber trackways are some of the earliest known man-made constructions in the UK, with the oldest examples being late Neolithic. Trackways are usually found in wetland and boggy areas to provide a dry and solid access out into the coastal and intertidal zones. They may have been used to access food resources enabling people to fish or gather seaweed and shells, or to access boats. Simple trackways are mostly made up of brushwood or weaved hurdle-like structures, though there are more complex examples constructed of planks and logs.

Trackways can provide a lot of information; such as evidence for the exploitation of wetland (for food or access), prehistoric wood-working techniques, and whether forests were managed. A Neolithic trackway at Hightown, near Liverpool, showed evidence of beaver teeth marks on the wood, giving indications of the wildlife in the area!

The Sweet Track is perhaps the most famous trackway. It is one of over 40 which have been found in Somerset. It is constructed of posts and planks to create a raised walkway. Other trackways have been found at Cleethorpes in Lincolnshire, Hightown in Merseyside, and Goldcliff in Wales.

Further information:

Pre-industrial Roads, Trackways and Canals (Historic England, 2011). (https://content.historicengland.org.uk/images-books/publications/iha-preindustrial-roads-trackways-canals/preindustrialroadstrackwayscanals.pdf/)

The Scheduled Ancient Monument list entry of the Sweet Track is on the Historic England website (https://historicengland.org.uk/listing/the-list/list-entry/1014438)

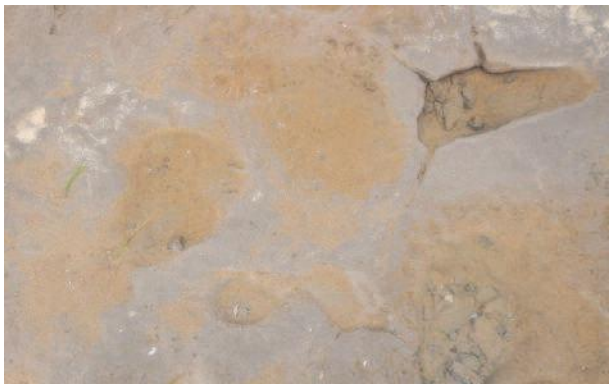
The Severn Estuary Levels Research Committee website includes images of the excavation and reconstructed drawings of the Sweet Track (www.selrc.org.uk/maplocation.php?location_id=47)

Footprints

The oldest known human footprints in the UK were found at Happisburgh, Norfolk, in 2013. They are also the earliest set of human footprints found outside of Africa, and are about 800,000 years old! Currently work is being done on them to reveal more about the people who left them. Footprints like these are an incredibly rare archaeological find. They are found in places where intertidal peats are located. Due to the nature of the environment they are found in, they are fragile and short lived, being exposed and then destroyed with the tides.

Footprints of animals such as deer, wolf and crane are more commonly found than human footprints. Archaeologists have also discovered footprints of auroch (a large extinct wild cow; on average they stood about 1.8m (6 feet) tall at the shoulder)!

Work on human footprints can help archaeologists understand more about the people of the past. Archaeologists can calculate gender, height, an age range, and occasionally other information. Sometimes collections of footprints can be found and show family groups, including small children walking with adults. Footprints have been found in numerous places along the coast, including Formby in Merseyside, Low Hauxley in Northumberland, Blyth in Northumberland, and the Gower Peninsula in Wales.



Mesolithic footprints at Formby in Merseyside; the one on the right belongs to a 6ft tall male

Further information:

More information about the Happisburgh footprints is available on the British Museum website, including a link to the scientific research paper which has many photographs and diagrams (www.britishmuseum.org/research/research_projects/all_current_projects/featured_project_happisburgh/happisburgh_footprints.aspx)

The Natural History Museum short film *The oldest human footprints in Europe*, is about recording the Happisburgh footprints. It is available on YouTube (www.youtube.com/watch?v=tHFFMyBb1O8)

The Formby Footprints website reports the extensive research carried out by Gordon Roberts (http://formby-footprints.co.uk/)

The BBC website reports about footprints found at Borth in Wales in 2012 (www.bbc.co.uk/news/uk-wales-mid-wales-17353470)

The CITiZAN website describes how to record footprints (www.citizan.org.uk/resources/footprints/)

Prehistoric boats

There is speculation regarding when the first watercrafts, or boats were used; however, there are examples of prehistoric boats. These include dugout logs, rafts of logs or animal hides, and boats similar to coracles and basket boats, although there is actually no archaeological evidence for coracles and basket boats in the UK yet uncovered. It is thought these crafts were used for in-shore travel rather than sea voyages. Neolithic dugout canoes are known from Greater London and Essex.

By the Bronze Age sewn-plank boats were being built; this is a type of boat where planks were not overlapped but rather joined by sewing them together using hide or bark threaded through holes in the planks. The Humber Estuary has the highest concentration of Bronze Age boats in the country; the most famous and internationally important of these being the Ferriby Boats, found in 1937. There have been some suggestions that the density of boats here may indicate a Bronze Age boat yard. Similar examples were also found in Dover in 1992, as well as fragments elsewhere in England. The Ferriby Boats were 16m long, which has been suggested as being too large for inland waters. There is no evidence for sails or a steering oar associated with any of these vessels so it is thought they were propelled using paddles; a Mesolithic paddle was found at Star Carr in Yorkshire.

Further information:

Ships and Boats: Prehistory to Present (Historic England, 2012) (https://content.historicengland.org.uk/images-books/publications/dsg-ships-boats/ships-boats-sg.pdf/)

Ships and Boats: Prehistory to 1840 (Historic England, 2016) (https://content.historicengland.org.uk/images-books/publications/iha-ships-boats/heag132-ships-and-boats-prehistory-1840-iha.pdf/)

The Ferriby Heritage Trust's Ferriby Boat website tells the story of the discovery and excavation of these amazing vessels (www.ferribyboats.co.uk)

The *Current Archaeology* website includes a report about the Dover Bronze Age boat (www.archaeology.co.uk/specials/the-timeline-of-britain/the-dover-bronze-age-boat.htm)

Clinker-built and carvel-built vessels

Clinker and carvel are methods of building boats. Clinker-built boats have been constructed since at least the early medieval period. Examples include the boat from the Sutton Hoo boat burial in Suffolk, and the Anglo-Saxon Graveney Boat found near Faversham in Kent. Carvel construction was a later form of construction, with examples in the Mediterranean being noted from the 15th century. The medieval *Mary Rose* was constructed using this technique.

In clinker-built vessels, the hull comprises of overlapping planks constructed first, then an inner frame is inserted for stiffening. The frames have distinctive rebates known as joggles to accommodate the overlap of the planking. This technique is also known as lapstrake.

Carvel-built vessels are constructed the other way around. The frame of the vessel is built first, and then planking is added edge to edge, so that the planks of the hull are flush to one another. This method enables larger vessels to be built.

This vessel is either a yawl or a sloop, a seafaring vessel which is carvel built. It is at Victoria Docks, Hull on the River Humber in East Yorkshire

Further information:

Thames Discovery Programme's "Identifying timber vessels" guidance sheet includes a useful diagram of clinker- and carvel-built vessels. (www.scribd.com/document/32835428/Vessels-Fact-Sheet#download&from_embed)

The CITiZAN website has a guidance sheet on wooden vessels (www.citizan.org.uk/media/medialibrary/2015/10/CITiZAN_Timber_Vessel_Guidance.pdf)

"New light on early ship- and boatbuilding in the London area" (D Goodburn, pp105-115) from *Waterfront archaeology: CBA Research Report 74* (eds. Good, Jones and Ponsford, 1991, CBA). (http://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-281-1/dissemination/pdf/cba_rr_074.pdf)

The Humber Keel and Sloop Preservation Society website has information relating to clinker- and carvel-built ships on the Humber (http://keelsandsloops.org.uk/humber-keel-origins)

Friends of the Newport Ship website (www.newportship.org)

Photographs of the Graveney Boat (www.faversham.org/gallery/galleryfolder.aspx?f=29)

Local variations

There are many local variations of small coastal trading vessels. A few examples include Humber Keels, Mersey Flats, and Thames Sailing Barges. All of these are carvel-built boats, suitable for short coastal trading voyages, mainly along the estuaries after which they are named but unsuitable for longer seafaring journeys; though Humber Keels have been known to venture as far as Whitby on the Yorkshire Coast. Few examples remain of these types of boats, though there are several societies now which have restored and run trips on these vessels. Museums house a few examples, like the National Waterways Museum in Ellesmere Port which has one of the last two Mersey Flats thought to be in existence.

A model of a Thames Sailing Barge

Further information:

The Humber Keel and Sloop Preservation Society website includes old photographs, the history of boats on the Humber, and dates for sailing events (http://keelsandsloops.org.uk)

The Thames Sailing Barges website has a useful glossary and FAQs (www.thamesbarge.org.uk)

Information about Mersey Flats and their demise is available on the Canal Junction website (www.canaljunction.com/craft/mersey.htm)

Historic England has a Scheduled Ancient Monument list entry for the *Daresbury*, a rare example of a Mersey Flat (https://historicengland.org.uk/listing/the-list/list-entry/1417593)

Hulk assemblages

Wrecks are vessels which have been abandoned due to adverse conditions, whereas hulk assemblages are groups of ships which have been deliberately grounded and abandoned, and are often stripped of fixtures and fittings of worth. Sometimes this was done to protect river banks and sometimes it was to avoid a monetary value of disposing of these vessels. By 2015, 188 hulk assemblages had been identified in England.

This is the hulk assemblage at Maldon in Essex, most of the remains here are of Thames Sailing Barges

Hulk assemblages can range is date, usually from the 18th century through to the modern period, as well as ranging in type of vessels, although they are mostly made up of regional industrial barges (such as Humber Keels, Mersey Flats, and Thames Sailing Barges mentioned above).

The largest hulk assemblage is Purton Barge Graveyard, in Gloucestershire on the River Severn. Approximately 80 vessels were hulked here during the 20th century. Most of these “graveyards” are found on the south and west coasts. There are very few assemblages on the east coast, due to the dynamic nature of the coast here; however some examples survive in river estuaries along the east coast, including at Amble where there is a group of suspected herring keels and coal barges, seemingly abandoned. Another example is at Victoria Dock in Hull, where three vessels have been abandoned. Both of these examples can be seen on Google Earth.

Further information:

Ships and Boats: Prehistory to Present (Historic England, 2012)
(https://content.historicengland.org.uk/images-books/publications/dsg-ships-boats/ships-boats-sg.pdf/)

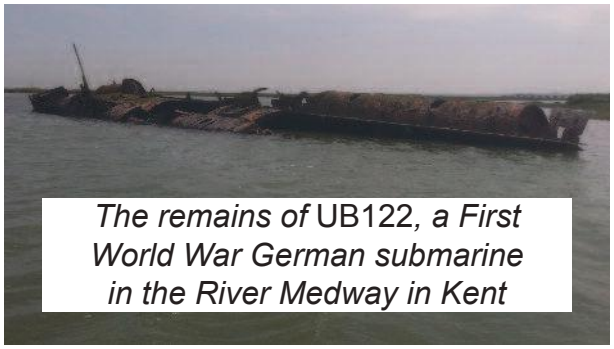
Hulk Assemblages: Assessing the national context (Museum of London Archaeology, 2012-13)
(http://archaeologydataservice.ac.uk/archives/view/hulk_2012/downloads.cfm)

The Nautical Archaeological Society did a survey on the hulks at Purton on the River Severn
(www.nauticalarchaeologysociety.org/content/purton-ship-graveyard-river-severn)

Submarines

The first experiential submarines were built in the 1620s; but they only began to be used effectively in the late 19th century, during the American Civil War. In 1878, Reverend Garrett created a hand-powered submarine called the *Resurgam*, which he intended to demonstrate to the Navy but whilst en route the vessel sank! She was rediscovered in 1995 and is now a protected wreck. The first successful sinking of a surface vessel by a submarine was in 1864, by the *Hunley*, an American Confederacy submarine. She sunk an enemy warship during the American Civil War; unfortunately the *Hunley* sank herself shortly after this. The first British submarine used by the Navy was the *Holland* in 1901.

During the First World War and into the interwar years, seven British submarines were lost. Only three of these were in British waters; the *G3* at Filey Bay in Yorkshire, the *G11* at Howick in Northumberland and the *J6* at Seahouses in Northumberland. There are significantly more German U-boat wrecks in English territorial waters, totalling 41 German wrecks in all.



The remains of UB122*, a First World War German submarine in the River Medway in Kent*

Further information:

Ships and Boats: Prehistory to Present (Historic England, 2012)
(https://content.historicengland.org.uk/images-books/publications/dsg-ships-boats/ships-boats-sg.pdf/)

Ships and Boats: 1840-1950 (Historic England, 2016) has a section on submarines
(https://content.historicengland.org.uk/images-books/publications/iha-ships-boats-1840-1950/heag133-ships-and-boats-1840-1950-iha.pdf/)

The Nautical Archaeological Society has comprehensive web-based resources about two submarines: *A1* (www.nauticalarchaeologysociety.org/content/a1-submarine-0) which sank in the Solent in 1911, and *Holland No.5* (www.nauticalarchaeologysociety.org/content/holland-no5-submarine) which sank off the coast of Sussex in 1912.

In 2016, two submarines, one British and one German, were designated as Protected Wreck Sites; more information is available in this report from the *Daily Mail* (www.dailymail.co.uk/news/article-3701951/Wrecks-two-British-German-submarines-sank-100-years-ago-given-protected-status.html)

Explore a 3D model of the German First World War U-Boat *UB122* on the CITiZAN blog (www.citizan.org.uk/blog/2016/Dec/06/scourge-seas-ww1-german-u-boat)

Lifeboats

Lifeboats are a key part of life on the coast, and even before the Royal National Lifeboat Institution and other lifesaving organisations, local men have been venturing out into rough seas to help rescue vessels in distress. The first record of a lifeboat service is in Northumberland by Bamburgh, where a man called Lionel Lukin was commissioned to convert a local coble into a boat which would be able to venture out in seas to assist vessels in distress. This was the lifeboat which was launched to help the *SS Forfarshire*, the vessel which Grace Darling is famous for helping.

The first purpose-built lifeboat was for use on the River Tyne and was known as the *Original*. She was built following a competition in 1789 to design a lifeboat; no one actually won the competition outright, and the design of the *Original* incorporated two of the entries, by William Wouldhave and Henry Greathead. The *Original* was wrecked in 1830.

The *Zetland* and the *Tyne* are the two oldest lifeboats still in existence in the country. The *Zetland*, built in 1802, patrolled the North Yorkshire coastline and is now in the RNLI museum at Redcar. The *Zetland*, was built by Henry Greathead and modelled on the design of the *Original*. The *Tyne*, is in South Tyneside, close to the seafront as an attraction under a cast-iron canopy and was built as a replacement for the *Original* when she was wrecked. The boat and canopy are Grade II listed structures; which makes the *Tyne* one of only three boats listed, one of the others being the *Cutty Sark*. The *Tyne* served for 60 years and saved over 1,000 lives.

The Tyne *lifeboat at South Shields in Tyne and Wear*

Further information:

The RNLI website's history section includes information about lifeboats and lifejackets (https://rnli.org/about-us/our-history/resources)

Ships and Boats: Prehistory to Present (Historic England, 2012) (https://content.historicengland.org.uk/images-books/publications/dsg-ships-boats/ships-boats-sg.pdf/)

"A brief look at the Archaeology of Lifesaving in the North" (Megan Clement, CITiZAN blog, 2016) (www.citizan.org.uk/blog/2016/Dec/15/brief-look-archaeology-lifesaving-north)

Other uses for boats

A few examples of Viking boat burials have been discovered in Scotland including several in Orkney at Westness, Rousay, and the Scar boat burial on Sanday; though few have been found elsewhere in the UK. The most famous example of a boat burial is at Sutton Hoo; in this Anglo-Saxon burial mound, remains of a traditional Scandinavian clinker-built vessel were found. It was 27m long and thought to be rowed by 40 oarsmen. It may have been used for leisure rather than practicality. Very little remains of the ship at Sutton Hoo, other than the sand imprint and the ship's nails.

In Northumberland, upturned keelboats were often used as roofs for buildings such as sheds or boat huts; occasionally they were used in houses for fishing families too. Famous examples can be found on Holy Island or Lindisfarne, but they were common elsewhere such as at Beadnell and Newbiggin-on-Sea. One fisherman's hut in Beadnell reused an old sail as waterproofing on the roof of the building; used tarring commonly used for waterproofing nets on the timber walls; and had its door painted 'marine blue', which is the colour used on Northumbrian Cobles (a local variant of boat).

The remains of the fisherman's hut at Beadnell in Northumberland which was made and repaired using boat materials

In 2008 at the Hungate dig in York, a sunken-feature building was found with walls made of reused timbers. The timbers were assessed as coming from a clinker-built vessel, with wooden rather than iron fastenings; the timber itself originated in the southeast of England and dated to c. AD 955.

Further information:

Ships and Boats: Prehistory to Present (Historic England, 2012) (https://content.historicengland.org.uk/images-books/publications/dsg-ships-boats/ships-boats-sg.pdf/)

The British Museum's Teaching history with 100 objects website has information on the Scar Boat Burial in Orkney (www.teachinghistory100.org/objects/about_the_object/a_viking_dragon_plaque)

Historic Environment Survey for the National Trust Properties on the Northumberland Coast (Archaeo-Environment Ltd, 2009) includes information about the famous Lindisfarne Boat huts (see pp 37-38) (www.aenvironment.co.uk/downloads/Lindisfarne%20Management%20Plan.pdf)

"The Reading Room, Beadnell" (Katrina Porteous, CITiZAN blog, 2016) discusses the Fishermen's huts in Beadnell (www.citizan.org.uk/blog/2016/Jun/20/reading-room-beadnell)

Ships and Boats: Prehistory to 1840 (Historic England, 2016) (https://content.historicengland.org.uk/images-books/publications/iha-ships-boats/heag132-ships-and-boats-prehistory-1840-iha.pdf/)includes information about the Sutton Hoo boat burial as well as an archaeological drawing of the planks used in the Hungate building (pp 7-8).

Time Team Special 40: "The Real Vikings" (2010) (www.youtube.com/watch?v=89FuQofJmhw&t=637s) has a small section on the boat found at Hungate (about 6.30mins in).

The Open University and York Archaeological Trust produced a further film of the planks being removed from the Hungate sunken building (www.youtube.com/watch?v=iYWAN_q4RpA)

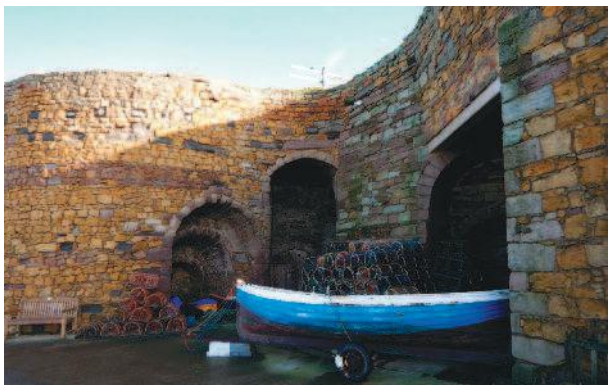
Lime kilns

Lime, or calcium oxide, is an alkali product which is produced by burning limestone or chalk. The production of lime has been undertaken since Roman times, and it is still used today in many industries. Today it is used in products like toothpaste and in making sugar; it is also used to balance acidic soils for farming, and in mortar, plaster and concrete. It was for these applications in agriculture and building that lime was used in Roman times.

A lime kiln is the structure which is used to produce the lime. Lime kilns and their remains form the archaeological evidence of the lime industry of the past. Many are built next to a hillside or by raised land as the limestone is loaded into the kiln from the top. Usually a limestone quarry was nearby, which allowed easy access to the natural resources and it was not too far to transport the raw material to the kiln.

There were two types of kilns; a flare kiln and a draw kiln. The former of these was a periodically run kiln, which involved placing a single charge of limestone into the vault over a furnace which was then lit and continued to burn for several days until all the limestone had calcined (reduced or oxidised due to the extreme heat). Once it had cooled, the kiln was unloaded and the process repeated. The difference with a draw kiln, also known as a running kiln, was that the furnace could be fired permanently. The lime was loaded in in layers, with layers of fuel in between the limestone layers, and as the fuel burned, the limestone was calcined. The lime dropped through the grate and was raked out at the bottom. The commercial businesses preferred to use the latter of these two processes.

Places, such as Northumberland, started to produce lime commercially in the 18th century and began shipping it by boats to other destinations. This was a risky business as lime can be explosive if it gets wet! The lime industry began to decline in Northumberland after the invention of the railways because it was a safer way to transport lime, and production moved away from the coast. However there is still evidence of this industry present with large lime kilns at Seahouses, Budle Bay, Beadnell and Holy Island, many of which are listed structures. Usually waggonways and jetties are associated with these features, which would have been used to transport the limestone from the quarry to the kiln and then the lime onto further destinations by boats.



Lime was a big industry in Northumberland and here are two examples of lime kilns, one at Budle Bay (left) and one at Beadnell Harbour (right), both are listed structures

Further information:

Pre-Industrial Lime Kilns (Historic England, 2011) (https://content.historicengland.org.uk/images-books/publications/iha-preindustrial-lime-kilns/preindustriallimekilns.pdf/)

The University College London website has a page which provides a good explanation and diagrams of lime kilns (www.ucl.ac.uk/~ucfbrxs/limes/Kilns.htm)

David Kitching's website has lots of information about lime kilns across the UK, including a database of surviving lime kilns and lots of photos (www.brocross.com/industrial%20history/limekilns.htm)

The National Trust have written a guide to the lime kilns on Lindisfarne or Holy Island (www.nationaltrust.org.uk/lindisfarne-castle/documents/download-a-guide-to-the-castle-point-lime-kilns.pdf)

The BBC TV programme *Edwardian Farm* looked at how quick lime was made and how a lime kiln was used. You can watch more about the process in these three short clips:

Part 1: www.youtube.com/watch?v=IJpZsvYygF8
Part 2: www.youtube.com/watch?v=wXQS105fAwY
Part 3: www.youtube.com/watch?v=aIOYmX4tA9k

Salt pans

Salt has always been an important commodity. Prior to canning and refrigeration, to preserve and store food it had to be dried, smoked or salted. Salt was also used in the past for tanning, cloth dying and for glazing pottery. In the UK, salt was originally made from either using sea water or inland brine springs. The archaeological evidence for salt making can be found dating as far back as the Bronze Age, with the earliest evidence being found at South Woodham Ferrers in Essex. Place names can give clues to a past salt industry, for instance Saltfleet in Lincolnshire but also places ending in *–wich* can denote a connection with the salt industry, such as Droitwich.

One of the simplest ways to extract salt was via evaporation from sea water, which was the process used in sunnier locations, such as the Mediterranean. However, in the UK, this was an unreliable method to produce salt! Solar evaporation was sometimes used at the beginning of the process to help increase the concentration of the brine. These sites became known as “sunworks” and involved a series of shallow saltpans, set behind a sea bank, and fed at high tide via sluice gate. Once the sea water had settled, it was tapped off into a second lower pan and then a third, allowing time in each for evaporation to take place. After each stage, the concentration of brine became stronger.

In the medieval period a different method of increasing the concentration of brine at the start of the salt-making process was also used on the coast. It was called “sleeching” in Cumbria and Lancashire, and “muldefang” in Lincolnshire. It involved washing salty sand from the beach in a trench or “kinch” with sea water. When the solution was tapped, the sand was thrown away, leaving a brine solution with a high concentration of salt.

Once the brine solution was strong enough (following either of the processes described above) it was moved to a tank to be heated. To test if a solution was strong enough, an egg could be used: if the egg floated on top then the brine was strong enough for the next stage.

The next process was to remove the salt from the solution, and this was done through boiling. This was usually done in metal or ceramic pots and the crystals were scooped out as they formed. Ceramic lined pits have been found on prehistoric sites and lead lined ones from the Roman sites. There are two remaining coastal salt extractors, one at Anglesey and one in Maldon, and both still use this process.

Further information:

Pre-Industrial Salterns (Historic England, 2011) (https://content.historicengland.org.uk/images-books/publications/iha-preindustrial-salterns/preindustrialsalterns.pdf/)

Salt has been manufactured since the Bronze Age in Essex. This leaflet written by Essex County Council encouraging farmers and landowners to protect salt-making sites in Maldon explains more: www.essex.gov.uk/Activities/Heritage/Documents/planning_red_hills.pdf

A brief explanation of how coastal salt extraction occurred and further information on the well-known site at Allonby in Cumbria, can be found in Historic England's Scheduled Ancient Monument list entry for Allonby saltpan: https://historicengland.org.uk/listing/the-list/list-entry/1007256

SCAPE (Scottish Coastal Archaeology and the Problem of Erosion) worked with Clyne Heritage Society community archaeology group to record salt pans at Brora on the east coast of Sutherland in 2011 (www.shorewatch.co.uk/brora/)

Alum

The alum industry has been described as "the first chemical industry". Alum is a chemical made up of aluminium sulphate with either ammonia or potassium sulphate. It was used for a number of things such as fixing dyes to clothes, tanning leather, and in Roman times it was used for purifying water. Prior to Henry VIIIs break with Rome, alum was mostly imported from Italy, with the Vatican controlling most of the world supply; this supply was stopped after the Reformation. With wool being the principal industry in Britain, another source of alum had to be found; most of the production of alum took place in Yorkshire, both on coastal sites and further inland. There are examples in Dorset and in Lancashire.

The alum process was a long one; firstly shale had to be extracted from quarries and burned to separate the alum from the quarried shale. This burning could take months and sometimes up to a year to complete. The burnt shales would then be leached in large tanks of water to create a liquid called aluminium sulphate. This would take place in several stages, through a series of tanks which would remove impurities and concentrate the liquid aluminium sulphate further. It was then transported to an alum house where it was boiled over a coal fire. To create the alum crystals a source of potassium (such as potash or burnt seaweed), or a source of ammonia (such as urine) was mixed with the aluminium sulphate. It was then left to cool.

The last alum works were closed in 1871. Many were located at the coast because it provided easy access to quarrying shales from cliff edges, as well as easy transportation for resources such as coal, seaweed, potash and urine. Many remains such as alum houses and sluicing tanks can still be seen, as well as jetties and wooden staithes which would have been used by boats associated with the industry.

Further information:

In 2014, Archaeological Reserach Services Ltd carried out the Coastal Alum Works Project, which recorded several of the Coastal Sites in Yorkshire (www.archaeologicalresearchservices.com/projects/coastal-alum-works-project)

North York Moors National Park blog post "Cliff edge archaeology" tells the story of more of these sites (https://northyorkmoorsnationalpark.wordpress.com/2016/01/25/eroding-history/)

The National Trust webpage "How alum shaped the Yorkshire coast" (www.nationaltrust.org.uk/yorkshire-coast/features/how-alum-shaped-the-yorkshire-coast)

Bridges

Bridges are as important a part of infrastructure nowadays as they were in the past. Some important bridges around the UK include the Humber Bridge, the Severn Bridge and the Forth Bridge. In some places, ferries were used in place of bridges.

The Humber Bridge over the River Humber near Hull in East Yorkshire

Some place names give indication of ferry points; such as North and South Ferriby on the Humber, their names deriving from the Old Norse *ferja*. More recently some places have opted to create tunnels rather than bridges such as on the Mersey and Medway. Nowadays bridges (and tunnels) have reduced the need for ferries or long detours.

The Roman bridge, *Pons Aelius*, was the first major bridge to span the Tyne and is the only bridge outside of Rome to be named for a Roman Emperor. When the Swing Bridge was built at Newcastle in 1872, the remains of this Roman bridge were uncovered. *Pons* is the Latin word for bridge. Many medieval bridges had buildings on them, including Old London Bridge, which had over 200 buildings during the Tudor period, with some more than six storeys high. In the 14th century there were over 100 shops and a public latrine. The medieval bridge at Newcastle had a gaol. Many rivers have a good chronology of bridges, especially where a city is concerned; Newcastle and London are good examples of this.

Further information:

English Heritage website: www.english-heritage.org.uk/visit/places/historical-bridges

Historic England have a number of images of different bridges of different dates (https://historicengland.org.uk/services-skills/education/images-by-theme/bridges)

Timeline and more information on the Roman bridge at Chesters Roman Fort on the River Tyne: www.english-heritage.org.uk/visit/places/chesters-bridge-abutment-hadrians-wall/history/

Mylearning has information, documents, vidoes and photos on the constructions and use of the Humber Bridge (www.mylearning.org/history-and-construction-of-the-humber-bridge/p-3687/)

The Humber Bridge website has information about the history of the bridge and links to other bridges (www.humberbridge.co.uk/explore_the_bridge/bridge_history_and_detail/history.php) (www.humberbridge.co.uk/links/other_bridges.php)

Jetties

Jetties are timber platforms which extend outwards into a river or the sea for loading and unloading boats. Modern equivalents are usually made from concrete and steel. They are formed by driving timber piles into the foreshore and these are the archaeological remains which usually survive. A walkway of flat timber planks is usually added on the top and sometimes the inner centre is infilled with small stones or rubble to help stabilise the structure. There are some examples of stone jetties which were more durable than wooden ones but were costly and time consuming to build.

Stone jetty at Hest Bank, Morecambe in Lancashire

Jetties can range from small examples, for instance for a local industry such as lime or alum production, to large examples such as the one at South Landing in Yorkshire which was used as a port for trading. Rare Iron Age examples of jetties have been found in Poole Harbour in Dorset, but can only be seen at astronomically low tides and suitable weather conditions, so are rarely seen.

Further information:

Thames Discovery Programme has a downloadable factsheet about jetties and wharves (www.thamesdiscovery.org/discover/foreshore-factsheets-jetties)

'Upland Pete' writes a landscape archaeology blog; there is an interesting post about a recently uncovered jetty called Hest Bank Jetty which is near Morecambe Bay in Lancashire. The blog includes a link to the archaeological report (https://uplandpete.wordpress.com/2013/09/26/hest-bank-jetty-morecambe-bay-lancashire-report-online/)

Seaside piers

Seaside piers were an important part of the historic seaside holiday. When seaside holidays became fashionable, piers began to spring up everywhere including Skegness, Brighton, Weston-super-Mare and Morecambe. Piers differ from jetties as they have no practical purpose, other than for a pleasant stroll out over the sea.

Southport pier
Southport, Merseyside

The longest pier in the country is at Southend-on-Sea, which is 2158m long. When it was originally built in 1829 it was only 180m long, but it was extended several times, and became the longest pier in the country by 1848. The second longest pier is at Southport, which is 1107m long. It was opened in 1860.

Further information:

The National Pier Society has documented the history of present and destroyed piers in Great Britain (not Northern Ireland). Their website includes pictures and facts (www.piers.org.uk)

The Defence of East Sussex website has a blog about the piers in Sussex in the Second World War (wwww.pillbox.org.uk/blog/216741/)

Why not visit all 56 surviving piers in England AND Wales?! The *Daily Mail* reported on one such pier tour that Danny Smith and Jon Bounds undertook in 2014 (www.dailymail.co.uk/travel/article-2587917/Two-men-visit-56-piers-England-Wales-just-two-weeks.html)

Fishtraps

Fishtraps, sometimes known as fish weirs, are a method of coastal fishing. Fishtraps or fish weirs use man-made barriers to guide fish into baskets; sometimes this works in conjunction with the tide. There is evidence of Mesolithic fishtraps but this method of fishing was being used until relatively recently, such as at Cleethorpes, where fishtraps were used into the 20th century. A majority of fishtraps are located in the intertidal zone. Prehistoric and Roman fishtraps are rare and this is mainly due to sea level rise. It means that very low tides are needed to see them because much of the time they are covered by water even at low tide. Some of the medieval examples are associated with monasteries or manors.

Fishtraps are usually made of wood but some stone and metal examples are known, such as the stone example at Teifi Estuary in Dyfed. Fishtraps are usually "V" shaped structures, with the open end of the "V" facing seaward. When the tide comes in, so do the fish. The barriers guide the fish into a wattle basket or net located at the point of the "V". The shape of the fishtrap is constructed of timber stakes and then the barriers are usually wattle hurdles, weaved from willow or hazel.

Archaeologically, stone fishtraps are hard to recognise but are more durable than wooden examples. Wood fishtraps are usually identifiable by the remains of upright stakes, in the "V" shaped formation. It is less common to find the wattle baskets and hurdles but some examples have been found, for example on the Thames and the Severn.

Fishtrap and fish weir at Oldbury in Gloucestershire on the River Severn

Further information:

River Fisheries and Coastal Fish Weirs (Historic England, 2011)
https://content.historicengland.org.uk/images-books/publications/iha-river-fisheries-coastal-fish-weirs/riverfisheriescoastalfishweirs.pdf/

Thames Discovery Programme has a downloadable factsheet about fishtraps (http://www.thamesdiscovery.org/discover/foreshore-factsheet-fishtraps)

SCAPE has a PDF on evidence for fish traps (www.scapetrust.org/pdf/Fish%20traps/fishtraps2.pdf)

The Ashmolean Museum has produced a video on how to weave a basket for a fish trap (www.youtube.com/watch?v=i_7BdGZgEAA)

"Primitive British fishweirs" (C.R. Salisbury, pp76-87) from *Waterfront archaeology: CBA Research Report 74* (eds. Good, Jones and Ponsford, 1991, CBA)
(http://archaeologydataservice.ac.uk/archiveDS/archiveDownload?t=arch-281-1/dissemination/pdf/cba_rr_074.pdf)

Work by archaeologists from Leicester University at Hemington Quarry in Leicestershire uncovered a 2m-long wattle fishtrap basket (www.le.ac.uk/ulas/projects/hemington.html)

Fish hullies and oyster beds

Fish hullies could be considered a version of refrigeration before fridges were invented. Once fish and shellfish were caught, there had to be a means of keeping them fresh and in some cases this meant keeping them alive. Some places used fish hullies; in Northumberland these are also known as Bratt Holes. They are pits cut into the rocks which were submerged at every high tide, to provide fresh sea water, where fish and shellfish could be stored until they were transported. Examples of these have been found at South Landing in Yorkshire and Beadnell in Northumberland.

Fish hully at Beadnell in Northumberland

The example at Beadnell was cut into the rocks and has a recess to which a wooden lid can be fixed so that the fish did not escape at high tide. Other examples are at Robin Hoods Bay in Yorkshire and

Cresswell in Northumberland. Fish hullies tend to be found in the North-East and Yorkshire and appear to only have been used in areas where no deep water harbour was present.

Although some shellfish were caught and kept fresh in the same manner as the fish in the fish hullies, most of the oyster beds were used to cultivate and grow the shellfish rather than to just keep them fresh. This is the case for the oyster beds at Orfordness in Essex. These sites were located in the intertidal zone to ensure they had a fresh supply of sea water.

Cultivation of oysters seems to have begun in the Roman times, but it is known that prehistoric people made use of this resource and Roman contemporary authors mention that the Iron Age Britons ate shellfish. They appear to have remained popular, and they are even mentioned in Dickens' *Pickwick Papers*, where it is said "that poverty and oysters always seem to go together".

Further information:

Rapid Coastal Zone Assessment Survey of Yorkshire and Lincolnshire (Humber Field Archaeology & English Heritage, 2014) includes photos and an explanation of the function of hullies in Yorkshire (pp 85-86) (https://content.historicengland.org.uk/images-books/publications/rczas-yorks-lincs-phase3/rczas-yorks-lincs-3-vol8-overview.pdf)

Uncovering the Past: An Archaeological Study of Oyster Beds at Emsworth, Project Summary (Julie Satchell, Emsworth Maritime and Historical Trust, 2011) (www.conservancy.co.uk/assets/assets/Emwsorth%20Oyster%20Beds%20Archaeology%20Summary_Nov_2011%20_2_.pdf)

The Archaeology of the Suffolk Coast and Intertidal Zone: A report for the National Mapping Programme (Cain Hegarty and Sarah Newsome, English Heritage, 2005) https://content.historicengland.org.uk/images-books/publications/suffolk-coast-nmp/suffolk-coast-nmp-internal-report.pdf/

Lighthouses

Lighthouses have been used since at least Roman times. There is only one example of a Roman lighthouse in the UK, which is located within the Dover Castle grounds. It is one of only three in the world. Unfortunately later use of the lighthouse has removed parts of it and there is no evidence of any Roman structures associated with the lighthouse. Fires would have been lit on top of the lighthouse at night, and it may also have been used as a smoke beacon too. Some priories, like at Tynemouth would have a light burning in one of their turrets, however many of these "ecclesiastical lights" were lost during the Reformation.

The oldest complete lighthouse in the country is on the east coast at Flamborough Head, and is known as the Chalk Tower. It was built in 1669 but was allegedly never lit. The second Flamborough lighthouse was built in 1806. The first automated lighthouse was Souter Lighthouse, at South Shields. It was purpose built to house the first electric light within a lighthouse in 1871.

Every lighthouse light uses a different pattern of flashes. Alongside their primary purpose to protect shipping from dangerous rocks, this enables sailors to easily locate themselves whilst at sea.

The Corporation of Trinity House was established in 1514 to safeguard the coast. They were responsible for the erecting of lighthouses; nowadays they are still known for overseeing and maintaining them. Trinity House looks after over 60 lighthouses still in use in England, Wales, the Channel Islands and Gibraltar, many of which are listed buildings.

Souter Ligthhouse at South Shields, Tyne and Wear

Further information:

More information about the Roman Lighthouse in Dover is available on the Pastscape website (http://pastscape.org.uk/hob.aspx?hob_id=467772)

The Journal of Antiquities: Ancient Sites in Great Britain & Southern Ireland has a blog on the Roman Lighthouse https://thejournalofantiquities.com/2013/05/12/the-roman-lighthouse-dover-kent/

Britain's top landmark lighthouses are described on the Countryfile website (www.countryfile.com/countryside/britains-landmark-lighthouses)

The National Trust website includes a brief history of Souter lighthouse and the Leas (www.nationaltrust.org.uk/souter-lighthouse-and-the-leas/features/a-brief-history-of-souter-and-the-leas)

The BBC *Coast* TV programme visited the Eddystone Lighthouse, the world's first offshore lighthouse. You can see the clip on YouTube (www.youtube.com/watch?v=TZKowr6_F3I)

The National Museum of Scotland highlight their lighthouses collection on their website. The page includes photos of different objects in their collection, and includes a 'Lighthouse lives' film (www.nms.ac.uk/explore/stories/science-and-technology/lighthouses/)

Coastguard stations

The coastguard has a interesting past; the initial purpose of the coastguard was for revenue protection, not lifesaving as it is now. In the 19th century their role began to change, and by the 1920s lifesaving had become their primary role. The coastguard has always had, and still do have, close links with other lifesaving organisations such as the lifeboats and life brigades. At its peak during the early 20th century, there were over 500 coastguard stations; most now have been demolished or are privately owned. This is due to the advances in technology and organisation structure.

From the late 17th century there were numerous different government departments patrolling the coastal waters and shore of Britain. In 1821, the "Coast guard" was created as a new single force to replace the numerous government ones in existence. The main role of the coastguard, and the organisations before it, was to prevent smuggling but it was also responsible for shipwrecks and assisting ships in distress.

In order to assist with rescues, the coastguard used a method called “shore to sea” rescue. For this they used specific apparatus such as Manby’s mortars, which shot a line from shore to ship via a mortar to rescue passengers and crew on the distressed vessel. Later these were used in conjunction with a breeches buoy, which was like a pair of trousers suspended from a pulley used to pull people to shore.

Some coastguard stations were placed near lighthouses such as St Mary’s on the Isle of Scilly, others were by military installations like the one at the Needles on the Isle of Wight. Some on the south and east coasts were placed in reused Martello towers, 19th century defensive towers, like at Felixstowe. “Watch vessels” were also used; these were hulked vessels usually ex-naval ships, like the *HMS Kangeroo* which was on the Medway.

The Tynemouth Volunteer Life Brigade was established in 1864, after two boats the *Friendship* and the *Stanley* became stranded in the mouth of the Tyne on a November night, having tried to seek refuge there from a storm. Only one of the four lifeboats on the Tyne made it to the vessels, but that lifeboat got into difficulty and lost two of her own crew in the attempt. At the time, four coastguard crews were based at Tynemouth. They attempted a shore to ship rescue, using a rocket with a line attached and a breeches buoy. They were forced to use untrained members of the public to assist with the rescue. They managed to rescue three people before the line became tangled and they were forced to abandon the vessel until day break. It was decided later that volunteers from the public would be trained to assist the Coastguard in the use of the rocket and breeches buoy so that in future rescues more people could be saved. Had this been the case in 1864, many of 32 of the people who died on the two wrecks may have been saved. Out of this came the Tynemouth Volunteer Life Brigade, with others also formed at South Shields and Sunderland, though the one at Tynemouth is now the only one of its kind in the country.

Further information:

Coastguard Stations (Historic England, 2016)(https://content.historicengland.org.uk/images-books/publications/iha-coastguard-stations/heag130-coastguard-stations-iha.pdf/)

The National Maritime Museum has information sheets on Manby’s mortars and the breeches buoy (www.rmg.co.uk/sites/default/files/import/pages/files/shipwreck_objects22_manbysmortar.pdf) (www.rmg.co.uk/sites/default/files/import/pages/files/shipwreck_objects26_breechesbuoy.pdf)

Saving the crew of a wrecked ship using Captain Manby's mortar apparatus; firing the mortar: http://collections.rmg.co.uk/collections/objects/112989.html?_ga=1.184925289.1352971452.1481214031

The Tynemouth Volunteer Life Brigade website (www.tvlb.org)

Roman coastal defences

The Romans had at least two examples of defensive structures related to the coast: Roman signal stations and Saxon Shore forts.

Roman signal stations were built by the Roman army and used primarily as observation posts against Picts and seafaring Saxons. As a result, they are usually found on cliff tops and formed chains along the coast, using beacons to forewarn of invaders. The signal stations consist of rectangular towers of stone or wood situated within ditched, embanked, palisaded or walled enclosures. In Yorkshire they make up a comprehensive chain from north to south: Saltburn, Goldborough, Ravenscar, Scarborough and Filey. The Roman signal station at Filey Brigg was excavated in the early 1990s as part of a rescue excavation due to severe erosion. There are fewer than 50 examples of Roman signal stations in England and therefore all examples with surviving archaeological remains are considered nationally important.

Saxon Shore forts were situated on sea harbours or river estuaries, and they are thought to have been built to protect these sites from Saxon invaders and to safeguard the trade route between Britain and the continent. These types of forts are located on the southeast coast and East Anglia. There is some suggestion that many converted later into Roman signal stations. The Saxon Shore forts were abandoned when Rome withdrew from Britain, though some were reused by the Normans. The site at Walton Castle was destroyed by coastal erosion in the 18th century; cartographic evidence from the time survives showing how erosion is not a new problem.

Further information:

The Scheduled Ancient Monument list entry for the Roman signal station at Goldsborough in North Yorkshire is on the Historic England website and has further information of how Roman signal stations were used (https://historicengland.org.uk/listing/the-list/list-entry/1016537)

A reconstruction image of a 4th-century stone-built Roman signal station here in Scarborough Castle can be found on the English Heritage website (www.english-heritage.org.uk/visit/places/scarborough-castle/history/significance/)

The Journal of Antiquities: Ancient Sites in Great Britain & Southern Ireland has a blog on Ravenscar Roman signal station (https://thejournalofantiquities.com/2012/08/27/ravenscar-roman-signal-station-east-yorkshire/)

An engraving showing the remains of the Roman Saxon Shore fort known as “Walton Castle”, in Felixstowe, Suffolk. From: *The Antiquities of England and Wales* by Francis Grose. Dated 1766, after coastal erosion (https://en.wikipedia.org/wiki/Walton_Castle,_Suffolk#/media/File:Walton_Castle_-_Francis_Grose.jpg)

The Journal of Antiquities: Ancient Sites in Great Britain & Southern Ireland has a blog on Saxon Shore forts https://thejournalofantiquities.com/2015/08/15/the-saxon-shore-forts-of-south-east-england-and-east-anglia/

Pillboxes

Pillboxes are small concrete buildings which sprung up all over the country during both the First and Second World Wars. They appear both on the coasts and inland, and made up a suite of fortifications which were to defend against invasion. Although made out of concrete, many fixtures and fitting were wooden, such as the shutters for the embrasures (the sight holes).Over 18,000 pillboxes were created during the Second World War.

First World War pillbox, Bridlington, East Yorkshire

After the Second World War, farmers who had pillboxes on their land were given £5 to remove them; many took the money but removing the pillboxes was a lot of effort so many just left them where they were.

Different types of pillboxes were built, some housed pairs of machine guns like the eared pillboxes in Yorkshire, others held searchlights, anti-tank guns, or men armed with rifles.

Further information:

The BBC *Inside Out* website has some basic information about pillboxes (www.bbc.co.uk/insideout/southwest/series3/secondworldwar_pillboxes_defence.shtml)

“Anti-invasion and Coastal Defences” on the Historic England explains why anti-invasion defences were needed along the Yorkshire coast, and has links to good photos https://historicengland.org.uk/whats-new/first-world-war-home-front/what-we-already-know/land/anti-invasion-coastal-defences/

Anti-tank blocks

Anti-tanks blocks are blocks of concrete laid out across flat beaches where invasion forces might have landed. They formed part of a defensive landscape across beaches and the foreshore. There were also other defences like anti-tank walls, anti-tank ditches and anti-glider posts. Usually anti-tank blocks are cubes, but other types can be found including anti-tank coffins, anti-tank cylinders, and dragon's teeth which are shaped like a square-based pyramid.

Anti-tank blocks are large features, commonly 5m x 5m in width and height, and were immovable, fixed into the ground by a concrete base. In the event of an invasion, tanks would not have been able to move the blocks out of the way and, due to the long lengths of anti-tanks blocks laid out along the coast, they could not go around; this left the only option as going over the top. Although a tank could go over the top of these blocks, it meant exposing their weak underbody.

Many of the anti-tank defences were erected by the Home Guard, but sometimes they would be contracted out to local companies. There are two examples at Bridlington in Yorkshire of anti-tank blocks with contemporary 1940s graffiti. The graffiti reads "GD 1941" and "WEP", presumably these are the initials of the builders of the anti-tank blocks, scribed while the concrete was still wet.

Some of these types of blocks have been moved for secondary uses such as part of farmers' field boundaries, or as coastal defences to try to prevent erosion. In one or two places, they have been incorporated into art installations such as at Bamburgh where two have been painted as playing dice.

You can read more on anti-tank obstacles and different types on the Pillbox Study Group's website (www.pillbox-study-group.org.uk/other-wwii-defensive-structures/anti-tank-obstacles/)

The CITiZAN blog describes military defences at Bridlington including anti-tank blocks (www.citizan.org.uk/blog/2016/Mar/24/defending-our-isle-military-defenses-bridlington/)

The Defence of East Sussex website has a blog about creating a reconstruction of a "pimple" (a small version of a dragon's tooth) (wwww.pillbox.org.uk/blog/245141/)

Where can I find more ideas for sessions on intertidal or maritime archaeology?

Home Front Legacy (HFL)
www.homefrontlegacy.org.uk/wp/project/hfl-1914-18-young-people-resources/
The HFL has recources for young people surrounding recording Home Front archaeology from the First World War

Royal Museums Greenwich
www.rmg.co.uk/DISCOVER/TEACHER-RESOURCES
The National Maritime museum has lots of images and activities based around maritime heritage

Maritime Archaeology Trust
http://schools.maritimearchaeologytrust.org/resources
The Maritime Trust has resources on education or archaeology in maritime contexts

Wessex Archaeology
www.wessexarch.co.uk/heritage-learning/resources
Wessex Archaeology has some online activities and lesson plans about marine archaeology including activities on boats, seafaring and aircraft crash sites at sea

Society for American Archaeology (SAA)
www.saa.org/publicftp/PUBLIC/resources/SAAlessons.html
The SAA have a public archaeology webpage with a good activity called “How to become a Shipwreck Sleuth”

Nottingham University
http://kepn.nottingham.ac.uk/
The University of Nottingham’s Key to English Placenames project has mapped the origins of many placenames; it is a fun way to find out more about coastal placenames

Session 1:

Introduction to intertidal archaeology

Session 1 is designed to provide an introduction to intertidal and coastal archaeology and the types of features archaeologists are looking at in this environment: everything from wrecked vessels to submerged forests, from pillboxes to lime kilns. As well as an understanding of the archaeology that might be discovered, the session also provides a chance to practise using some of the techniques used by intertidal archaeologists, such as offset planning, in a safe and warm environment.

Learning outcomes:

In this session, your YAC members will:

1. Define intertidal and coastal archaeology
2. Identify intertidal and coastal archaeology features
3. Understand the hazards that are present in the intertidal zone
4. Learn about some of the techniques archaeologists use in the intertidal zone
5. Use some of the archaeological techniques themselves

1.1 Starter activities

Begin the session by discussing different types of archaeology: terrestrial, marine and intertidal. Ask the group what they think 'intertidal' means and where the intertidal zone is, as well as the sort of archaeology they may expect to find there. Ask your members why we are concerned with the archaeology in the intertidal zone and what threats might affect the preservation and condition of the archaeology there.

True or false game

This game helps leaders to assess how much the group already know about the coast and intertidal zone and is a good chance to get them to start thinking about what kinds of archaeology are present.

Learning outcomes: LO1, LO4
Time: 10 minutes
Resources: None

The idea of the game is to ask the group a set of questions which have two possible answers (e.g. true/false, Neolithic/Bronze Age, north/south). One side of your room or activity space is one answer (e.g. true, Neolithic, north) and the opposite side of the room is the other (false, Bronze Age, south). Your members move to the side of the room which they believe corresponds with the correct answer. Keep score and see who got the most answers correct.

Use the questions below or research your own questions using the factsheet. Example questions:

Q. The Ferriby Boats are prehistoric – are they Neolithic or Bronze Age?
A. Bronze Age

Q. True or false: going to the seaside for a holiday didn't become popular until the invention of the railway?
A. True

Q. True or false: the intertidal zone is a part of the beach above the water when the tide is high?
A. False

Mix and match game

This game introduces the range of archaeology that can be found in the intertidal zone and on the coast. It will also introduce different terminology used, which your members may be unfamiliar with.

Learning outcomes: LO2
Time: 10 minutes
Resources: Photos and names of features (Worksheet 1 and answer sheet)

The photos on the worksheet show a range of different types of archaeology (shipwreck, prehistoric trackway, ancient footprints) and the names of these. Your members must match the words with the photographs of the features. The game can be made more challenging by splitting them into teams and seeing who can do it fastest by timing them.

Hazard identifying

The intertidal zone can be a hazardous environment, and anyone thinking of going out to explore the archaeology there should take precautions to make sure they are safe. These hazards are both natural, such as tides, and man-made, such as unexploded ordnance. As well as understanding what might be a threat in the environment, the group will also learn what the appropriate responses are. This a fun way to risk assess activities in the intertidal and coastal zone.

Learning outcomes: LO3
Time: 15 minutes
Resources: Pencil and paper and/or Worksheet 2 (cut out before using them)

Split your members into pairs and challenge them to come up with three things that might be considered a hazard in the intertidal zone (e.g. tides, quicksand, pirates). Give them five minutes and then get your members to read out some of their ideas. Discuss as a group why each thing might be a hazard. Using Worksheet 2, get your members to match the hazards with the appropriate response.

1.2 Main activities

An intertidal archaeologist's backpack

Intertidal archaeology is a specialism within archaeology, like osteology or geophysics, and therefore they have special equipment we take into the intertidal zone to help us rapidly record sites.

Learning outcomes: LO4
Time: 20 minutes
Resources: Worksheets 3a, 3b, 3c and answer sheet, scissors and glue

This is a short activity that challenges your members to decide what an intertidal archaeologist needs to have in their kit bag. Challenge your members to go through the pictures on the worksheets to decide which items intertidal archaeologists might need. When they have decided, get them to cut out their choices and stick them on the backpack. The answer sheets list what archaeologists would need and why.

Feature timeline

Sometimes the concept of time depth is difficult to demonstrate. Through this activity you can demonstrate how long people have been using the coast and what they have been using it for.

You can also discuss with your members how archaeology is different in the intertidal zone than on terrestrial sites. On terrestrial sites, time is usually represented through layers by stratigraphy. On the foreshore, there are no layers, therefore sites of different time periods can be present at the same height – for instance, a prehistoric submerged forest and a 20th century fishtrap. This activity will help the group better understand what archaeology in the intertidal zone may look like.

Learning outcomes: LO2
Time: 20 minutes
Resources: Timeline, Worksheet 4 and answer sheet

Run out a tape measure or a piece of string to act as your timeline and decide how long on your tape measure or string represents how long in history. If you have enough space, 1cm to 100 years works well (but you'll need a space at least 120m long!) Add labels to your timeline with the different time periods. Give your members each a feature and get them to try decide where they belong on the timeline. Can they explain why they think this?

Periods to use: Neolithic, Bronze Age, Iron Age, Roman, Viking/Saxon, medieval, post-medieval, First World War, Second World War, modern.

Foreshore finds

The foreshore is the largest archaeological site in the country and unlike on terrestrial sites, many of the archaeological finds here can span thousands of years. Finds such as Roman roof tiles, prehistoric worked flint and pottery from prehistory up until the 20th century can all be discovered on the foreshore. This activity helps your members to familiarise themselves with different objects that can be found on the foreshore, including looking at different materials and uses of these artefacts.

Learning outcomes:	LO2, LO4, LO5
Time:	20 minutes
Resources:	A box of finds (terrestrial finds can be used if no foreshore finds are available; these should include: oyster shells, glass and plastic bottles, animal bones, clay pipes, pottery of various periods, worked flint, CBM and roof tiles, plastic bags and packaging, metal finds and slag).

Get your members to sort through the finds and separate them into groups of materials (e.g. bone, metal, stone). Sheets of paper with the materials written on may help to guide younger members. Once all the finds are in the right category, examine the finds and see what you can tell from them and theorise about how they ended up in the sea.

Remind the participants that anything removed from the beach belongs to the landowner, anything considered treasure must be reported appropriately, and any remains of vessels must be reported to the Receiver of Wrecks.

Note: Make sure everyone washes their hands after this activity, especially before eating or drinking.

Portable foreshore

The portable foreshore is a safe way to bring the beach to your members, and is especially useful if your group is based far from the coast. This requires imagination to set up a pretend foreshore, with different types of archaeological features present e.g. submerged forest, anchors. This activity reinforces the types of archaeology we find on the foreshore. It also teaches the practical skill of scale drawing, an archaeological technique which is used on a majority of archaeological sites. On most sites excavation is only 50% of the work, the other half is producing a record for the site through photographs, context recording forms and scale drawings.

Learning outcomes:	LO4, LO5
Time:	At least 30-45 minutes
Resources:	Tarpaulin, 'archaeological' features, long 30m tapes, 5m tape measures, sticky tack, pencils, rubbers, drawing boards/clipboards, permatrace/ graph paper/tracing paper, Worksheet 5

This activity takes a bit of setting up and needs some space. The aim of this activity is to create a portable foreshore, using your imagination. Alternatively, you could ask your members to lay out the features on the foreshore at the start of the session. Your members have to imagine that before them is a foreshore with archaeology on it, and that they are archaeologists who must record it before the tide comes in and covers it over.

To set up, lay out the tarpaulin to cover the floor, this means the flooring doesn't get scratched or dirty and defines the extent of the foreshore. Layout the features: round offcuts of trees work well as a submerged forest, chains can act as anchor chains, and a triangular garden trestle might serve as a fishtrap.

To begin with, get your members to guess what features and finds are present on the foreshore, this helps them kickstart their imaginations and reinforces the types of features present on the foreshore from previous acitivities.

To set up for the survey, get your members to set up the long 30m tape along one side of the 'foreshore', with zero at the left end, and secure it to the floor with sticky tack. This is the survey baseline.

They will record the site off this baseline the same way an intertidal archaeologist would, by offset planning at a scale of 1:20 (for those unfamiliar with this, Worksheet 5 may help (Archaeology 101)). A plan is like a bird's-eye view of the site.

Spilt the participants into groups of two for older children and three for younger ones, ideally there should also be a leader with the younger ones. Give them a drawing board or clipboard, pencil, rubber, hand tape, and permatrace. If you do not have access to permatrace then graph paper, or tracing paper laid over a piece of graph paper will also work.

Archaeologists often draw site plans at a scale of 1:20. This means every 20cm in real life is represented by 1cm in their scale plan drawing. The grid on graph paper helps to keep your drawings accurate; at a scale of 1:20, every small square on the paper represents 2cm, every 10 of the smallest squares is 20cm and 5 sets of the 20cm squares is 1m. This is how the plan should be drawn.

Look at the feature you are drawing and decide which points make up the basic parts of its shape. For example, if you are surveying something rectangular you would use each corner. For a circular object you would use the centre and the outermost edge either side of it. As most features are irregular you will have to choose your points carefully - more points is better than fewer: too few and you won't accurately represent its shape on the drawing.

Choose your first point to survey. Measure along the baseline until you can use a hand tape to reach the point by measuring away from the baseline at a right angle. This is the 'offset'. Record the baseline and offset measurements on a seperate piece of paper or in a notebook. This will make it easier to remember when you draw the points on the paper. As you get more confident you can go straight to the drawing without writing down the measurement first.

Points are put on the drawing as if you were plotting data on a graph. Use the baseline measurement along the bottom line (or X axis) and then measure the offset measurement up (on the Y axis). Remember to work at the right scale. Mark your point and measure the next one. Once you have measured and drawn all your points you complete the survey by joining up the points, like a dot to dot picture. Don't just use straight lines, unless your feature is straight sided! Look at the feature and use the points to guide your hand as you draw the shape. It will be obvious very quickly if you haven't got enough points as the shape will be hard to draw correctly.

1.3. Closing activity

Archaeo-Pictionary

This a fun way to see how much your members have remembered from the session.

Learning outcomes: LO2
Time: 20 minutes
Resources: Photographs of archaeology, flipchart, felt tips

This game is like Pictionary but with archaeological features, to reinforce the sites that have been looked at during the session. Have photos and names of some of the features we've looked at (e.g. anchor, sea henge, wrecked vessel, harbour) and place in a bag or hat, folded in half so that no one can see what is pulled out. Get your members to pick one at a time and then get them to draw it on the flipchart. The others must guess what it is. The member who guesses right gets to pick the next feature or site to draw. Go round the group until all the members have drawn a feature.

Session 2

Waterlogged contexts

Whilst waterlogged contexts are occasionally found on terrestrial sites such as at Star Carr and Must Farm, they are most commonly found on coastal or riverine sites. Waterlogged sites are useful because they can preserve organic materials, such as wood and textiles, and environmental evidence, such as pollen samples and diatoms (types of marine algae), for analysis. Due to the unique conditions in the intertidal zone, fascinating archaeology exists, which does not survive elsewhere. Session 2 explores the prehistoric sites and finds which have been discovered in the rivers and on the coasts around the UK.

Learning outcomes:

In this session, your YAC members will:

1. Examine what evidence of prehistoric people archaeologists can find on the coast
2. Interpret how people in prehistory thought of and used waterlogged contexts
3. Reproduce some of the sites and objects found in on the coasts and in rivers

2.1 Starter activities

Timeline of prehistoric features and finds

This starter game helps to introduce the types of prehistoric sites and finds which may be present on the coast. Your members will better understand the concept of time and recognise that prehistory encompasses a long period of time in the past.

Learning outcomes:	LO1
Time:	20 minutes
Resources:	Timeline, Worksheet 6, Answer sheet

Run out a tape measure or a piece of string to act as your timeline and decide how long on your tape measure or string represents how long in history. If you have enough space, 1cm to 100 years works well (but you'll need a space at least 120m long!) Add labels to your timeline with the different time periods, with dates associated. Give your members a prehistoric feature or find each and get them to try to decide where they belong on the timeline. Discuss as a group where they have placed their features and finds. Are they right?

Periods to use: Mesolithic, Neolithic, Bronze Age, Iron Age, and unknown, with relevant dates.

Prehistory and the beach

In prehistory, many populations utilised the foreshore and coast in many ways for different reasons; food and transport primarily. Using the images, your members can start to understand what prehistoric people may have used the coastal regions for, and what types of technology they had at their disposal.

Learning outcomes:	LO1, LO2
Time:	10 mins
Resources:	Images of items and activities of foreshore activities (some prehistoric some not), Worksheet 7

Split your members into small teams of 3 or 4 and give them a set of images relating to items or activities from the foreshore. Get them to work together to split them up into prehistoric and not prehistoric. Encourage them to explain their thoughts and reasoning behind their decisions.

2.2 Main activities

Make and record Formby footprints

Prehistoric footprints in the UK are unique to the coast and are a rare find. However a number have been found by non-archaeologists, such as the Formby Footprints. This activity helps your members to better understand techniques archaeologists might use to record sets of footprints, through scale drawing using grids.

Learning outcomes:	LO1, LO2, LO3
Time:	40 minutes
Resources:	A length of blank wallpaper, non-toxic paint (make sure it is safe for putting on skin) or felt tips, a planning grid (not essential), permatrace or graph paper, pencil, tape measure

This is activity is to imitate the Formby footprints. To begin, show the group images of the different footprints which can be found in submerged landscapes across the country on the coast in places like Formby, Happisburgh and Gower. The aim of the task is to create some of the groups own ‘ancient’ footprints.

Using the sheet of wallpaper as a pretend foreshore, get your members to leave a trail of footprints, this can be done with non-toxic and skin-friendly paint or by drawing around feet.

If you are using paint, make sure you are in a suitable area; tarpaulins to cover the floors and buckets of clean water and towels at either end of the paper to clean feet. Alternatively, draw around feet whilst keeping shoes/socks on. If making paint footprints, try to create different trails using different methods of travelling, like hopping on one foot or sidestepping.

After the footprints have been created they may need time to dry, so the second part can be done later in the session. This part involves recording the footprints in the way an archaeologist would if they came across them on site. If you have access to planning frames then this would work well here, if not a grid could have been drawn on the paper before adding footprints.

The aim is to draw the footprints in the grid accurately onto your graph paper or permatrace. You could choose to plot them using the offset planning method described in **Session 1**. You may need to work to scale.

Discussion point: archaeologists might decide to take photographs of the footprints and then create the plan drawing offsite. Why might archaeologists choose to do this? What would they need to ensure appears on the photographs? You can easily create your own scale bars using garden canes painted with red and white paint!

Salt-dough peat footprints

This activity will mimic how prehistoric footprints are created; a process where the silt or mud is soft and the footprints left by animals or people are then baked hard by sun and covered over by further layers of silt, mud and sand. The salt-dough will simulate this soft silt and then the hardening. Human footprints are much rarer than animals; auroch and deer footprints are much more common, but where these are present there is always potential for human footprints too, as both animals were a food source for people.

Learning outcomes:	LO1, LO2, LO3
Time:	30 minutes
Resources:	Salt-dough (1 cup of flour, ½ cup of salt, ½ of luke warm water and either brown food colouring or brown acrylic paint), rolling pin, tools for shapes, baking parchment for cooking or transporting home

Begin by examining different type of footprints that animals left in peat (Formby has some good examples); such as crane, wolf, deer, and auroch. Can your members figure out which animals made them?

Make the salt-dough; this can be done before the session or during the session if you want the activity to last longer. Knead the ingredients together. Either add the food colouring during the mixing process or add the acrylic paint after, to make the salt-dough brown. Roll out the dough. Try and recreate some of the footprints examined at the beginning of the activity, by using different tools or implements to create the shapes needed. Your members might like to make impressions of their own feet too!

These can be cooked to harden in an oven on a low heat for 3-4 hours, making sure that they are flipped and not overcooked. If you use a microwave, then they only need about 3 minutes to cook, however do this in 10 second intervals to avoid overcooking; depending on thickness and water content some may take longer. The other alternative is to air dry which can take up to a week.

To illustrate how the footprints are revealed to archaeologists, cover your salt dough footprints with layers of sand then 'wash' them with water to mimic the tide.

Creating votive finds (torc, coin hoard, Battersea shield)

There have been many votive finds discovered in rivers and bogs across the UK. Most notable of these are items like the Battersea Shield and the Waterloo Helmet, both of which were deposited in the River Thames and are Iron Age in date. Images of torcs, coin hoards and the Battersea shield are all available on the internet to provide inspiration for this activity.

Discussion point: why do your members think these objects were deposited in these places?

Learning outcomes:	LO2, LO3
Time:	Various (Torc 10 minutes; coin hoard 10 minutes; Battersea shield 30 minutes)
Resources:	1. Torc: two yellow and two gold pipe cleaners 2. Coin Hoard: Several pennies and tin foil 3. Battersea Shield: Large square of cardboard, string, red and gold or bronze metallic paint and glue

1. Torc:
To make a torc, take two yellow pipe cleaners and join them together to create one long length. Do the same for the gold pipe cleaners. Twist the two pipe cleaners together. At one end create a loop. At the other end, wrap the ends together to create a small ball. Bend the twisted pipe cleaners to create an almost complete circle.

2. Coin hoard:
To make a coin hoard, take a coin and place a piece of tin foil on top. Rub the tin foil until the image of the coin appears. Move the coin and repeat until the tin foil is covered in coin rubbings. This will create a 'sheet' of coins to represent your hoard. Alternatively you could carefull cut out each coin rubbing and make individual coins.

3. Battersea shield:
Take a large rectangle of cardboard, round the corners so it is sub-rectangular. Using string, recreate the Celtic patterns depicted on the Battersea Shield. You might find it easiest to draw the pattern onto the cardboard first, then follow your pencil line as a guide with the string. Secure the string pattern with glue or sticky tape. Paint the shield adding red and bronze colouring where needed. Once dry, add a strap to the back.

Star Carr headdress

Star Carr is a remarkable site with preservation of a number of different rare and unique finds. The preservation of the finds was so good due to waterlogged conditions. Although Star Carr is an inland site, the conditions are very similar to those which you find on the coast. Organic materials such as bones, teeth and shells survive better in waterlogged conditions, as well as wood. In the original excavations at Star Carr (in 1949-51), 21 antler headdress were recovered, made of male deer skulls with the antlers still attached. Well-preserved examples of mammoth tusks and rhinoceros teeth, as well as deer antlers, have all been found on the coast and survive because of waterlogging.

Learning outcomes:	LO2, LO3
Time:	30 mins
Resources:	Plain fancy dress masks (ones which cover the eyes only would be best), large twigs or pipe cleaners, felt-tips or paint.

Discussion point: what do your members think the Star Carr headdress may have been used for? Some suggestions include rituals or to bring luck whilst hunting.

Painted or colour the mask to match the colour as the Star Carr headdress. Create some antlers, either using twigs or brown pipe cleaners. Attach these to the mask, either using sellotape or by making holes in the mask and threading the pipe cleaners or twigs through it and fixing them.

Bog butter

Bog butter is a waxy substance that is found in peat bogs and is prehistoric in date, with over half of the known examples coming from Ireland and Scotland.

Bog butter has been found in different types of preserved vessels in peat bogs such as wooden containers, earthenware pots and animal skins. There are many theories about what bog butter is; the most common is that the process of placing it within a peat bog was part of an old method of making and preserving butter. Many of the examples have been tested: most are dairy products (hence the name bog butter), but some examples are tallow or animal fat. In Morocco, there are still cases of butter being preserved underground, whilst in Iceland and the Faroe Islands people still bury tallow.

Learning Outcomes:	LO2, LO3
Time:	40 mins
Resources:	Cream, jam jar with a lid, sieve, container, box filled with shredded brown paper, salt and sliced bread.

To make the bog butter, pour double cream into a jam jar until it is half full. Screw the lid on tightly. Then shake the jar. Keep shaking! Eventually the cream should separate until there is butter and buttermilk. Once it has fully separated, pour out the contents into a sieve, so the buttermilk drains out into a container. (This video shows the process www.youtube.com/watch?v=Wt_RG42N3GM)

Once the butter in made, a ceremonious fake burial of butter can be undertaken, using a box with shredded brown paper. Alternatively, after all that shaking, your members may be hungry so add a small amount of salt to the butter and spread it on some sliced bread to test it!

2.3 Closing Activities

Reconstruction drawings

Reconstruction drawings of sites and objects help archaeologists, as well as members of the public, better understand what the archaeological features and evidence is showing. They help to demonstrate what landscapes looked like, what activities and crafts people did, and what artefacts may have been used for.

Learning outcomes: LO1, LO2
Time: 15 mins
Resources: Paper and pencils

Encourage your members to create a reconstruction drawing of one of the sites or finds which they have looked at. For instance, can they imagine what a submerged forest may have looked like before it was submerged? What species of trees and plants might have been there and what animals existed? Or for the Ferriby boats; what cargo might they have carried across the river and how might the River Humber have looked different in the Bronze Age?

Examples of some reconstruction drawing may be helpful (e.g. the Sweet Track). John Hodgson is a freelance archaeologist who specialises in reconstruction art and has examples of different sites and objects on his website (www.johnhodgson.uk.com/index.html)

Today's votive offerings

Votive finds from the past were deposited in watery contexts due to the fact that they had some symbolism and importance attached to them. This activity encourages your members to assess what today's society values. What objects might be modern-day equivalents of votive offerings made during prehistory?

Learning outcomes: LO2, LO3
Time: 20 mins
Resources: Paper, magazines or photographs, glue, scissors, colouring pencils

Ask your members to think about the kinds of items which are found in waterlogged conditions and how and why they may have ended up there. Next consider what nowadays might be considered as a votive offering to the water gods. What objects mean the most to them?

You could use images from magazines or photographs of objects which might be used as a votive offerings today. Create a watery context (e.g. a sea, river, or lake) on a sheet of paper with colouring pencils. Use this as the background for a collage of the items they would offer to the water gods.

Offering of votive finds

This activity can be done at the very end of the session as a closing activity. This is your members' chance to re-enact a deposition of the types of finds which prehistoric people made as votive offerings. You could use pictures or even some of the objects that your members created (e.g. a pipe-cleaner torc or tin foil coin hoard).

Learning Outcomes: LO2, LO3
Time: 15 minutes
Resources: A cardboard box, blue and white tissue paper, votive offerings

Having made replicas of votive offerings it is time to offer them to the water gods. In a mock ceremony, using a cardboard box filled with blue and white tissue paper to act as water, deposit the gifts to the water.

Discussion points: many of the votive offerings found had been deliberately broken. Why do your members think this was done? What do your members think might have happened during a ceremony to deposit gifts to the water? Do your members think that there might have been music, dance and other performances? You might like to make your offerings to the gods at a performed ceremony that your members' parents witness!

Session 3:

Coastal industry

The coast has long been used for many different forms of industry; with many coastal populations using the resource of the sea for fishing and salt making amongst other industries. Access to the sea also provides a means to transport local goods to other parts of the UK and overseas. Many of the industries undertaken by coastal communities suffered as a result of the railway, which provided inland industries with a quicker form of transportation. Despite this, much evidence of industry along the coastline can still be seen, with structures such as lime kilns and alum works in the coastal zone and saltworks and fishtraps in the intertidal zone. Session 3 will look at the industries which have been associated with the coast throughout history.

Learning outcomes:

In this session, your YAC members will:

1. Identify different types of industry located on the coast
2. Experiment with some of these industries to produce a product e.g. salt making
3. Examine the infrastructure and archaeological features related to industry along the coast

3.1 Starter activities

Flappy fish game

This game is quick and fun start to the session.

Learning outcomes:	LO1
Time:	10 mins
Resources:	A piece of paper cut out in a fish shape (Worksheet 8), a flapper (made of an old newspaper/magazine, a board or tray)

Split the group in to teams of 4 or 5 and use this activity as a race. The idea is to waft the fish from one end of the room to the other in a relay; the first team back wins. It can be a difficult method to get right, so a practice run may be helpful, especially for younger members.

Float an egg

In the past, salt makers would test the strength of their salt brine by floating an egg. If the egg floated on the top, the solution was strong enough for the next stage in the salt-making process.

Learning outcomes: LO2
Time: 10 mins
Resources: One egg, a glass of water, 6 tablespoons of salt, spoon

Place the egg in the water; the egg should sink to the bottom of the glass. Remove the egg, and add one tablespoon of the salt, stir until all of the salt is dissolved. Place the egg back into the glass. Does it now float? Keep adding salt one tablespoon at a time until the egg floats. How much salt did you need to add to make the solution salty enough for the egg to float?

Bridge pros and cons

Some early evidence of bridges still exists, including a few standing Roman and medieval examples. Where bridges were not constructed or were inappropriate, fords or ferries had to be used to cross rivers and estuaries. From the Roman period onwards, bridges have been made of several different materials and some towns and cities have a long history of bridges.

Learning outcomes: LO3
Time: 10 mins
Resources: Worksheet 9 and pencils

Using the pictures on the worksheet, get your members to either work individually or in pairs to decide on the pros and cons of each bridge. Discuss these pros and cons as a group. Do you all agree? What material(s) would your members use if they were going to build a bridge?

You could create a timeline of bridges (using well-known examples; ones from Newcastle or London would work well). Once your timeline is complete, discuss the different construction methods and how each bridge surpassed the previous one in terms of its design.

3.2 Main activities

Alum crystal making

Alum was used in everyday industries such as tanning and clothes dyeing. During the Tudor period, the alum industry became essential; after the break with the Roman Catholic Church under the reign of Henry VIII, Britain lost its alum trade with Rome and were forced to produce their own.

Alum crystals were the finished product from alum works. This activity is a simplified version of making alum to demonstrate that it was a long and labour-intensive industry.

Learning outcomes: LO1, LO2
Time: 20 minutes (with an additional 12-24 hours to crystallise)
Resources: Alum powder (this can be bought on Amazon), jam jar with a lid, pipe cleaners, food colouring, boiling water, sewing thread, cardboard

Put 90g of alum power in a jam jar and add 200ml of boiling water. Stir until the alum powder has all dissolved. Add food colouring of your choice and stir again until the water has changed colour. Roll up the pipe cleaner into a tight flat spiral, and tie a length of thread to it. Fix the thread to the inside of the lid. Put the lid on the jar so that the flat pipe cleaner spiral is submerged in the solution. Leave for 12 hours; your members can take their jars home to observe the alum crystal forming. Encourage your members to bring their crystals back at the next meeting!

After 12 hours, the alum crystal should have formed on the pipe cleaner. To make a bigger crystal, reheat the solution and add another 30g of alum powder and stir. After the crystallised pipe cleaner has cooled entirely, re-submerge it in the reheated solution for another 12 hours.

There is a video on YouTube of making alum crystals (www.youtube.com/watch?v=-DUDhkw3AF4)

Making salt

Salt making has been around since prehistory and it was a very important industry in the past; it was used not just for preserving food but was also used in tanning and for glazing pottery. The process of extracting salt was time consuming and labour intensive but, as it was crucial for preserving food, it was worth it.

Learning outcomes: LO1, LO2
Time: Various (based on 1 tbsp of dissolved salt; 30 mins with a hot air hairdryer, 60-90 mins on a hot radiator, 8+ hours in the sun on a window sill on a sunny day)
Resources: 1 tbsp of salt, a bowl of water, spoon, food colouring (optional), an evaporation dish, hair dryer (optional)

This method will produce salt from salt water using evaporation, to simulate the process saltworks used in the past to get salt from seawater. The times above are rough estimates of the amount of time it will take to produce salt from evaporation if 1 tbsp of salt is dissolved in water; adjust the timings for the amount of salt used.

Put the salt into water and stir until dissolved. Place the solution in a shallow dish; evaporation will occur faster on a shallow dish with a larger surface area such as a saucer or a dish with a slight concave. Dark coloured dishes will also show the salt crystals better than a light dish once evaporation has occurred; you can add food colouring after the salt is dissolved to show the crystals better. The slower the evaporation, the bigger the salt crystals will be.

Place your dish of brine on a radiator or sunny window sill and wait for the process of evaporation to take place! You can speed up the process by using a hair dryer. Turn it to the hot setting and direct the airflow across the solution. Do not direct the hot air into the solution as this will cause splashes and mess!

Lime kilns role play

Remains of lime kilns are the primary archaeological evidence for the extensive coastal lime industry.

Learning outcomes: LO2, LO3
Time: 15 mins
Resources: Worksheet 10

Use the information on the worksheet on to role play how a lime kiln works. You may like to show your members pictures of what different lime kilns look like and a diagram showing how they work.

The Geolancashire website has a useful downloadable PDF about how lime kilns worked, including some good diagrams (http://geolancashire.org.uk/wp-content/uploads/2015/07/Lime_kilns.pdf)

Build a spaghetti bridge

This is an activity that some university lectures get civil and structural engineering students to undertake! The idea is to create models of different types of bridges and test which break or buckle under the weight of a bag of flour. It will help your members to visualise the problems and solutions that engineers today and in the past faced when building a bridge.

Learning outcomes: LO3
Time: 45 mins
Resources: A bag of dry spaghetti (one per team), a small bag of flour, two boxes of the same height for each team (approximately 10-25cm high such as teabag boxes) and a range of items for construction: elastic bands, a ball of string, paper clips, sellotape, plastic cups, lollipop sticks, sticky tack.

The idea of this activity is to get your members to work together in teams to create a bridge made out of spaghetti which is strong enough to hold a small bag of flour without collapsing.

Give each team a bag of spaghetti, a range of materials to connect it with, and act as footing in the water, like sellotape and plastic cups, as well as a stable surface and two boxes to act as the shore at either end. The spaghetti can rest on or be connected by other materials to both of these boxes, but the gap between the two boxes must be longer than one strand of spaghetti. The teams can use whatever construction method and bridge typology that they wish using the materials provided and can be as simple or as complex as they want. You might like to provide pictures of bridges as inspiration. Can any of your teams create a bridge strong enough to hold the bag of flour without collapsing?!

Seaside stratigraphy

Although intertidal and coastal archaeologists usually explore the archaeology on the foreshore, sometimes they work on old land layers in cliff faces. Being able to see layers in the cliff face can help with identifying archaeology at risk of erosion. This could include sites which used to be terrestrial but which are not protected by coastal defences, such as on the East Yorkshire coast, where the remains of deserted medieval villages, burial mounds and Iron Age promontory forts can be seen in the elevation of cliff faces. Coastal archaeologists record these cliff faces to get a record of the archaeology before it entirely erodes away. On some island sites, such as Sumatra, test pits show layers of sand in the stratigraphy. The sand is suggestive of prehistoric tsunamis, so cliff face stratigraphy can help to understand dramatic land changes in the past.

Learning Outcomes:	LO3
Time:	30 mins
Resources:	Clear plastic cup, different coloured sands/different consistencies of sands and pebbles, Worksheet 11

Give each of your members a clear plastic cup and get them to build up different layers, either using different coloured sand or with sand and pebbles (see the examples on the worksheet). Once this is done, follow the instructions on the worksheet to complete the activity. This mimics an exercise that archaeologists do on site, looking at stratigraphy. It enables archaeologists to better understand a site's chronology by designing matrices (a bit like flow diagrams) based around the order in which layers have built up. Proformas are completed with specific information on each different layer to identify and describe it, e.g. pebble layer.

Make a fishtrap

Fishing is a key part of life in many coastal towns and has been since prehistoric times. Unlike nowadays where most fishing take places out at sea in deep water, coastal fishing was more common in the past and evidence of this still remains in some places.

Fishtraps consist of timber stakes in a "V" shape with wattle fencing in between and a basket at the point of the "V", in the middle. They work with the tides: when the tide comes in, it brings in the fish, which are guided by the wattlework fences into a basket at the point of the "V". The fish cannot escape or swim backwards so are caught. At low tide, the fishermen go out and collect the fish.

Learning outcomes:	LO2, LO3
Time:	30 mins
Resources:	Cardboard or a flat block of wood, plasticine, straight twigs of a similar length, brown pipe cleaners or long bendy twigs and twine.

To help your members plan how to go about making their fishtrap, show some photos of wooden examples found, with aspects of the wattlework and wooden stakes to model their own creations on.

Roll the plasticine into two long sausage shapes and press them onto the cardboard or wood in a "V" shape. This will make the foundation of your fishtrap. Insert the straight twigs vertically into the plasticine "V" shape, with an equal amount of space between them. There must be an odd number of vertical sticks in order for your wattle weaving to work. Additional plasticine may be needed to fix the vertical sticks in place.

Next, decide what kind of wattleworking to use; pipe cleaners may be best for younger members as they are easier to bend and manipulate, but older members may want the challenge of using supple twigs which they have to fix with twine or string. Wind the twigs or pipe cleaners in and out of the vertical stakes, over and under, leaving as few gaps as possible to create the wattle "V" which will guide the fish into the trap.

You could make a Mesolithic fish basket to add into the point of the "V" of your fishtrap using the activity on the YAC website (www.yac-uk.org/userfiles/file/1429016591_Mesolithic-fish-trap.pdf)\

You could try creating a larger-scale fishtrap outside, by inserting the vertical stakes into the ground, and then weaving in between them using longer lengths of supple willow.

3.3 Closing activity

Coastal industry poster

Many families in the coastal villages did the same occupation and generally sons would apprentice with their fathers and take over when they retired. In some industries, wives and daughters helped too; such as with fishing, where the men would catch herring and the women would gut, salt and place the herring in barrels. This can be seen in census data where occupations had to be recorded.

Learning outcomes: LO1, LO3
Time: 15 mins
Resources: Paper and colouring pencils

Finish off your session by making a poster about one of the industries that your members have learnt about; for example, fishing, salt making, lime or the alum industry.

Your members might like to work together in groups to research and present a poster each; some could do reconstruction drawings and others could write descriptions of the archaeological evidence for the different industries.

Session 4:

The seaside

The popularity of seaside holidays grew slowly from the 18th century onwards, but in the Victorian period the seaside holiday took off, helped by the railway. Many of the small industrial villages and towns along the coast benefitted immensely from widespread large-scale expansion of railways which helped to facilitate these types of holidays. New infrastructure was built to service the seaside holiday, such as piers, fairgrounds and dance halls, and structures such as beach huts and bathing houses.

During both the First and Second World War, new structures appeared at the seaside due to the threat of invasion. Structures such as pillboxes, anti-tank walls and blocks were installed, as well as coastal batteries. Piers were taken over by the Royal Navy. Despite this, seaside towns still hosted some holidaymakers during the Wars, particularly on the west coast, but not nearly as many as previously or in the interwar period.

From the 1960s onwards, the popularity of the seaside holiday started to decline, with cheap package holidays to Europe replacing them. However, more recently, weekend trips to the seaside have experienced a small revival. Session 4 will look at the types of recreation which have been associated with the coast throughout history, as well as exploring some of the defensive structures found at the seaside.

Learning outcomes:

In this session, your YAC members will:

1. Examine what seaside holidays were and what activities people did in the past at the seaside
2. Examine what infrastructure is related to the more recent past and the coast, for both wartime and leisure
3. Reconstruct aspects of seaside infrastructure and seaside holidays in the past
4. Discover what kinds of souvenirs were brought back from the seaside

4.1 Starter activities

Seaside photos

Seaside holidays were the first mass holidays open to all parts of society, particularly the working classes of the UK. Sometimes visitors would only come for a day, but to make the most of their time at the seaside, there were lots of activities to keep them entertained: paddling in the sea, building sandcastles, riding donkeys, and walking along the pier.

Learning outcomes: LO1, LO2
Time: 10 mins
Resources: A range of old photographs or pictures depicting activities at the seaside e.g. paddling, building a sandcastle, Punch and Judy. Historic England have some on their website which can be used

Using the pictures and photos on Historic England website (https://historicengland.org.uk/services-skills/education/images-by-theme/seaside), or some of your own choice if you have them, examine what people used to do at the seaside. What do your members do at the seaside if they visit themselves? Do your members' seaside activities match traditional seaside pastimes?

A-pier or Disa-pier-ed?!

Piers are a common sight at seaside resorts, but many are disappearing through neglect, fires and storms. Piers are a traditionally British phenomenon, and are uncommon in other places around the world. Many piers were established during the Victorian period as an essential part of seaside infrastructure for holidaymakers. No trip to the seaside was complete without a stroll along a pier!

Learning outcomes: LO2
Time: 10 mins
Resources: A list of piers (Worksheet 12)

This is a simple game which is played in a similar way to the "True or false" game from **Session 1**. Nominate one side of your activity space for "A-pier" and the other side for "Disa-pier-ed". Say the names of piers, both still existing and destroyed, and get your members to guess if they are still in existence or not. Once they've decided, they should move to the side of the activity space that corresponds with their answer, either "A-pier" or "Disa-pier-ed". Get your members to keep a score of how many they get right in their heads. Once the right answer has been revealed, you can provide a brief background on the pier e.g. When it was built? When and how it was destroyed?

Go to the National Pier Society's website for more info on existing and destroyed piers (www.piers.org.uk/)

4.2 Main activities

Make a First World War pillbox

In some places along the coast, especially the east and south coasts, remains of pillboxes and anti-tank defences are still visible, though many are now at risk of disappearing because of coastal erosion. In the First World War, as in the Second World War, they defended the beaches as there was a serious risk of invasion as well as attack, such as the naval bombardment of Scarborough, Whitby and Hartlepool in 1914. Pillboxes during the First World War were mostly of a square design, with small embrasures (sight holes).

Learning outcomes: LO2, LO3
Time: 30 mins
Resources: Worksheets 13 and 14, scissors, cardboard and glue.

Work through Worksheet 13 and either discuss or label the different types of defences present on the map.

To make your own First World War pillbox, cut out the square pillbox template from Worksheet 14; it may be useful to stick it onto some cardboard to give it more rigidity. Colour it in, then fold on the dotted lines to create the 3D pillbox shape. Fix it together with sellotape on the join so it stands up.

Battleships

During the First World War, as well as fighting overseas on the continent, there was a battle to control the sea. There were naval attacks on the east coast in 1914 and the infamous U-Boats were making the seas treacherous for merchant ships carrying much needed supplies. But wars have been fought at sea for much longer than this, with well-known battles such as the battle of Trafalgar in 1805 and the Battle of Solent in 1545.

Learning outcomes: LO2
Time: 15 mins
Resources: Worksheet 15, felt tips.

Split your members into pairs or small groups to compete against one another and give them a worksheet each so that they can play a game of Battleships. Who can sink the ships of their opponent quickest? It may be best to construct a makeshift wall between the competitors so they don't cheat!

Punch and Judy

In 1662, Samuel Pepys wrote in his diary about a new Italian puppet show he saw in Covent Garden, known as *Punchinello*; this is the first written record of Punch and Judy in England. You can read more about the history of Punch and Judy on the V&A website's blog (www.vam.ac.uk/content/articles/t/thats-the-way-to-do-it!-a-history-of-punch-and-judy/).

In the Victorian period and into the 20th century, Punch and Judy was a very popular seaside entertainment. Punch and Judy shows can still occasionally been seen today during the summer holiday season.

Learning outcomes:	LO1, LO3
Time:	1 hour
Resources:	A shoe box, wooden skewers or lollipop sticks, paper images or cut-outs of characters, felt tips and sellotape.

Cut a hole in each of the short ends of the shoe box, these will be the wings of the stage and will enable you to move your Punch and Judy characters within your puppet theatre. Colour a background on the interior of the shoe box. You may also want to add an exterior to the theatre; traditional Punch and Judy stages have red and white striped canopies or curtains around the stage.

Next you need to make the cast; either draw your own characters, or cut out pictures of the cast from Punch and Judy. For easy cut outs, go to the Punch and Judy website (www.punchandjudyonline.com/pdfs/Cutout-Sheets.pdf) Further examples to be found on the V&A website (www.vam.ac.uk/moc/learning/things-to-do/)

To move the characters around within your shoebox puppet theatre, glue them to lollipop sticks or wooden bbq skewers (remove the sharp ends first!) and attach with sellotape.

Why not try putting on a mini Punch and Judy play for the other members in the session, or for parents and friends?

Lollipop stick beach huts

Beach huts are an integral part of seaside holidays, and the beach hut we know today has evolved from the Victorian bathing machine. Although many beach huts are 20th century in date, they are an aspect of seaside heritage which is under threat from more severe storms and coastal flooding, as well as vandalism like arson.

Learning outcomes: LO2, LO3
Time: 20 mins (and some extra for drying time)
Resources: 15 wooden lollipop sticks, glue, felt-tips, Worksheet 16

Follow the step-by-step instructions on Worksheet 16 to create your own lollipop stick beach huts.

Ship in a bottle

Shipbuilding and shipping were big industries in the past; Britain is a maritime nation and has some of the biggest ports in the world, including Liverpool, Portsmouth, Grimsby and the Port of London. Huge ocean-going ships were commonplace in these ports and it is thought that the sailors may have sold items they made on board when they came ashore; one example being a ship in a bottle.

Ships in bottles are a common nautically themed gift, which cause wonder to many as it seems impossible to get a large model ship through the narrow mouth of a bottle. It is suggested that ships in bottles were made in sailors' spare time whilst on board, utilising scrap bits of wood, sail and ropes to create miniature replica ships. To get the ships into the bottle, they were inserted down the neck of the bottle before the sails were pulled upright using a piece of string from outside the bottle.

Learning outcomes: LO4
Time: 30 mins
Resources: 2 litre clear plastic bottle, paper, sticky tack, sellotape, felt tips, cocktail sticks, blue crepe paper, pva glue, cardboard

Get an adult to cut a smallish rectangle along the side of the bottle, but only cut three sides; this will act as a flap to insert the ship, so it must be big enough to allow the ship to be inserted.

Design and make a model ship out of paper or cardboard; the name of the vessel could be added, and the sails decorated. Attach a cocktail stick to the back of a ship and make it stand upright by pressing the end of the cocktail stick into a small ball of sticky tack.

Create waves inside the bottom with scrunched up blue crepe paper, and stick it down with clear pva glue. Then position your paper or cardboard ship inside the bottle using the sticky tack base to stick it to the waves. Seal the flap of the bottle with clear sellotape. You can make a stand out of cardboard.

You may want to show how a real ship in a bottle is made. This video from the Channel Islands Maritime Museum in California demonstrates it: www.youtube.com/watch?v=erBNZN3R6wE&t=72s

4.3 Closing activities

Seaside postcard

Sending a postcard when you are on holiday is something many people still do and was a key part of going on holiday to the seaside in the past.

Learning outcomes: LO1, LO4
Time: 15 mins
Resources: Worksheet 17

Using the template provided, create a postcard for someone enjoying a Victorian seaside holiday. Can your members think about the landscape and activities at the Victorian seaside and portray this through the picture on the front and in the written message?

Pier Top Trumps

Piers are a common sight at seaside resorts, but many are disappearing through neglect, fires and storms. The heyday of the piers was in the Victorian period when they sprung up all over the UK as part of seaside holiday amusements; approximately 100 piers were built along the coastline, but now only about half of these survive. Many of those which remain are Listed structures, but some are not as long as they originally were, and several are at threat of destruction from the sea and vandals.

Learning outcomes: LO2
Time: 15 mins
Resources: Worksheet 18, access to the internet on a computer or mobile device

Give each of your members a pier to study from the list of piers on the National Pier Society's website (www.piers.org.uk/piers/); it doesn't have to be in existence anymore but they should be able to find out information about it from the website, and find a photo of the structure. Give each member Top Trumps template worksheet: your members should complete the template for their pier, in order to create a Top Trumps card with the pier on it.

The type of information which should be on the card is: location, current length, date of construction, destroyed or not, and how much it cost to build (if available). There should also be a picture of the pier; this could be a drawing or a copy of a photograph.

Why not try playing a game of Top Trumps using your members Top Trumps cards, using the length, date (of construction and destruction) and cost to build categories. In the date categories, the earliest date wins “date of construction” and the latest date wins “date of destruction’ (surviving piers all beat piers that have been destroyed).

She sells seashells by the seashore

Victorian holidaymakers to the seaside would sometimes return home with mementos of their holiday; such as pottery or glassware, as well as postcards and souvenirs made of shells. Some would return home with jewellery made of shells, or household ornaments such as photo frames or handheld mirrors covered in shells. Some of the shells had delicate pictures drawn or painted inside of seaside scenes such as ships or lighthouses.

Learning outcomes: LO4
Time: 15 mins
Resources: Shells, felt tips

Give each of your members a shell to use as a canvas. Use the worksheet to provide examples and inspiration. Can your members design a decorated shell, like one which the Victorians would have taken home as a souvenir from their seaside holiday?

Session 5:

Ships and boats

Ships and boats have been an integral part of life by the coast since prehistory; with finds like the Ferriby Boats which date to the Bronze Age and the remarkable *Mary Rose* Tudor warship. These are remarkable finds and many shipwrecks are not as well preserved. As a seafaring nation and an island, the UK has much archaeological evidence for seafaring. Session 5 looks at the history and role of ships and life on board, as well as other aspects such as trading, smuggling and lifesaving on the coast.

Learning outcomes:

In this session, your YAC members will:

1. Examine the history, types and roles of ships
2. Examine what smuggling was and discover what types of items were smuggled
3. Learn how lifesaving came about on the coasts, and discover different types of lifesaving
4. Reproduce aspects of life at sea

5.1 Starter activities

Timeline of vessels

Boats and ships have been around since prehistory, with the earliest known examples in the UK being from the Bronze Age. However, it is assumed that boats have been used since before then. There are many famous ships from the past: the *Mary Rose*, Henry VIII's Tudor warship; *HMS Victory*, which was Nelson's ship at the Battle of Trafalgar; and the British clipper, the *Cutty Sark*.

Learning outcomes: LO1
Time: 10 mins
Resources: Worksheet 19 with pictures of famous ships and answer sheet

This activity introduces your members to different types of vessels from different periods. Can they work together to put the pictures in the right order? You could add the ships onto a timeline (like those used for intertidal and coastal archaeological features and finds from **Session 1** and **Session 2**).

Talk like a pirate!

Many of the phrases we use nowadays have their origins at sea, where a whole new language appeared. To communicate instructions aboard ships, certain phrases emerged to help those in charge delegate particular actions. Today, phrases such as “armed to the teeth”, “as the crow flies” and “at a rate of knots” are all used in everyday life but originated at sea.

Learning outcomes: LO4
Time: 10 mins
Resources: Worksheet 20

This activity can be done as a discussion, or as a mini quiz. Using the worksheet, pick phrases and either get your members to discuss what they think the phrases mean, or get them to write their answers down. Reveal the answers and the origin of the phrases. How many did your members get right?

“Where’s the contraband, Mr Wolf?”

Contraband is the word used for goods which have been illegally imported or smuggled into the country. Examples of goods which were smuggled include: tea, tobacco, brandy and lace. Smuggling of these items took off in the 18th century due to high taxation on these goods to pay for costly wars in Europe. Prior to the 18th century, smuggling was done on a much smaller scale.

Smuggling was a risky business. It occurred in the middle of the night between crews of the ships that purchased the goods overseas, working with local people who brought the goods ashore and stored them for distribution later. Custom officers tried to prevent smuggling usually by arriving as goods were clandestinely unloaded on shore. Their job was to ensure that imports were legal so that taxes related to them could be collected. Smuggling was, and still is, illegal.

Learning outcomes: LO2
Time: 15 minutes
Resources: A small item of contraband (a bottle/some lace/a teabag)

This game is a fun way to learn how hard it was for smugglers to avoid being caught by customs officers. This game is like “What’s the time, Mr Wolf?” One person is the Customs Officer, the equivalent of Mr Wolf, and has his/her back to the rest of the group, who are smugglers. The group must walk slowly towards the Customs Officer whilst his/her back is turned, passing an item of contraband between them. When the Custom Officer turns around, the item must be hidden behind

the back of the person who has it, and the Customs Officer must guess who has the contraband. If the smuggler is caught with the contraband, then that smuggler is out and the group must start again. The game ends when the smugglers get the contraband to the other end of the room without being caught red-handed by the Customs Officer, or when the Customs Officer has caught all of the smugglers.

5.2 Main activities

Contraband or not?

Much of the contraband smuggled into the country were goods which are now easily acquired, like tea, sugar and salt, whilst some are still seen as luxury items, such as lace and brandy. In the 18th century, the taxes were as high as 30% on some of these commodities, which meant that many of the poor members of society could not afford them. Contemporary sources suggest that at one point 80% of all of the tea drunk was smuggled into the country illegally.

Learning outcomes: LO2
Time: 10 mins
Resources: Worksheet 21

Use the worksheet with picture examples of commodities, and challenge your members to try to work out what was contraband and what was not contraband. It may surprise many of your members to find out what was contraband and what was not. You could use examples of the contraband rather than using the pictures.

Contraband items: Tea, tobacco, brandy, silk, lace, salt, cocoa beans
Non-contraband items: Cheese, timber, cotton, rope, salted meats, sugar, champagne

As an add-on activity, your members could make a poster, informing members of the 18th-century public which items were contraband, and the punishment for smuggling.

Timeline of lifesaving

There are thousands of shipwrecks which litter the forshore and seabed around our coastline. Before the Royal National Lifeboat Institute (RNLI) and the coastguard, local men and women would launch their own boats to aid people in need on distressed ships; but this was dangerous and often futile.

The first lifeboat station was built in 1777 at Formby, near Liverpool; the first lifesaving service was in Northumberland, established in 1786. In 1789, the first purpose-built lifeboat was created to be used on the mouth of the Tyne. Since then the RNLI and coastguard have been rescuing lives of people on the coast and at sea.

To find out more read the CITiZAN blog: www.citizan.org.uk/blog/2016/Dec/15/brief-look-archaeology-lifesaving-north/

Learning outcomes: LO3
Time: 10 mins
Resources: Timeline, Worksheet 22

Work through the key achievements which have occurred in lifesaving in the past by putting the events in order. You could work all together, or in groups.

Make a lifejacket

There are some very primitive examples of lifejackets which used inflated animal bladders. However, lifejackets were not really utilised until the mid-19th century, and it is only relatively recently that they have become essential on many vessels. Captain Ward, a RNLI Inspector, is credited with the creation of the first lifejackets in 1854. They used corks to help them float.

Royal Naval ships during the early-19th century did not carry lifejackets; at the time the Navy was involved in the Napoleonic War, and many of the men in the Navy had been pressed into service; the Navy feared that lifejackets would be used as a means of escape if they had them on board!

Learning outcomes: LO3
Time: 1 hour
Resources: Various materials (paper cups, straws, paper towels, rubber bands, paperclips, sellotape, balloons, plastic sandwich bags, bubblewrap, glue, corks, foam pieces, string, foil), a can of soup (or a doll to make it more lifelike), and a bucket of water

Split your members into small groups and explain that they must design a life preserver for a can of soup (or doll) which will be easy to attach and remove from the can in a 20-second time window, and which will help the can or doll to float.

Provide the groups with a range of materials and give them a time limit to choose their materials, create a design which will float, and to make it.

Test your groups' designs in a bucket of water. You can judge the different designs by awarding points. If the group can attach the lifejacket to the can of soup within the 20-second time window, they should be awarded 10 points. If they cannot achieve attaching the lifejacket to the can within the time limit, they don't get any points. Further points should be awarded for the length of time the can floats: e.g. if it does not float at all, the design gets 0 points; up to 15 seconds = 7 points; up to 30 seconds = 10 points; up to 45 seconds = 12 points; up to 1 min = 15 points; more than 1 minute = 20 points.

Add together the points awarded for the floating exercise, and for whether it was possible to attach the design to the can within the 20-second time window. Do you have a winning design?! Why do your members think that it was the best design?

After all the lifejackets have been tested, discuss the pros and cons of different lifejackets through time. You can see examples of different lifejackets on the RNLI website. (https://rnli.org/about-us/our-history/resources)

Role play the rescue by Grace Darling

The rescue of the *SS Forfarshire* by Grace Darling and her father, the lighthouse keeper from the Farne Islands off the Northumberland coast, in 1838 is well known and it shot her to fame. The rescue was daring and was in the days before there was a national lifeboat institution. There was an early equivalent of a lifeboat at Seahouses manned by local men, including Grace's brother, and it was launched to help rescue the survivors of the *SS Forfarshire*. But Grace and her father were closer, and reached the survivors first. It's important to understand that before the RNLI and coastguard were founded, local people would set out in their own boats to try and rescue ships in distress but this was dangerous and many boats were not adapted to be launched in rough seas. Nowadays we are fortunate to have the RNLI and coastguard, but they were not in place until the early-19th century.

Learning outcomes:	LO3, LO4
Time:	20 mins
Resources:	Worksheet 23

Use the worksheet to provide inspiration for your own role plays of the daring rescue undertaken by Grace and her father. Present your role plays to each other.

The “History of the RNLI factsheet” summarises Grace Darling story (https://rnli.org/about-us/our-history/resources)

Ship’s biscuits

Ship’s biscuits were a key part of sailors’ diets at sea. The biscuits were very hard and consisted of just flour and water and a pinch of salt. The biscuits did not rot or go bad so were perfect for taking to sea, but sometimes they did get infested with weevils! Sailors would soak them before eating.

The Royal Navy used to mark their property when they bought it so as not to be swindled; they marked timber they bought for their ships, cannons and even ship’s biscuits with a “crow’s foot” or an arrow which indicated it was property of the Crown. Some of these marks can be found on ships like *HMS Victory* today.

Learning outcomes:	LO4
Time:	40 mins
Resources:	170g wholemeal flour, 110 ml water, half a teaspoon of salt, bowl, baking tray, rolling pin, biscuit cutter (optional), access to an oven

Put the oven on to a very low heat; if there is no access to an oven, make the biscuits and allow your members to take them home to cook. Put the flour and salt into a bowl and mix them together, add the water and mix to create a dough. Put the dough onto a flat surface and roll it out to about 1.5cm thickness. Fold and repeat several times. Either cut out biscuits from dough, or use a biscuit cutter. Don’t forget to add a “crows foot” or arrow to any finished biscuits to mark them as Royal Navy property! Your members could add their own marks so they know whose biscuits are whose. Place them on a baking sheet and bake until they are hard.

5.3 Closing activities

Design a figurehead

Decorating the stern of a ship has been a tradition for thousands of years, with many of the classic civilisations carving and painting sterns of their ships; there are Egyptian examples dating back to 3000 BC. The original reason behind figureheads is uncertain; but it is thought they held a spiritual or religious significance. They were usually made out of oak or elm, then later pine; the carvers who made figureheads wanted a light wood but one which would not readily rot. The *Cutty Sark* has a large number of Merchant Navy figureheads in its museum and the Watch House Museum in Tynemouth has a large number which have come from shipwrecks in the mouth of the Tyne.

Learning outcomes: LO1, LO4
Time: 20 mins
Resources: Wooden spoon, fabric and wool (other craft materials e.g. pipe cleaner googly eyes, etc), pva glue, felt tips, scissors

Research different figureheads and show your members a variety of different examples. Discuss what they depict, what colours they are, and what they would represent for the sailors on board the ships.

The wooden spoon will the basis of your figurehead, with the handle being the body of the figurehead, and the bowl-end the face. Using the craft supplies provided, challenge your members to make their own figurehead. Get them to think about what type of ship their figurehead will be on; is it for a warship or a merchant ship? Think about how the name of the ship may affect the appearance of the figurehead.

Tin foil boats

This activity is a good way to end your session by allowing your members to create a ship of their own size and design, using as many masts and sails as they like. The only test is to make sure they can float!

Learning outcomes: LO1, LO4
Time: 20 minutes
Resources: Tin foil, drinking straws, coloured paper, colouring pencils, scissors, sticky tack, hole punch, bucket of water

Challenge your members to create a boat shape using tin foil. The boat can be any shape but the challenge is to make it float. Use coloured paper to create a sail. Punch two holes in it, one in the top and one at the bottom and thread the straw through. Add the paper sail on its drinking straw mast to the tin foil boat using sticky tack. Test whether the boats float in the bucket of water.

Ship bingo

Britain has a wonderful and long maritime history, and boat and shipbuilding and sailing have been a part of British heritage since prehistory. There are many famous ships and many different types of boats have been used throughout history.

Learning outcomes: LO1
Time: 15 mins
Resources: Worksheet 24

This is like bingo but with a grid of different types of ships or specific named vessels. Follow the instructions on Worksheet 24 to enable each of your YAC members to create their own bingo grid of vessels.In order to complete the game, the leader reads out questions that may have more than one answer. If a member has a ship on their grid which is a correct answer to the question read out, they should cross it off. The winner is the first member to cross off all of their vessels in their grid.

Example questions:

Q. Nelson sailed on this ship at one time in his life
A. *HMS Badger, HMS Victory, HMS Triumph*

Q. This boat was used in prehistoric times
A. Dover boat or the Ferriby boats

Q. A fictional ship from a famous book
A. The *Jolly Roger*, *Hispaniola*, *Swallow*

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Worksheet 1a – Mix and match game

Can you match the names of these coastal and intertidal archaeological features with the correct picture from Worksheets 1b, 1c and 1d?

Pillbox	Submerged forest
Hulk assemblage or barge graveyard	Jetty
Human footprints	Anti-tank blocks
Pleasure pier	Hulked vessel
Lime kiln	Anchor
Lighthouse	Submarine
Peat bed	Fishtrap / fish weir
Trackway	Animal footprints
Bridge	Fish hully

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Worksheet 1b – Mix and match game

Can you match the pictures of these coastal and intertidal archaeological features with the correct names from Worksheet 1a?

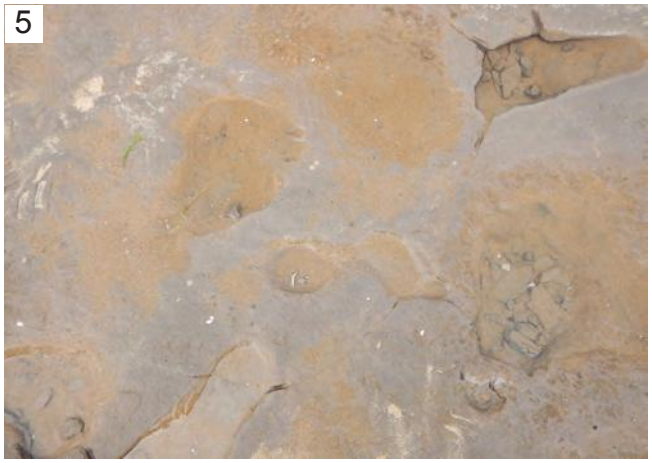
1

2

3

4

5



6

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Worksheet 1c – Mix and match game

Can you match the pictures of these coastal and intertidal archaeological features with the correct names from Worksheet 1a?

7

8

9

10

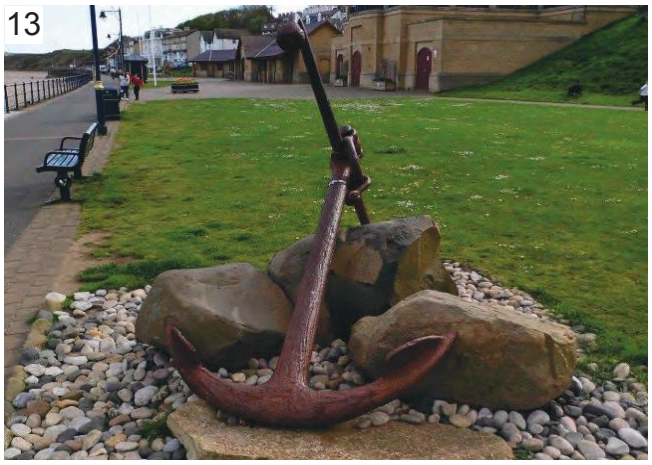
11

12

Worksheet 1d – Mix and match game

Can you match the pictures of these coastal and intertidal archaeological features with the correct names from Worksheet 1a?

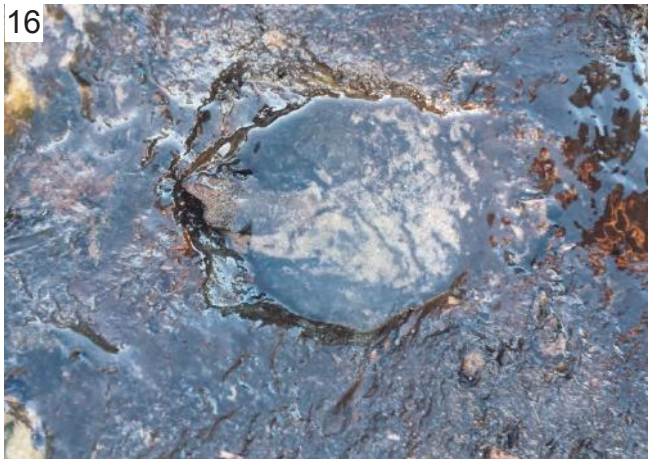
13



14

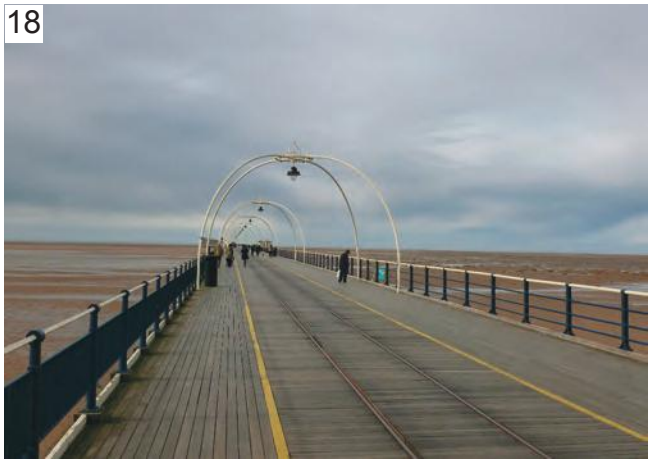
15

16



17

18



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Worksheet 1 – Mix and match game

ANSWERS

Pillbox *(Bridlington, East Yorkshire)*	10
Hulk assemblage / barge graveyard *(Maldon, Essex)*	8
Human footprints *(Formby, Merseyside)*	5
Pleasure pier *(Southport, Merseyside)*	18
Lime kiln *(Budle Bay, Northumberland)*	1
Lighthouse *(South Shields, Tyne and Wear)*	11
Peat bed *(Blyth, Northumberland)*	12
Trackway *(Mersea Island, Essex)*	14
Bridge *(River Humber, East Yorkshire)*	7
Submerged forest *(Hightown, Merseyside)*	6
Jetty *(Thornton-Cleveleys, Lancashire)*	15
Anti-tank blocks *(Bridlington, East Yorkshire)*	17
Hulked vessel *(Victoria Docks, Hull, E. Yorkshire)*	3
Anchor *(Filey, East Yorkshire)*	13
Submarine *(River Medway, Kent)*	9
Fishtrap / fish weir *(Oldbury, Gloucestershire)*	4
Animal footprints *(Cresswell, Northumberland)*	16
Fish hully *(Beadnell, Northumberland)*	2

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Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

1

2

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Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

3

4

young archaeologists' club

Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

5

6

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Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

7

8

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Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

9

10

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Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

11

12

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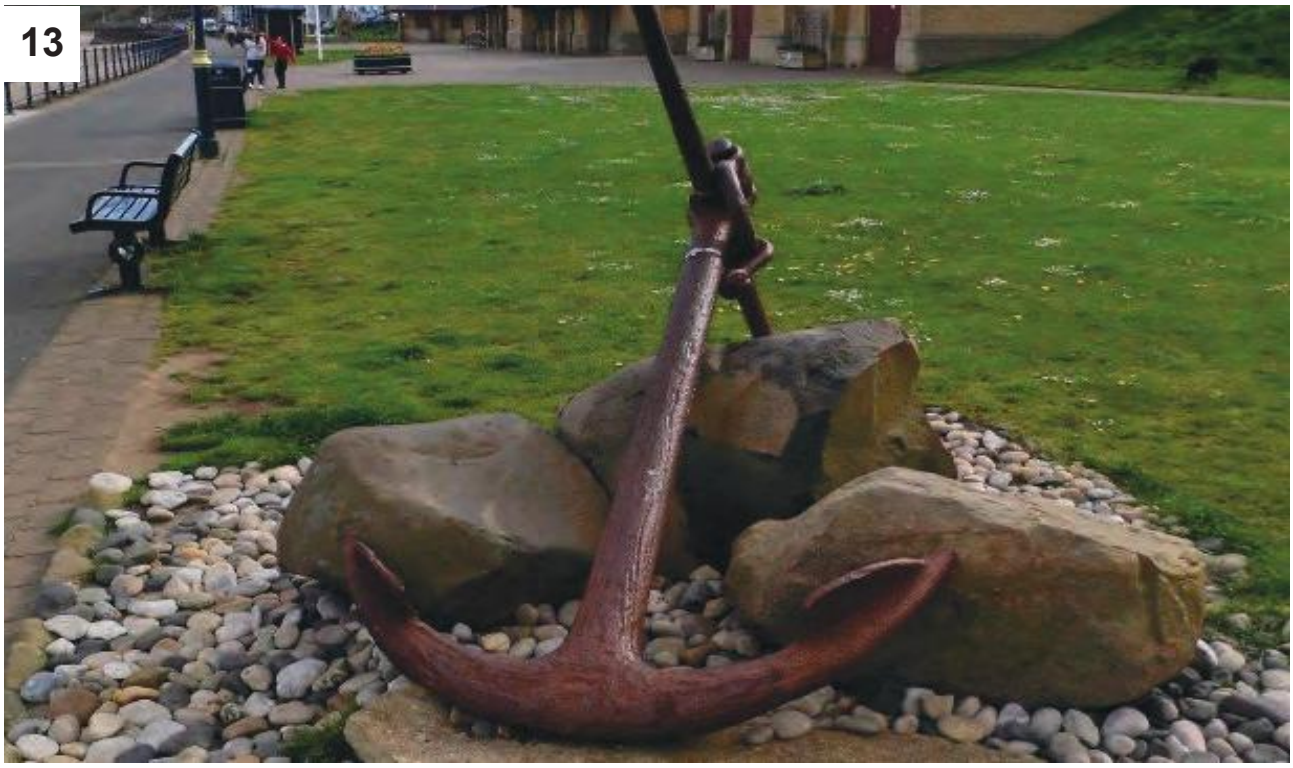
Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

13



14

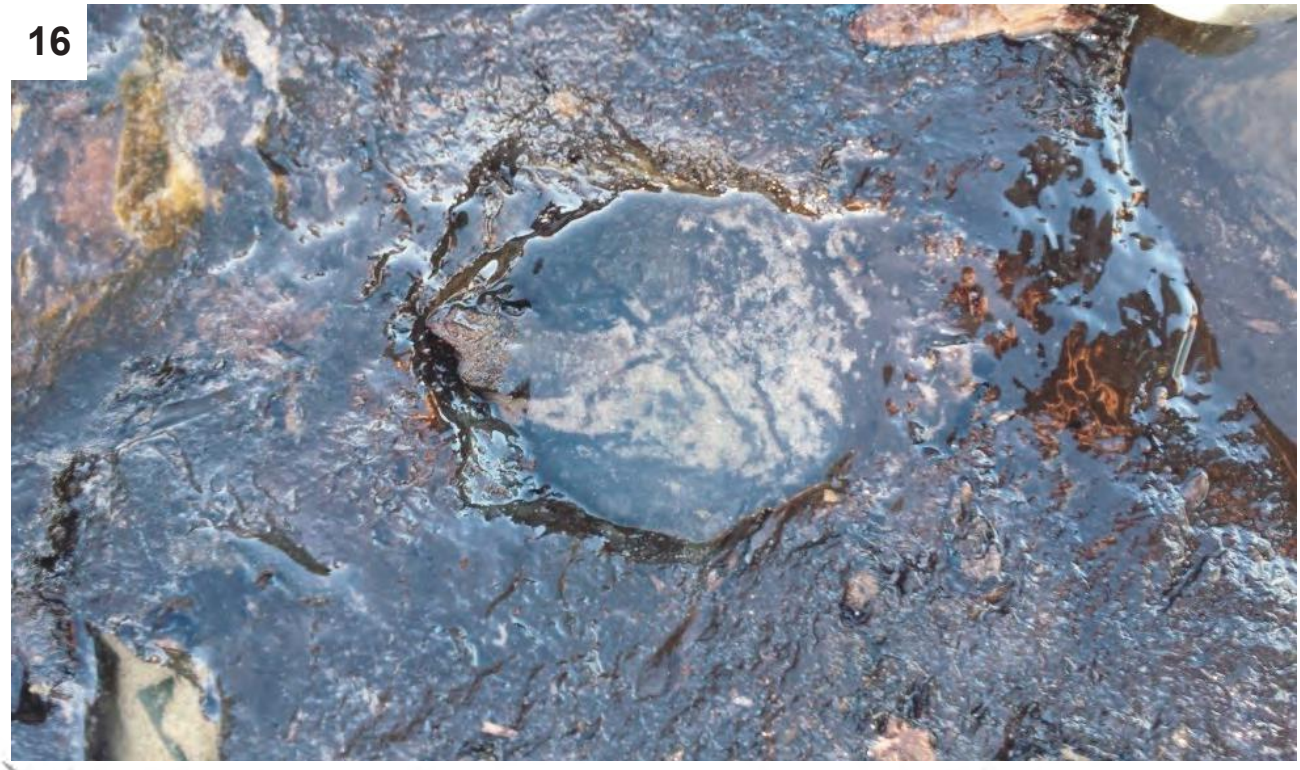
young archaeologists' club

Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

15

16



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Mix and match game – large images

These larger versions of the images can be used in place of the small ones from Worksheets 1b, 1c and 1d. The numbering is the same!

17

18

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Worksheet 2 – Hazard identifying

Match the hazard (red) with the correct response (yellow)

Spring tides	Always go out in groups of two or more. Inform someone of where you are going and when you'll be back.
Unexploded ordnance e.g. Second World War bombs	Do not enter the water especially where the water might be deeper than expected.
Bad weather e.g. storms or high winds	Do not eat or drink before washing hands. Cover up cuts and wounds.
Incoming tides and getting cut off	Call the coastguard and police on 999.
Deep water channels	Check tide timetable and do not go too far from the shore.
Sun stroke or hypothermia	Appropriate clothing for the weather conditions (warm and waterproof clothing, or sun hat and sun cream).
Unstable cliff edges prone to landslips	Check weather forecast. Postpone visit if bad weather is predicted.
Quicksand and deep mud	Check the tide timetable and don't go out at high tide.
Leptospirosis or Weil's Disease	Stay away from unstable cliffs.
Lone working	Call the coastguard on 999. Use a throwbag.

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Worksheet 2 – Hazard identifying

ANSWERS

Spring tides	Check the tide timetable and don't go out at high tide.
Unexploded ordnance e.g. Second World War bombs	Call the coastguard and police on 999.
Bad weather e.g. storms or high winds	Check weather forecast. Postpone visit if bad weather is predicted.
Incoming tides and getting cut off	Check tide timetable and do not go too far from the shore.
Deep water channels	Do not enter the water especially where the water might be deeper than expected.
Sun stroke or hypothermia	Appropriate clothing for the weather conditions (warm and waterproof clothing, or sun hat and sun cream).
Unstable cliff edges prone to landslips	Stay away from unstable cliffs.
Quicksand and deep mud	Call the coastguard on 999. Use a throwbag.
Leptospirosis or Weil's Disease	Do not eat or drink before washing hands. Cover up cuts and wounds.
Lone working	Always go out in groups of two or more. Inform someone of where you are going and when you'll be back.

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Worksheet 3a – Intertidal archaeologist's backpack

Pack your backpack with the correct items from Worksheets 3b and 3c!

Name: _____

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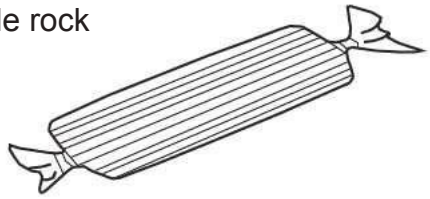
Worksheet 3b –
Intertidal archaeologist's backpack

Add the things an intertidal archaeologist needs to your backpack!

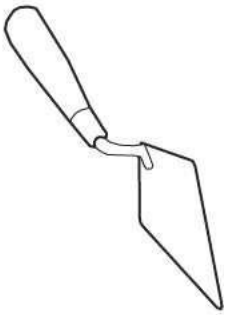
Seaside rock



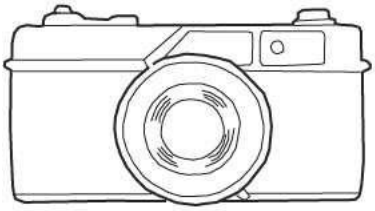
Wheelbarrow

Swimming costume

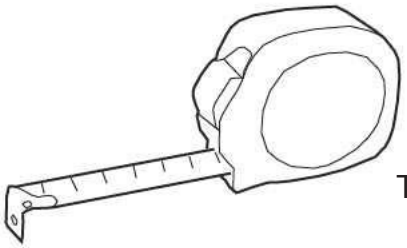
Wellies



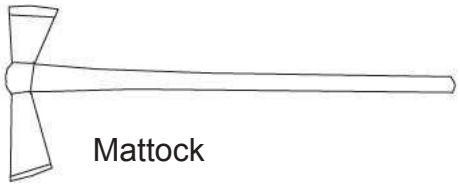
Trowel



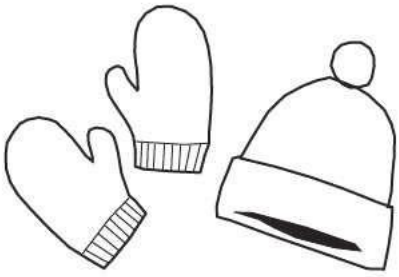
Camera



Tape measure



Mattock



Woolly hat and gloves

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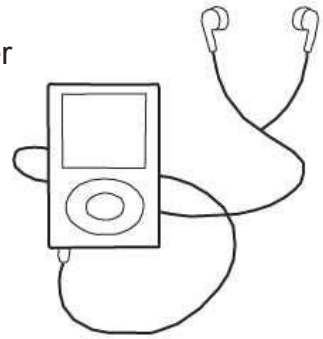
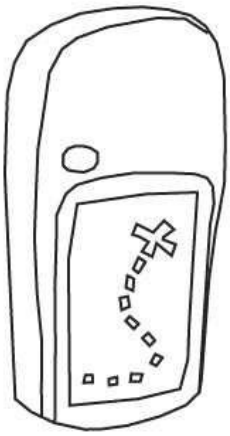
Worksheet 3c –
Intertidal archaeologist's backpack

Add the things an intertidal archaeologist needs to your backpack!

MP3 player



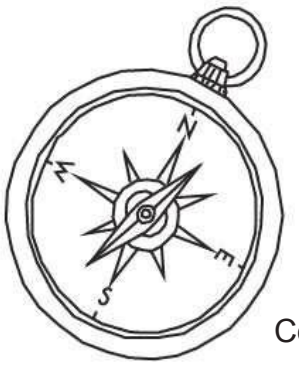


Handheld GPS

Water

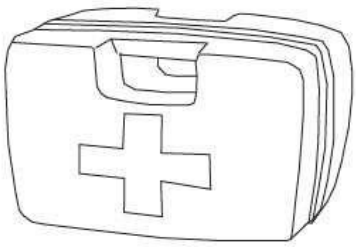
Ranging pole

Ice cream



Compass

First Aid kit



Whistle

Mobile phone

Worksheet 3 – ANSWERS
Intertidal archaeologist's backpack

Items to pack in the intertidal archaeologists backpack:

- Wellies
- Camera
- Tape measure
- Woolly hat and gloves
- Handheld GPS
- Water
- Ranging pole
- Compass
- Whistle
- First Aid kit
- Mobile phone

Items to NOT pack in the intertidal archaeologists backpack:

- Seaside rock
- Swimming costume
- Wheelbarrow
- Trowel
- Mattock
- MP3 player
- Ice cream

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Worksheet 4a – Feature timeline

Can you match the pictures of the archaeological features on Worksheets 4b, 4c, 4d and 4e with the correct periods below?
Create a timeline of the features by laying out the periods in order; you could use a tape measure with 1cm representing 100 years.

Prehistoric c. 9500 BC – AD 43
Roman AD 43 – 410
Medieval 410 – 1540
Post -medieval 1540 – 1901
Modern 1901 – present

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Worksheet 4b – Feature timeline

Can you match the pictures of the archaeological features with the correct periods on Worksheet 4a?

Lime kiln *(Beadnell, Northumberland)*

Fish hully *(Beadnell, Northumberland)*

Hulked vessel *(Hull, East Yorkshire)*

Fish weir *(Oldbury, Gloucestershire)*

Human footprints *(Formby, Merseyside)*

Submerged forest *(Hightown, Merseyside)*

Worksheet 4c – Feature timeline

Can you match the pictures of the archaeological features with the correct periods on Worksheet 4a?

Bridge *(River Humber, East Yorkshire)*

Hulk assemblage *(Maldon, Essex)*

Submarine *(River Medway, Kent)*

Pillbox *(Bridlington, East Yorkshire)*

Lighthouse *(South Shields, Tyne and Wear)*

Peat bed *(Blyth, Northumberland)*

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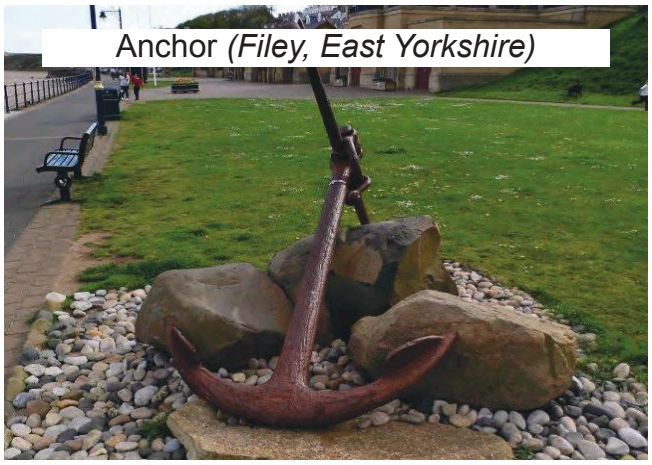
Worksheet 4d – Feature timeline

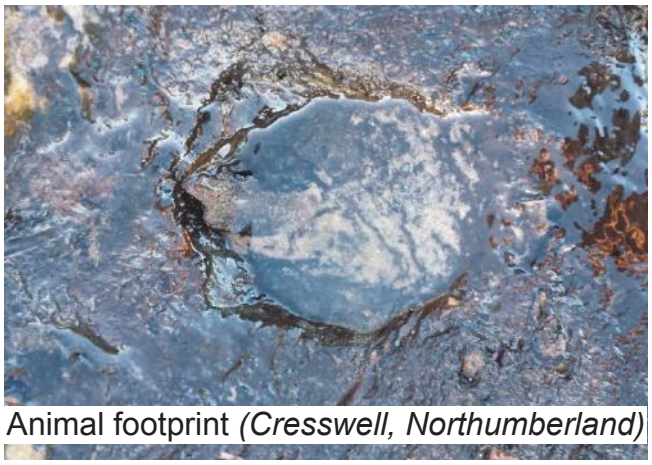
Can you match the pictures of the archaeological features with the correct periods on Worksheet 4a?



Anchor *(Filey, East Yorkshire)*

Trackway *(Mersea Island, Essex)*

Jetty *(Thornton-Cleveleys, Lancashire)*



Animal footprint *(Cresswell, Northumberland)*

Anti-tank blocks *(Bridlington, E. Yorkshire)*

Pleasure pier *(Southport, Merseyside)*

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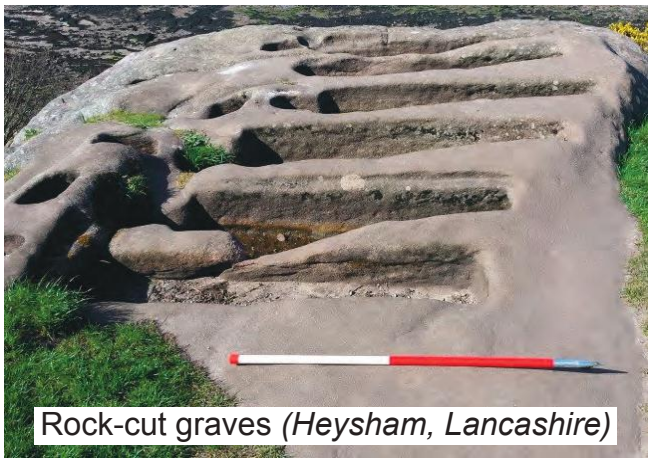
Worksheet 4e – Feature timeline

Can you match the pictures of the archaeological features with the correct periods on Worksheet 4a?



Rock-cut graves *(Heysham, Lancashire)*

Castle *(Dunstanburgh, Northumberland)*

Signal station (earthworks)
(Scarborough, East Yorkshire)

Saltworkings (Briquetage)
(Benfleet, Essex)

Fishtrap *(River Thames, London)*

Worksheet 4 – Feature timeline

ANSWERS

Prehistoric

Human footprints (Mesolithic)
Submerged forest (Neolithic)
Animal footprint (Neolithic)
Peat bed (Neolithic ?)
Trackway (Bronze Age)

Roman

Saltworkings (1st-4th century AD)
Signal station (4th century AD)

Medieval

Rock-cut graves (9th-10th century)
Castle (14th century)
Fishtrap (9th-10th century)

Post-medieval

Hulk assemblage (18th-20th century)
Anchor (19th century)
Lime kiln (19th century)
Fish hully (19th century)
Hulked vessel (19th century)
Fish weir (19th century)
Lighthouse (19th century)
Jetty (19th century)
Pleasure pier (19th century)

Modern

Pillbox (1910s)
Submarine (1940s)
Anti-tank blocks (1940s)
Bridge (1970s)

Worksheet 5 – Archaeology 101

The information on this factsheet will help you to record your Portable Foreshore, and for archaeological recording on site.

Planning

Why?

It is important to have an accurate record of what can be seen e.g. accurate measurements, shape of feature, relationship of contexts and angle of slope. Photographs cannot not show all aspects of a feature or measurements.

Scales

There are three main types of scale:

1:20	1cm = 0.2m	This is the most common scale, used for plans
1.10	1cm = 0.1m	This is the next most common scale, used for sections
1:50	1cm = 0.5m	This is the next most common scale, used for trench plans

Drawing details checklist:

- A title – what does your drawing show?
- Your initials
- A scale – 1:10, 1:20, 1:50
- A north arrow
- A drawing number – especially if you have more than one sheet and an accompanying drawing register

Offsetting from a baseline

Setting up the baseline:

1. Place a survey pins or 6” nail in the ground; this is where your baseline will start.
2. Place the 0m end of the tape at this end and secure it.
3. Run out the tape, make sure it horizontal and straight.
4. Place another survey pin or 6” nail in the ground where your baseline will end and secure the tape.
5. If the baseline is particularly long or the conditions are windy, more pins or nails can be placed along the baseline to secure it in place.

Worksheet 5 – Archaeology 101

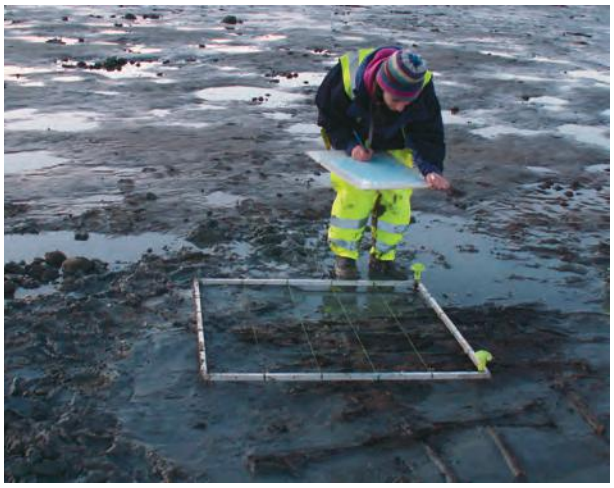
(Continued)

How to take offsets from a baseline

1. Pick a point on the archaeology to plan.
2. Using a hand tape, run the end out to point that will be planned. Make sure the hand tape is perpendicular to your baseline tape (white tape).
3. Read the number off the baseline tape where the hand tape crosses it.
4. Read the number off the hand tape where it crosses the baseline tape.
5. Add this to the plan.
6. Once all the points are planned join them together with a fluid line and check that the drawing looks similar to the feature in plan.

How to plan using a frame

1. Set your drawing frame against the baseline, being careful not to knock it out of place. It is easier to arrange the 5mx5m planning frame at 5m intervals e.g. from 0-5m or 5-10m.
2. Make sure you stand so you are looking directly over planning frame.
3. It may help to add the planning frames extent to the plan.
4. Draw the archaeology in each box, this can be done by eye, with a plumb bob or with a tape.



Worksheet 5 – Archaeology 101

(Continued)

Photographs

Why?

It is important to have an accurate record of what can be seen e.g. colour, shape and position. Drawings can sometimes be mislabelled or drawn inaccurately.

Handy hints for photography:

- Make sure the archaeology is in the centre of the photograph.
- Ensure bags, feet, equipment etc. are not in the photograph.
- It is always best to take photographs on a cloudy day. Sun can sometimes bleach the colour of the photo.
- Make sure there is an appropriate scale in the photo – this can be as simple as a 30cm ruler.
- Keep a written record of the photos taken; this can act as a reminder of what each photograph shows later. Ensure that the image number, a brief description and the direction in which the photo was taken are all noted.
- Always take more than one photo – two is best.

Photo Number:	P1010151
Location:	Cleethorpes submerged forest
Direction:	North facing
Scale:	1m
Brief Description:	Preserved tree stump to the east of breakwater.

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Worksheet 6a – Prehistoric features and finds

Create a timeline of the features and finds by laying out the periods in order; you could use a tape measure with 1cm representing 100 years.

Mesolithic
(10,000 BC – 4000 BC)

Neolithic
(4000 BC – 2200 BC)

Bronze Age
(2200 BC – 800 BC)

Iron Age
(800 BC – AD 43)

Throughout prehistory

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Worksheet 6b – Prehistoric features and finds

Can you match the pictures of the prehistoric features and finds with the correct periods on Worksheet 6a?

Bronze axe heads
(Creative Commons)

Star Carr headdress (Creative Commons)

Submerged forest (© CITiZAN)

Waterloo helmet (Creative Commons)

Formby footprints (© CITiZAN)

Reconstruction of the Sweet Track
(Creative Commons)

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Worksheet 6c – Prehistoric features and finds

Can you match the pictures of the prehistoric features and finds with the correct periods on Worksheet 6a?

Mammoth's tusk (© CITiZAN)

Reconstruction of a Ferriby boat
(© Andy Sherman)

Flint arrowhead (Creative Commons)

Hafted stone axe (Creative Commons)

Battersea shield (Creative Commons)

Peat bed (© CITiZAN)

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Worksheet 6 – Prehistoric features and finds

ANSWERS

Mesolithic

- Formby footprints
- Star Carr headdress
- Mammoth's tusk

Neolithic

- Hafted stone axe
- Flint arrowhead
- Reconstruction of the Sweet Track

Bronze Age

- Bronze axe heads
- Reconstruction of a Ferriby boat

Iron Age

- Waterloo helmet
- Battersea shield

Throughout prehistory

- Peat bed
- Submerged forest

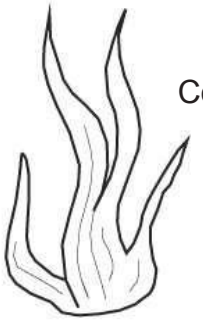
Worksheet 7a – Prehistory and the beach

Which of these activities would prehistoric people have used the coast for?

Short sea journeys along the coast in simple boats

☐ Yes

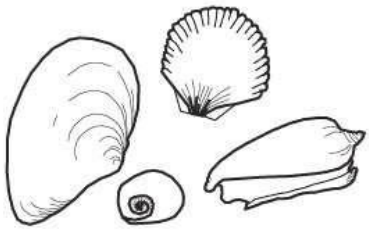
☐ No



Collecting seaweed

☐ Yes

☐ No



Collecting molluscs to eat

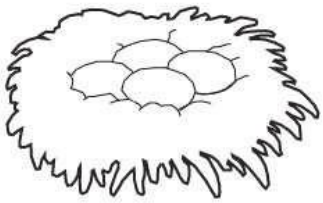
☐ Yes

☐ No

Extracting salt from sea water

☐ Yes

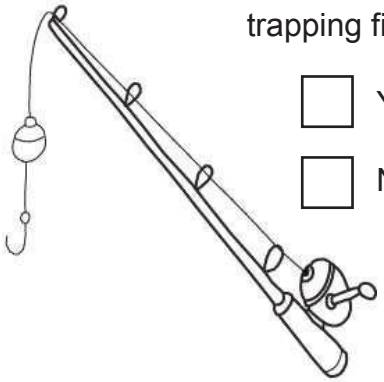
☐ No



Collecting seabirds' eggs to eat

☐ Yes

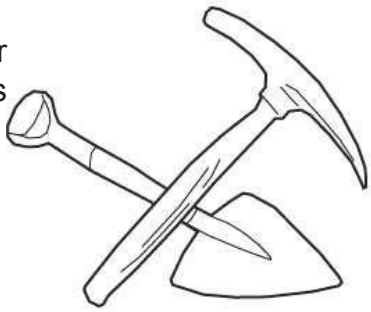
☐ No



Inshore fishing and trapping fish

☐ Yes

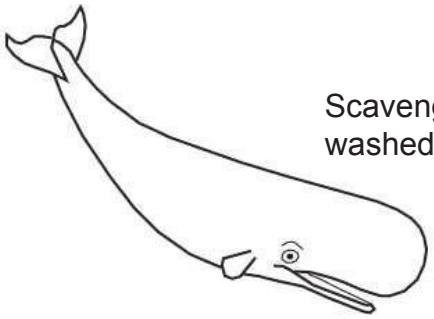
☐ No



Mining for resources

☐ Yes

☐ No



Scavenging for whales washed up along the coast

☐ Yes

☐ No

All these activities were done by prehistoric people on the coast

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Worksheet 7b – Prehistory and the beach

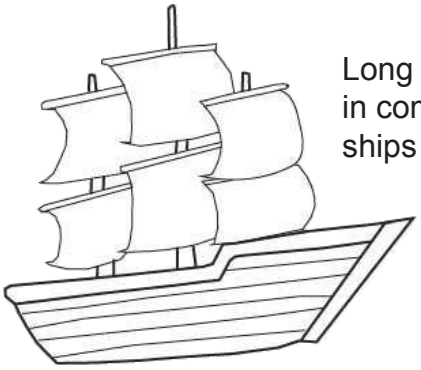
Which of these activities would prehistoric people have used the coast for?

Deep sea fishing

☐ Yes

☐ No

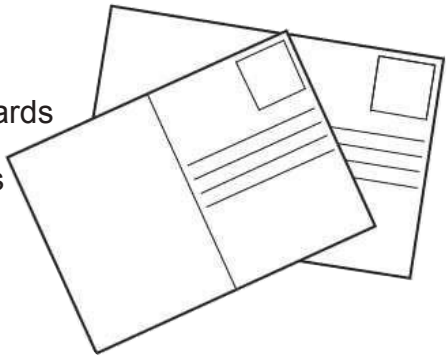
Long sea journeys in complex sailed ships



☐ Yes

☐ No

Sending postcards



☐ Yes

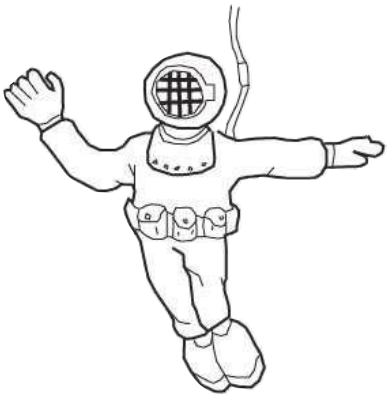
☐ No

Eating ice cream

☐ Yes

☐ No

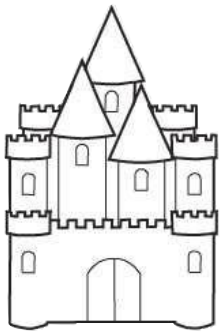
Deep sea diving



☐ Yes

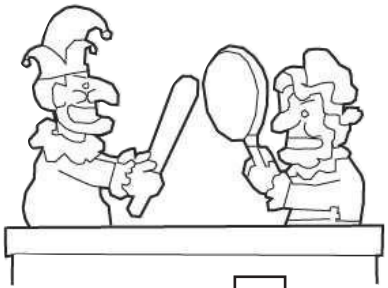
☐ No

Building 'real' castles



☐ Yes

☐ No



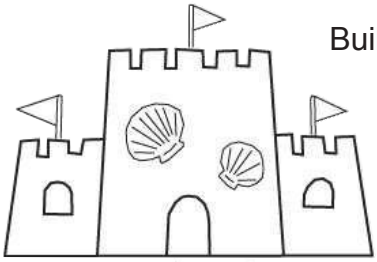
Punch and Judy shows

☐ Yes

☐ No

There is no evidence for prehistoric people doing any of these activities on the coast

Building sandcastles



☐ Yes

☐ No

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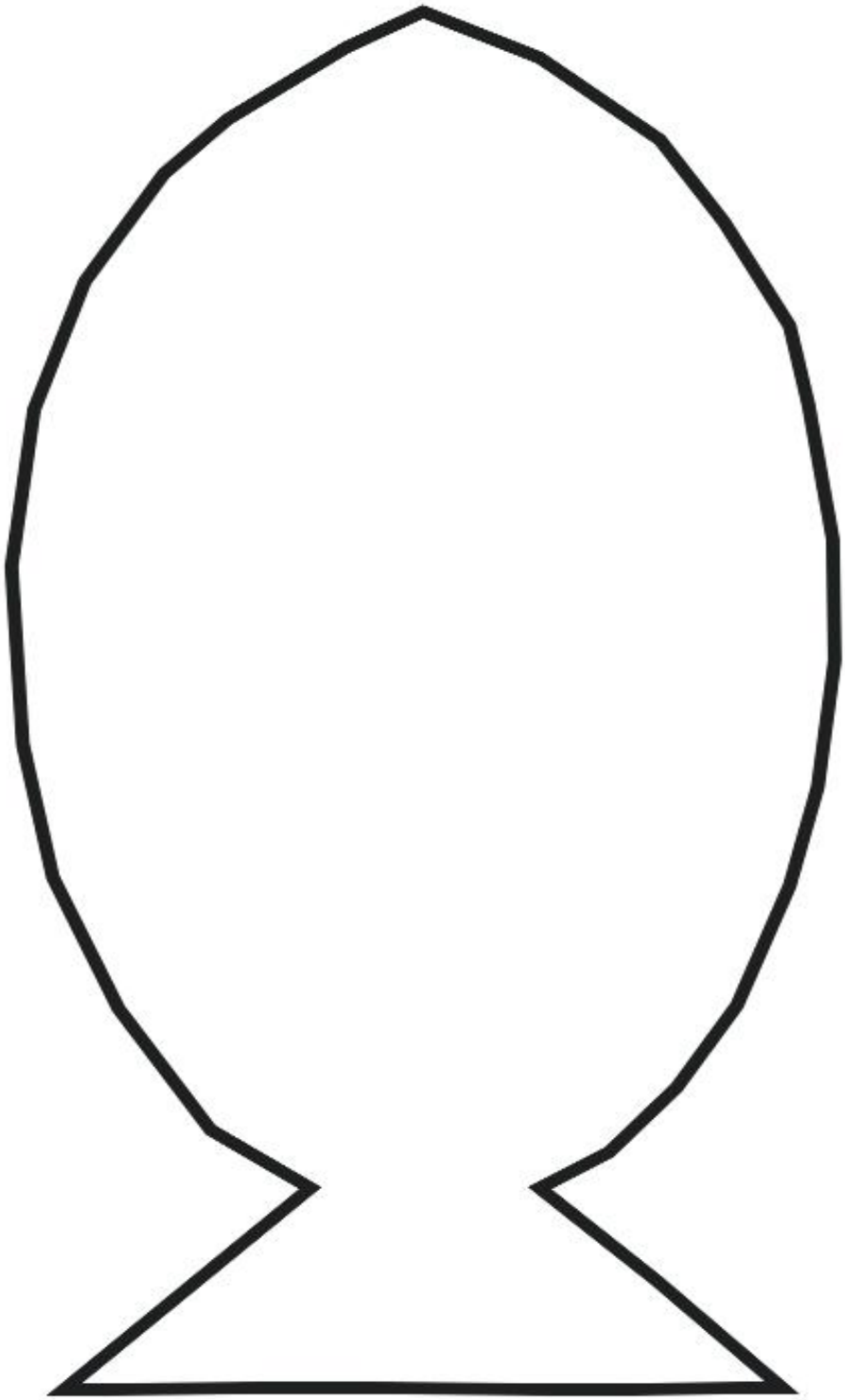
Worksheet 8 – Flappy fish template

Cut out the fish template and use it for your game of Flappy Fish!



Worksheet 9 – Bridges

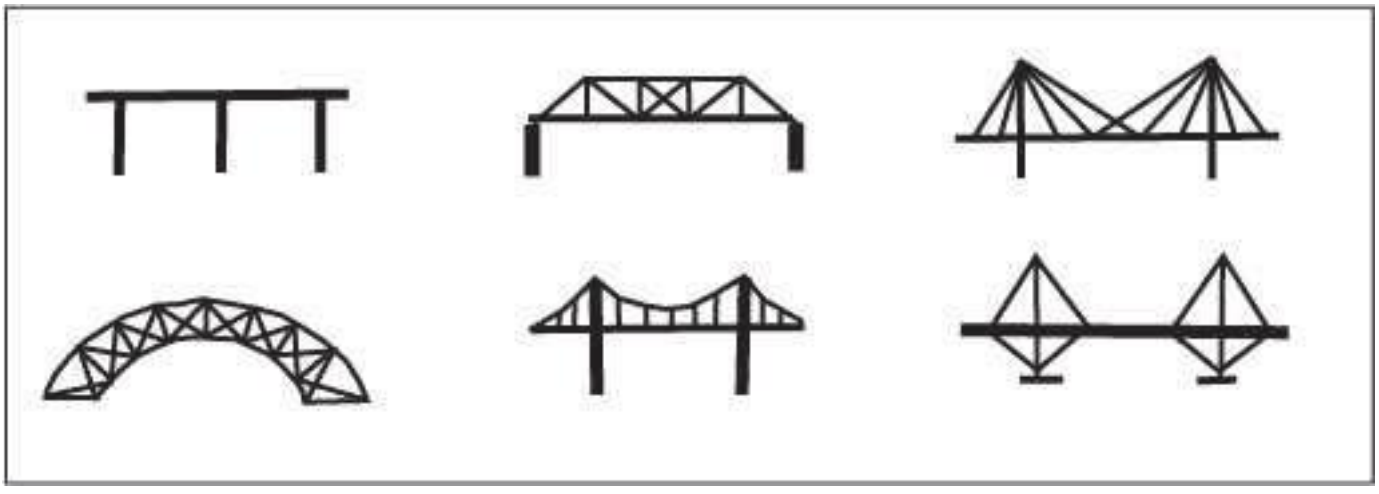
Name: _____

Can you discuss the pros and cons of making a bridge out of the following materials?
Can you think of any other materials to build a bridge out of?

Material	Pros	Cons
Wood		
Stone		
Metal		
Plastic		

Can you match the types of bridge with their correct names?

Cable-stayed bridge
Truss bridge
Beam bridge
Arch bridge
Cantilever bridge
Suspension bridge



ANSWERS: From left to right
Top row: Beam bridge, Truss bridge, Cable-stayed bridge Bottom row: Arch bridge, Suspension bridge, Cantilever bridge

Worksheet 10 – Lime kilns role play

Follow the instructions on this sheet to build your own 'human' lime kilns, which will demonstrate how lime was procesed in flare and draw kilns.

Before you start building your 'human' lime kilns, show your group some photographs of lime kilns; examples can be found by following the links on page 18 of the Workbook. You will need a large flat space, free of hazards, to conduct this activity. You can try acting out two different methods of making quicklime: flare kilns and draw kilns.

Flare kiln:

1. Choose three people to join hands in a circle. Get them to step back as far as they can without letting go of each others' hands. They form the main body of the lime kiln, with the opening at the top and at the bottom.

2. Get four more participants to kneel down in the middle of the circle, they will be used later.

3. Choose some of your group to act out quarrying for limestone. Other group members can act out bringing the limestone to the lime kiln; for example, one person could be a horse and another person could lead it up a waggonway to the kiln!

4. Act out putting limestone into the top of the lime kiln. When this is being done, three of the participants within the main body of the lime kiln need to stand up; they represent the limestone which has been put in the kiln.

5. It is time to light your 'human' flare lime kiln! Get the last person inside the kiln to sit and wave their arms slowly; they represent the fire. Explain how this would then burn for several days, and as it did, the chemical composition of the limestone within the kiln changed, and quicklime was produced.

6. To mimic the quicklime being created from the limestone, the people representing the limestone need to shrink down. The 'fire' also needs to die down. The person waving their arms needs to stop doing so and make themselves small.

7. Once the fire has gone out completely, the quarrymen need to extract the quicklime. They should act out racking out the lime from the bottom of the kiln, with the three 'limestone' people crawling out carefully from the within the structure.

8. In a flare kiln the whole process would then be repeated. It was fairly inefficient because the fire had to cool down and then be relaid.

Worksheet 10 – Lime kiln role play

(Continued)

Draw kiln:

1. Choose three people to join hands in a circle. Get them to step back as far as they can without letting go of each others' hands. They form the main body of the lime kiln, with the opening at the top and at the bottom.

2. Get four participants to kneel down in the middle of the circle; one as the fire and three to represent the limestone and layers of fuel.

3. Add two extra people outside your lime kiln; they need to hold hands across the middle of the kiln to create a platform.

4. Act out putting limestone and fuel into the top of the lime kiln. This is done in alternate layers unlike in the flare kiln. To represent this, three of the participants within the main body of the lime kiln need to stand up and place their hands on top of the platform across the middle of the kiln. To make it look more like alternating layers, they should place their hands in turn to build up a stack.

5. It is time to light your 'human' draw lime kiln! Get the last person inside the kiln to sit and wave their arms slowly; they represent the fire which would be allowed burn day and night continuously. As it did, the chemical composition of the limestone within the kiln changed just like in the flare kiln.

6. The quicklime would drop through a grate on the platform. To act this out, the people representing the layers of limestone and fuel should remove their hands from on top of the platform in reverse order and shrink down to the floor to be racked out by the quarrymen.

7. Add more layers of limestone and fuel, and allow the process to continue by repeating steps 4 and 6 whilst your fire keeps burning.

You could finish your role play with the quicklime being loaded onto boats and being shipped off. This could be dangerous, as quicklime could explode when it got wet. You could act out an explosion!

In the later Victorian period, the railways became a safer way to transport quicklime, and coastal lime kilns began to decline in favour of inland lime kilns. You could act out your coastal lime kiln collapsing through disuse.

Worksheet 11 – Seaside stratigraphy

Use the template to record the layers of your seaside stratigraphy.

Name: _____

How many layers can you see?

What does the layer look like? (What colour is it? What is it made of? How deep is it? Does it contain anything, e.g. pebbles, shells etc.?)
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5

Drawing of the profile

Worksheet 12 – Pier factsheet

You can use this factsheet for a game of 'A-pier' or 'Dis-a-pier-ed'!
It is also useful for completing Worksheet 18, Pier Top Trumps

This Worksheet provides a few examples of piers which you may wish to use, but it is by no means an exhaustive list of piers in the UK. For more information use the National Pier Society website (www.piers.org.uk/) (Note: the National Pier Society does not cover Northern Ireland).

Scotland

Portobello, Edinburgh (Lost) – Built in 1871, Portobello pier was originally 1250 feet long and cost £10,000 to build. It was initially successful with a concert hall on the seaward end. Continuing storm damage meant it was eventually demolished in 1917. Plans for another pier were discussed during the mid-1920s, but this was abandoned by the start of the Second World War.

Rothesay, Firth of Clyde (Existing) – Rothesay is on the Isle of Bute and is separated from Glasgow by a narrow stretch of water called the Kyles of Bute. The pier was built in in the 19th century, and is the landing point for holidaymakers from Glasgow. Some of the buildings burned down in 1962.

North-east England

Scarborough, Yorkshire (Lost) – Opened in 1869, this pier took three years to build and was 1000 feet long. It cost £12,135 to construct, and in 1889 a pavilion was added as part of a £10,000 refurbishment. In 1905, winter storms severely damaged the structure; the part of the pier with the pavilion survived offshore, but this was later demolished and the pier was not rebuilt.

Skegness, Lincolnshire (Existing) – In 1877 a competition to design the Skegness pier was held, which attracted 44 entries. Work began in 1880. Skegness pier was 1817 feet long and cost £20,840 to build. It had a 7,000 seat concert hall on the end. In 1919, a schooner crashed into Skegness pier, and it was not fully restored until 1939.

North-west England

Fleetwood, Lancashire (Lost) – This was quite a late pier. It only opened in 1910. It was 492 feet in length, and a pavilion was added in 1911. A devastating fire in 1952 severely damaged it. In 1972 £70,000 was spent to revive the pier. Several business ventures on the pier failed, and in 2008 a further serious fire necessitated the demolition of the pier. It was never rebuilt.

Southport, Lancashire (Existing) – This is the 2nd longest pier in the country. It was built in 1859 and was extended to 4380 feet in 1864. A combination of fires and storms in 1933 and 1957 resulted in its length being shortened to 3633 feet, which remains its length now.

Worksheet 12 – Pier factsheet

(Continued)

Wales

Aberavon, Wales (Lost) – Built in 1898 Aberavon pier was originally used by the port company. It was bought in 1902 by Aberavon District Council and turned into a pleasure pier. During the mid-1920s, a series of storms damaged the pier. It was closed during the Second World War and never reopened becoming derelict; it still exists but acts as a breakwater and is no longer used as a pier.

Llandudno, Wales (Existing) – The current pier replaced an old pier which was part of the harbour and was demolished in 1876. When the current pier opened in 1877, it was 1234 feet long. A pavilion was added in 1884 and the pier was extended to 2295 feet.

East Anglia

Hunstanton, Norfolk (Lost) – This pier was opened in 1807, at 830 feet long. In 1882, there was a paddle steamer service to Skegness pier. The pier was destroyed by fire in 1939 and never rebuilt.

Southwold, Suffolk (Existing) – This pier opened in 1900, at 810 feet long. Steamers would offload visitors from London, Clacton and Great Yarmouth, but this ended in the 1930s. The pier was taken over by the Navy during the Second World War, and was damaged by a mine in 1940. By 1979, following several storms, the pier was only 150 feet long.

South-west England

Plymouth Promenade Pier, Devon (Lost) – The pier was opened in 1884 and was 480 feet long, costing £45,000. In 1891, a 2000 seat pavilion was added for dancing, concerts and wrestling. The pier was bombed in March 1941; it was never rebuilt, and was demolished in 1953.

Weston-Super-Mare Grad Pier, Somerset (Existing) – This was the second pier to be built in Weston-Super-Mare. It was opened in 1904 and was 1080 feet long. It cost £120,000 to build. The pavilion was damaged by fire in 1930 and was replaced by a funfair.

South-east England

Dover Promenade Pier, Kent (Lost) – The pier opened in 1893. It was 900 feet long and cost £24,000 to build. It was demolished in 1927, after becoming dilapidated.

Southend on Sea, Essex (Existing) – This pier is the longest in the UK today, although the first pier was only 600 feet long when it was built in 1830. It was replaced by the current iron pier in 1888. In 1890 an extension made it the world's longest pier, reaching 7070 feet long. It was damaged by fires in 1976, 1989 and 2005, but major redevelopment helped to repair and reopen the pier.

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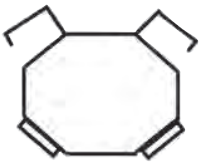
Worksheet 13a – Beach defences

This is a plan drawing of beach defences used during the Second World War. Can you label the features using the words provided?

Name: _____

Cliff / headland

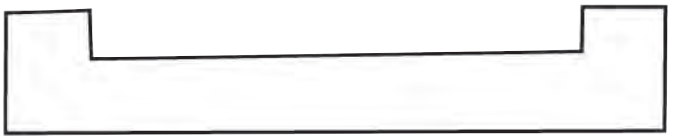
P



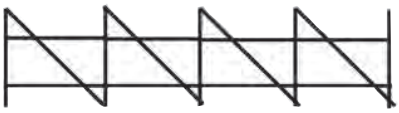
Words to use:

Beach scaffolding
Pillbox
Barbed wire entanglements
Anti-tank wall
Anti-tank blocks

T



W



H

T

Sea at low tide

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Worksheet 13b – Beach defences

Can you match these photographs of beach defences used during the Second World War to the plan on Worksheet 13a?

Name: _____

1. _____

2. _____

3. _____

4. _____

5. _____

ANSWERS

1. Anti-tank wall
2. Anti-tank blocks
3. Barbed wire entanglements
4. Beach scaffolding
5. Pillbox

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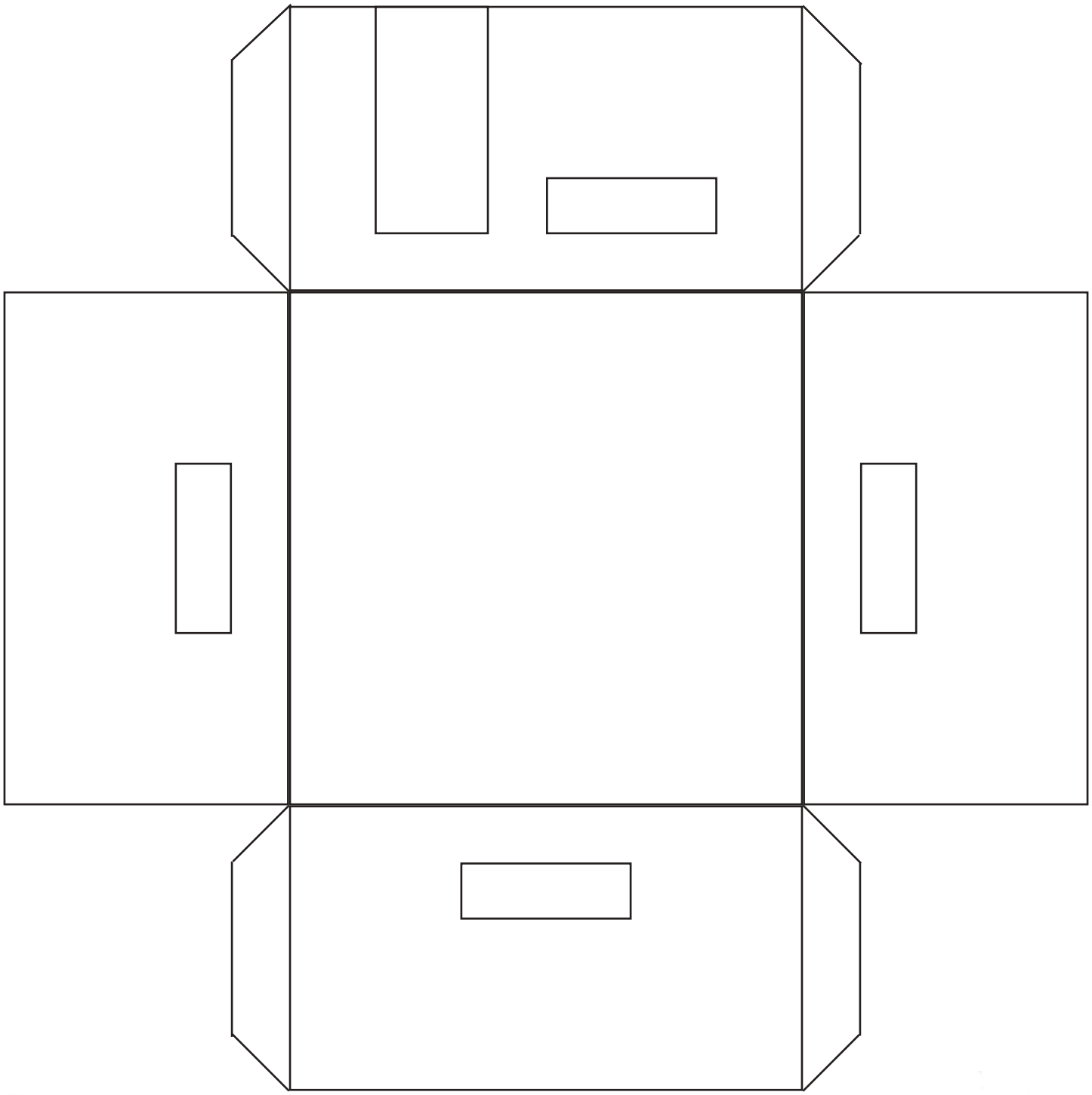
Worksheet 14 – First World War pillbox template

Use the template to create your own pillbox.



Worksheet 15a – Battleships

Follow the instructions on this sheet to play a game of Battleships against a friend!

This game of Battleships uses naval vessels from the past. You will need to place the vessels in the list at the onto your grid (on Worksheet 15b) by shading in the correct number of squares for each type of vessel, and labelling them with the right letter. Your ships can be horizontal or vertical, but must be made up of the correct number of squares. They can be placed next to each other, but they must not overlap. Make sure your opponent can't see where you have put them!

To 'fire' at your opponent's ships, choose a grid square and call out the co-ordinates, for example "A,3" or "E,9". Your opponent will then tell you whether you have a "hit" or a "miss". Remember to mark each of your shots on the second grid so you can keep track of your guesses. When you have a "hit", your opponent will tell you which type of vessel you have shot. If it is a vessel made up of more than one square, it is a good idea to fire your next shots at adjacent squares to try to hit the rest of the vessel. When all the squares that make up a vessel have been hit, it has been sunk.

Take it in turns to fire your shots; remember to record your opponent's guesses on your first grid (where you placed your vessels) so that you can keep track of when your vessels have been sunk by your opponent. The winner is the first person to sink all of their opponent's naval vessels!

The vessels to add to your sheets are:

3 x Sloops (1 square marked S) – a one-masted sailing vessel usually used for inshore fishing.

2 x Schooners (2 squares marked Sc) – two-masted sailing ships known for their speed and used for offshore fishing and privateering. Famous schooners include *HMS Pickle* (which carried news of Nelsons death at Trafalgar back to Britain) and the *Hispaniola* (a fictional ship from Robert Louis Stevenson's book *Treasure Island*).

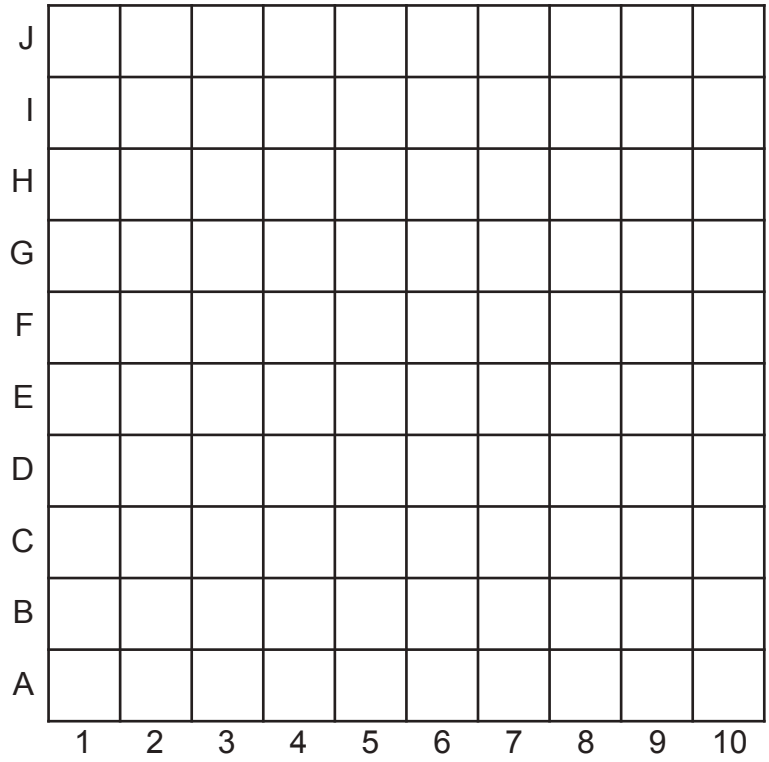
1 x Brig (3 squares marked B) – fast and manoeuvrable two-masted sailing ships used as naval warships or merchant vessels, but also popular amongst pirates. Examples include *HMS Badger* (the first ship Nelson served on in 1777) and the *Jolly Roger* (Captain Hook's ship in Peter Pan).

1 x Barque (4 squares marked Ba) – a sailing ship with three or more masts which could operate with a smaller crew than a brig. By the 19th century, barques were used to carry passengers. Famous examples include *HMS Endevour* (which was the vessel Captain James Cook used to explore Australia and New Zealand from 1769-71).

2 x Galleon (4 squares marked G) – a large three- or four-masted warship which could also be used for commerce. Famous examples include the *Ark Royal* (built by Sir Walter Raleigh, she was the flagship of the British Navy against the Spanish Armada in 1588) and the *Golden Hind* (the ship which Sir Francis Drake used to circumnavigate the world in 1577-80).

Worksheet 15b – Battleships

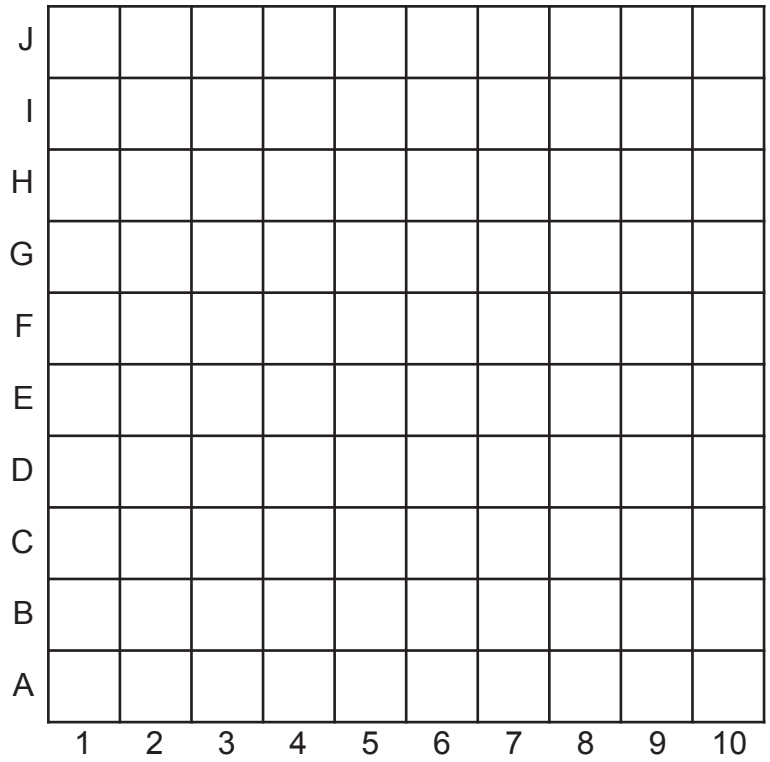
Use these grids to play a game of Battleships against a friend!



Your grid

Use this grid to mark where your naval vessels are positioned.

When your opponent fires a shot, mark their guess on the grid. Remember to tell them whether their shot is a “hit” or a “miss”



Your opponent’s grid

Use this grid to record your shots. Mark your “misses” with a cross.

When you “hit” one of your opponent’s ships, remember to mark which type of vessel it is. If it is a vessel made up of more than one square, you need to hit all of the vessel before you have sunk it!

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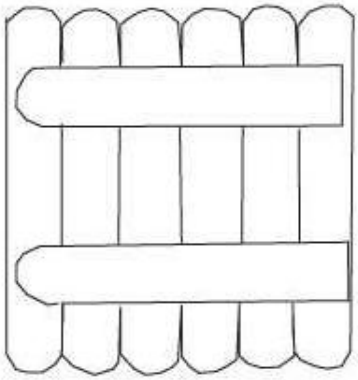
Worksheet 16 – Lollipop stick beach huts

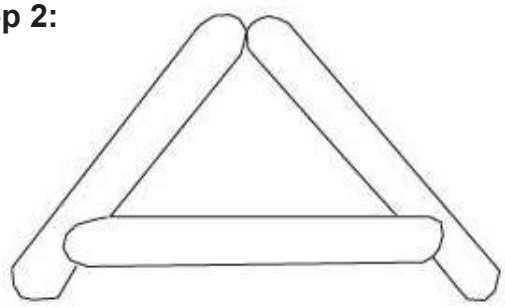
Follow the step-by-step pictures to create a lollipop stick beach hut

Step 1:



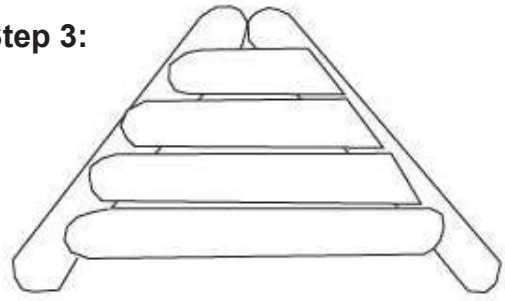
Lay six lollipop sticks alongside each other vertically and secure with two more sticks glued across them; trim off any ends

Step 2:



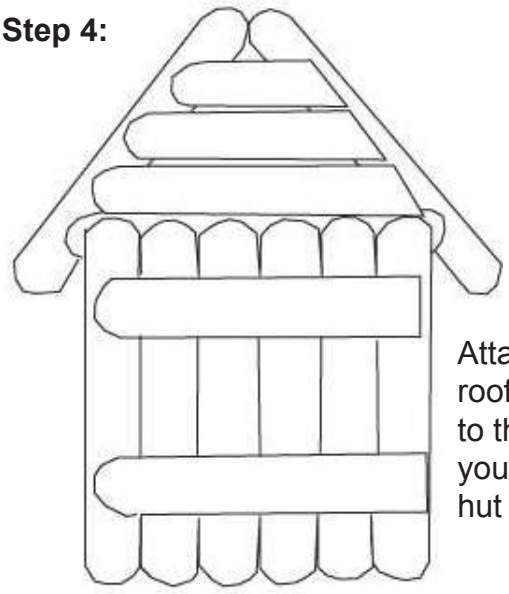
Create the roof shape with three lollipop sticks in a triangle shape, secured with glue

Step 3:

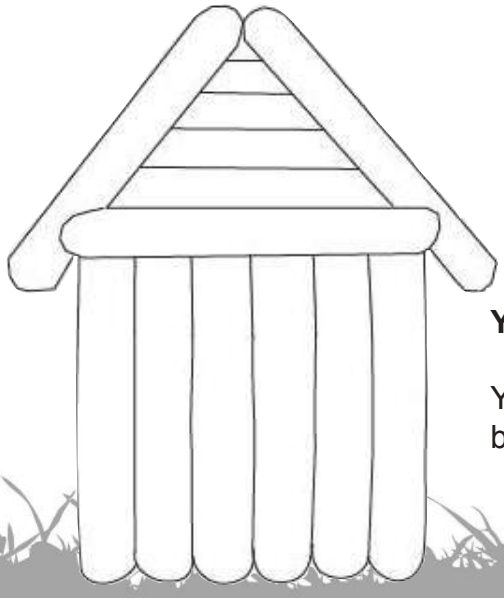


Add three further lollipop sticks to fill in the triangle shape to complete your roof; secure with glue and trim off any ends

Step 4:



Attach your roof structure to the front of your beach hut with glue



Your beach hut is finished!

You can colour it in using brightly coloured felt tip pens

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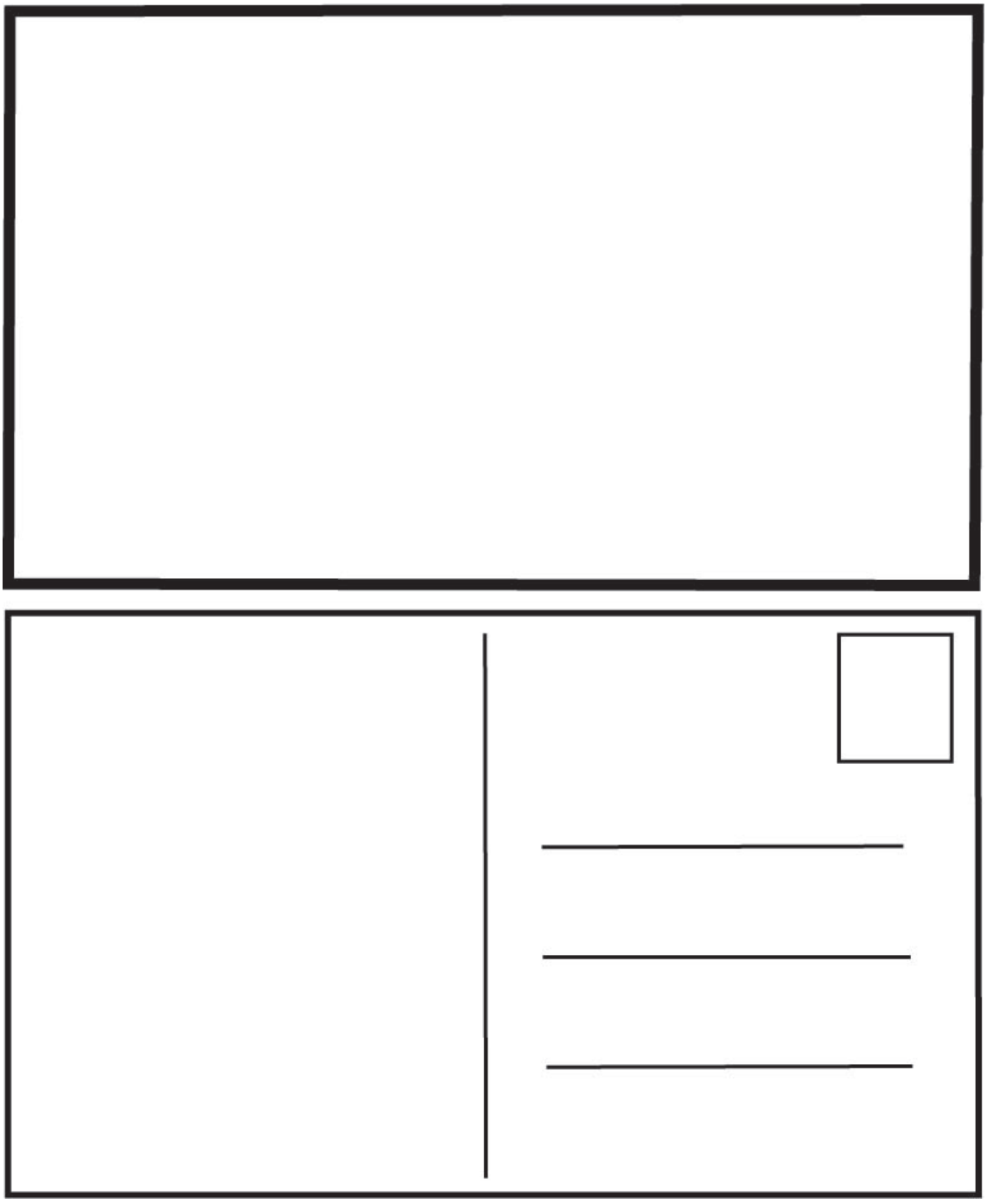
Worksheet 17 – Seaside postcard

Draw a Victorian seaside picture and write your message!

Name: _____



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Worksheet 18 – Pier Top Trumps

Create a Top Trumps card for your favourite pier!

Name: _____

Length of pier	
Date of construction	
Date of destruction	
Cost to build	

Worksheet 19 – Timeline of vessels

Below are the names and a brief description of some famous boats and ships. Cut them out and try and put them in order of earliest to latest.

Abbreviations:

HMS	*Her/His Majesty's Ship (Royal Navy)*
SS	*Steam Ship*
RMS	*Royal Mail Ship (ship which carried post as well as passengers)*
HMY	*Her/His Majesty's Yacht (The Queen/Kings personal ship)*

Ferriby boats
Three boats were found in the deposits of the Humber Estuary and exposed first in the 1930s. They are constructed of oak planks sewn together and there was enough room for 18 paddlers. A boat from a similar date was found in Dover.

HMS Victory
This ship was Admiral Lord Nelson's flagship at the Battle of Trafalgar which was fought against the French lead by Napoleon. She is also the ship on which Nelson died after being shot.

Cutty Sark
This ship was a tea clipper built on the River Clyde in Scotland. She was one of the last sailing ships built, before steam ships became quicker. She carried tea from China to Britain. Later she carried wool from Australia, and became the fastest ship for ten years to do the journey.

HMY Britannia
This three-masted sailing ship is the former yacht of Queen Elizabeth II. *Britannia* was the 83rd vessel built for a royal since Charles II, and was in use for 43 years. She was built on the Clyde in Scotland. Queen Elizabeth II toured aboard the Royal Yacht for her Silver Jubilee.

SS Great Britain
Designed by Isambard Kingdom Brunel, she was the first iron-built steamer to cross the Atlantic and was the largest vessel afloat when she was first built. She was a passenger ship. She was abandoned in the Falkland Islands after the First World War, before being rescued in the 1970s.

Newport ship
The Newport ship was found in 2002 in Newport, South Wales, during a redevelopment of the riverbank of the Usk. A large number of well-preserved leather shoes and Portuguese pottery was recovered from her.

***Peggy* of Castletown**
The *Peggy* is the oldest surviving vessel in the Isle of Man and the oldest surviving schooner in the world. She was built for George Quayle, whose house is now the Nautical Museum. After Quayle's death, she was forgotten about for over 100 years. Work started to restore her in 2014.

Worksheet 19 – Timeline of vessels

(Continued)

Ardnamurchan boat
Found in 2011 in Western Scotland, this boat was found as part of a boat burial of a high-status individual from Scandinavia. Although none of the wood survived, around 200 rivets which held the planking together did survive.

HMS Endeavour
This ship, captained by James Cook, was used to explore and claim parts of the South Pacific, including Australia and New Zealand. A shipwreck which is thought to be the *Endeavour* was found off the East coast of the USA, after apparently being sunk during the American Revolution.

Mary Rose
The *Mary Rose* was Henry VIIIs flagship, which sunk during the Battle of the Solent against the French. The shipwreck was found in 1836, but then it was lost again. In 1982, the *Mary Rose* was lifted from the seabed. She is now housed in a purpose-built museum in Portsmouth.

RMS Lusitania
The *Lusitania* was torpedoed by a German U-Boat during the First World War whilst en route from the USA to Great Britain. She sank in just 18 minutes with huge loss of life. The sinking was one of the reasons the USA entered the War, as many Americans were on the *Lusitania* when she sank.

RMS Titanic
Most people know the story of the *Titanic*. Built in Belfast, she left Southampton en route to New York, via Cherbourg in France. Four days into her maiden voyage, she struck an iceberg and sunk. It was one of the deadliest maritime disasters during peacetime.

HMS Beagle
This is the ship that Charles Darwin sailed on for his five-year expedition which lead him to write his famous book *On the Origin of Species*. The ship sailed to South America, including the Galapagos Islands.

HMS Ark Royal
This ship was an aircraft carrier for the Royal Navy, built just before the Second World War. She was known as the “Lucky Ship”, after the Germans misreported sinking her several times. She was finally hit and sunk by a torpedo from a German Submarine, but with only one loss of life.

Worksheet 19 – Timeline of vessels

ANSWERS

Below are the actual dates the ships were launched and either took their last voyage or were sunk.

Ferriby boats – Bronze Age (3rd-2nd Century BC)

Ardnamurchan boat burial – approx. 900-950 AD

Newport ship – 1449-1469

Mary Rose – 1511-1545

HMS Endeavour – 1764-1778

HMS Victory – 1765-1922

Peggy of Castletown – 1789-1804

HMS Beagle – 1820-1870

SS Great Britain – 1843-1886

Cutty Sark – 1869-1938

RMS Titanic – 1911-1912

RMS Lusitania – 1906-1915

HMS Ark Royal – 1938-1941

HMY Britannia – 1954-1997

Worksheet 20 – Talk like a pirate!

This worksheet has phrases which originated on board ships but which we still use today. Learn what they mean so you can talk like a pirate!

You can use the phrases on this worksheet in several ways. You could play a pairing game, trying to match the pirate/sailor phrase with its modern meaning. Or you could get a leader to read out the pirate/sailor phrase and challenge your members to write down what they think it means. You could even use the phrases in your own pirate-themed role plays!

These nautical phrases and more can be found at www.see-the-sea.org/nautical/naut-body.htm

Armed to the teeth This expression does not originate with pirates holding swords in their teeth! "To the teeth" means fully or completely, so the phrase means fully armed.

As the crow flies The most direct route from one place to another without detours. Before modern navigational systems existed, British vessels carried a cage of crows. These birds fly straight to the nearest land when released at sea thus indicating the most direct route to the nearest land.

At a rate of knots To go at top speed. This is used to describe someone who is travelling or driving very fast. A knot is a measure of speed for ships.

Bigwigs: Senior officers in the English Navy were known as "bigwigs" because they wore huge wigs. Today the word bigwig is still used to refer to the most important person in a group.

Bite the bullet: If you bravely face up to something unpleasant, you are said to "bite the bullet". This originated from the practice of giving sailors a bullet to bite during amputations or other surgery before the use of anesthetics.

Black book: Beginning in the 1300s, a collection of maritime laws and conduct became known as the *Black Book of the Admiralty*. The punishments for offences were often harsh. Today, if your name is in someone's black book, they believe you have offended them in some way.

Clear the deck In preparation for stormy weather, the phrase "Clear the deck" meant removing anything from the deck that was not essential. Today this phrase is usually used when preparing to start a project in order to be fully ready for new information.

Come through the hawse-pipe The hawse-pipe is a pipe in the ship's bow for the anchor cable to run through. Anybody who has risen to Captain from lowly deckhand is said to have "come up through the hawse-pipe." Today the expression is also used outside for people outside the Navy who have risen up through the ranks.

Worksheet 20 – Talk like a pirate!

(Continued)

Davy Jones' Locker Seamen's slang for the bottom of the sea. This expression is believed to be from the story of Davy Jones, the owner of a 16th-century London pub, where unwary sailors were drugged, put in lockers, and then awoke aboard ship to find they had been 'recruited' into the Navy.

Dressed to the nines To celebrate victories, a returning ship would approach her home waters or port "dressed" in bunting and flags. As many of the crew as possible would line up on the nine primary yards as a salute to their monarch. Today the expression is often used to describe a person who is dressed up in fancy clothing.

Feeling blue Today "feeling blue" means being sad or depressed. It comes from a custom that was practised when a ship lost her captain during a voyage. The ship would fly blue flags and have a blue band painted along her hull when she returned to port.

Give a wide berth Today this means to keep a safe distance, which is the same as the nautical origination to avoid a collision by allowing a large distance between vessels when maneouvering.

Go to the head This is synonymous with going to the toilet! The expression comes from the fact that on sailing ships, the toilet was located forward, close to the figurehead or the "head" of the vessel.

Holy Mackerel Because mackerel is a fish that spoils quickly, merchants were allowed to sell it on Sundays contradicting the blue laws in 17th-century England. The phrase "Holy Mackerel!" is still used today as an expression of surprise.

Idler This was the name for those members of a ship's crew, such as cooks and sail-makers, that did not stand night watch because of their work.

Keel hauling This was a naval punishment during the 15th and 16th centuries. The crew member who was to be punished was dragged under the bottom of the boat from one side of the boat to the other. The term "keel hauled" is still used to mean a severe punishment.

Loose cannon Today the term "loose cannon" refers to someone who is out of control, and who may cause damage, just as canons would do if they were to break loose on the decks of sailing vessels.

Mind your P's and Q's Sailors would get credit at the taverns in port until they were paid.
The barman would keep a record of their drinks on a chalkboard behind the bar. A mark was made under "P" for pint or "Q" for quart. On payday, the sailors were liable for each mark next to his name, so he was forced to "mind his P's and Q's." Today the term means to remain well behaved.

Worksheet 20 – Talk like a pirate!

(Continued)

Old Salt Nautical term for old, retired sailor or someone with many years of sailing experience. The term is also used to mean a genuine person.

Round robin This is an expression rooted in British nautical tradition. Sailors planning a mutiny would sign their names in a circle, or a round robin, so the leader could not be identified. Today the term is often used in sporting events and competitions when referring to a series of games in which all members of a league play each other one time.

Skyscraper This word is most commonly used to describe a tall building. It originates from the term for a small, triangular-shaped sail that was set above the other sails on the old square-rigged vessels. They were so tall they seemed to scrape the sky.

Square meal This is an expression synonymous with a proper or substantial meal. It originated from the square platters that were used to serve meals aboard ships.

Stick in the mud This expression was originally used to refer to someone of no consequence, such as a pirate or mutineer. It came from the old English practice of burying executed criminal seamen in the mud of the River Thames. Today the expression is used to mean someone not likely to be persuaded to change.

Whole nine yards This expression means everything or all encompassing. The expression comes from the old square-rigged sailing vessels that had three masts with three yards of sails on each. The whole nine yards meant all sails were up.

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Worksheet 21a – Contraband or not?

Which of these items were contraband?

Tea

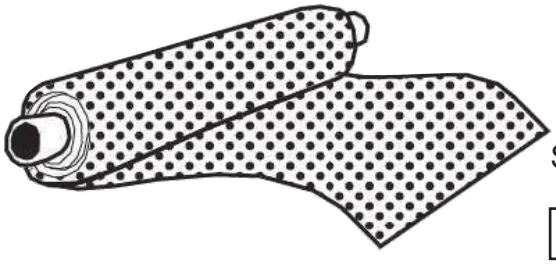
☐ Yes

☐ No

Salt

☐ Yes

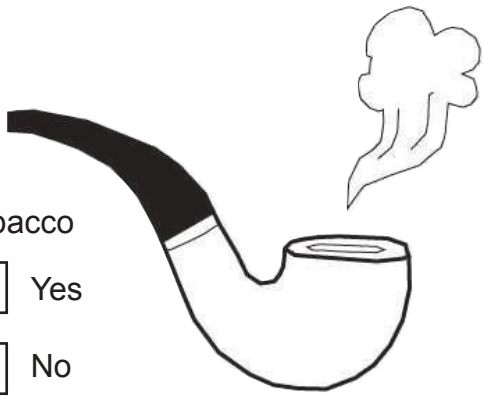
☐ No



Silk

☐ Yes

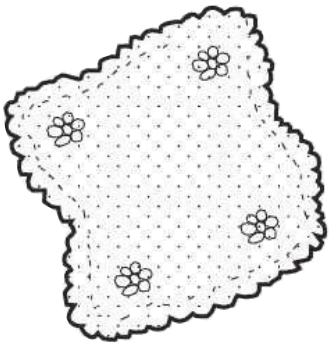
☐ No



Tobacco

☐ Yes

☐ No



Lace

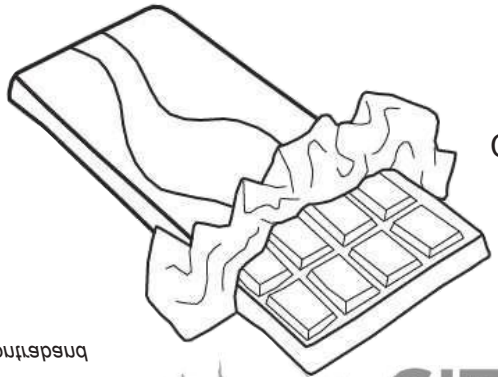
☐ Yes

☐ No

Brandy

☐ Yes

☐ No



Cocoa beans

☐ Yes

☐ No

All these items were contraband

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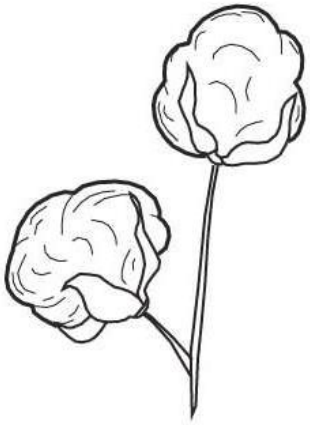
Worksheet 21b – Contraband or not?

Which of these items were contraband?

Cotton

☐ Yes

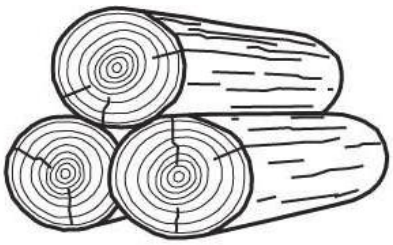
☐ No



Timber

☐ Yes

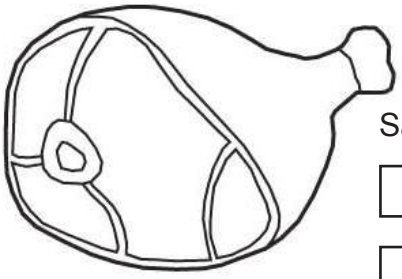
☐ No



Salted meats

☐ Yes

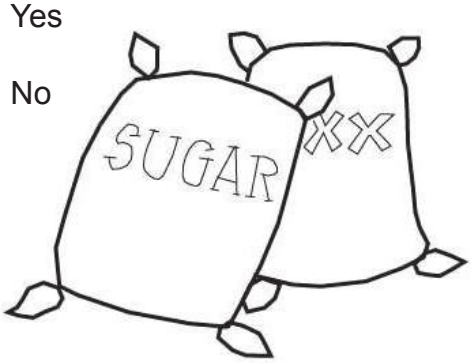
☐ No



Sugar

☐ Yes

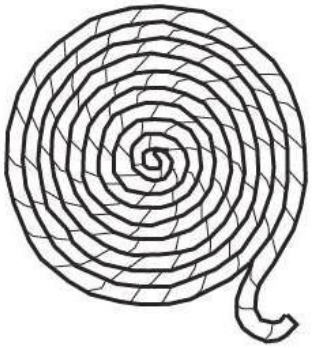
☐ No



Rope

☐ Yes

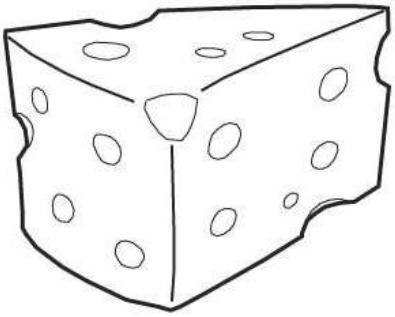
☐ No



Cheese

☐ Yes

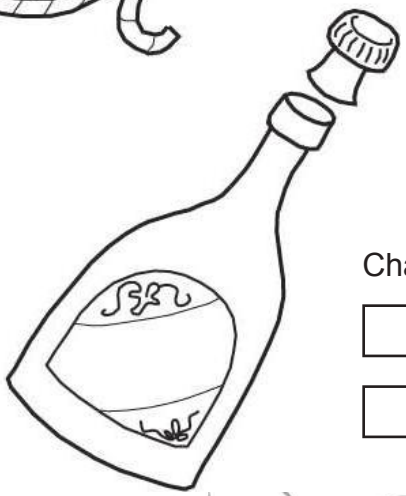
☐ No



Champagne

☐ Yes

☐ No



All these items were not contraband

Worksheet 22 – Timeline of lifesaving

Cut out the events and dates below, and muddle them up before getting your members to put them back in the right order, matching the correct date to the fact. Currently the timeline below shows the correct order (so this worksheet is also an answer sheet!). Putting the dates in order first may help your members to decide when the events took place.

Formby Lifeboat Station is established to serve the treacherous Mersey Estuary, this is the first of its kind in the UK.	1777
Lionel Lukin converts a Northumberland Coble into an “unimmergable” boat as the first lifeboat.	1785
Henry Greathead, from South Shields, builds the first purpose-built lifeboat, called the *Original*.	1795
The Royal National Lifeboat Institution (RNLI) was formed, but local lifeboats and lifeboat services had been in existence prior to this.	1824
The *Original* is wrecked in the mouth of the Tyne whilst assisting a ship in distress.	1830
The *Tyne* replaces the *Orginal* as one of the lifeboats working on the Tyne. The Tyne is the second oldest lifeboat still in existence in the UK .	1833
Grace Darling and her father make a daring trip to rescue survivors of the wrecked *SS Forfarshire* and get there before the lifeboat from Seahouses.	1838

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Worksheet 22 – Timeline of lifesaving

(Continued)

The cork lifejacket is introduced, by Captain Ward. It was a canvas jacket with strips of cork sewed on to it. Before this lifejackets were rarely used.	1854
The *Zetland*'s final launch. The *Zetland* is the oldest lifeboat in existence in the UK and is in the RNLI museum at Redcar.	1880
During a severe gale, volunteers at Lynmouth in Devon dragged their lifeboat for 13 miles to launch at Porlock Weir to aid a vessel in distress.	1889
Cork jackets are replaced by Kapok lifejackets. This a fibre which does not absorb water so they are more buoyant than cork jackets. They remained the standard for 70 years.	1904
First motorboat used as a lifeboat by the RNLI.	1905
The *Suevic* was wrecked off the Lizard peninsula in Cornwall. The rescue set the record for the largest number of people saved in a single operation in RNLI history (456 people) – a record that still stands today.	1907
During the First World War (1914–1918), lifeboats were launched 1,808 times and saved 5,332 lives.	1917-18

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Worksheet 22 – Timeline of lifesaving

(Continued)

Two RNLI crews joined an armada of little ships for one of the Second World War's greatest rescues: Operation Dynamo at Dunkirk.	1940
The first woman joined the crew of the RNLI – 18-year-old Elizabeth Hostvedt.	1969
Beaufort jackets replaced Kapok jackets after the development of synthetic foams. They had more buoyancy around the neck, so if the wearer was unconscious they would float face upwards.	1970
Modern RNLI lifejackets introduced.	1990
The RNLI start to patrol the River Thames. These are the first lifeboat stations to specifically cover a river rather than estuarial waters or the sea.	2002
The RNLI start using hovercrafts.	2002

Worksheet 23 – Grace Darling role play

This is the story of Grace Darling, who along with her father, William, attempted a daring rescue to save survivors of a nearby shipwreck.

Characters:
Narrator
Grace Darling
William Darling, Grace's father
Four survivors of the *SS Forfarshire* (one of whom is badly injured)
Rider
Three members of the Seahouses lifeboat crew
William Darling, Graces brother

If there are not enough members of the cast for all the characters, you can double up roles. For instance the rider and William Darling (the brother) can be played by one person.

Narrator: Grace Darling lived on the Farne Islands, off the Northumberland coast, where her father, William Darling was a lighthouse keeper.

Grace and William wave

Narrator: Grace was the seventh of nine children. She was 22 years old when she undertook the rescue.

The four survivors sit on a pretend ship, rocking slightly like they are at sea. They hit a storm; rock more violently

Narrator: On the 5th September 1838, the *SS Forfarshire* set off from Hull heading for Dundee. But in the early hours of the 7th September, they hit a storms and the ship was pushed onto the rocks and broke in half. A few people managed to escape the sinking ship. Nine people were stranded on a rock and 45 people died as the ship sunk.

The survivors cling together on a pretend rock; the badly injured survivor lies on the floor

Survivors: Help! Help! Help!

Narrator: Grace spots the shipwreck and goes to her father to tell him.

Grace spots the sinking ship, then runs to William

Grace: Father, there is a shipwreck on the rocks. Do you think there will be survivors?

William: I don't know. But the lifeboat from Seahouse will not be able to reach them in time!

Worksheet 23 – Grace Darling role play

(Continued)

Grace: We might be able to reach the survivors easier from here. The rocks are only half a mile away.

William: Yes, but I will need your help to row there, Grace. Are you brave enough to try in these stormy seas?

Narrator: Grace and her father decide they must try and reach any survivors of the stricken ship. They get in their rowing boat and begin the journey to the wreck of the *SS Forfarshire*.

Grace and William get in a boat and pretend to row

Narrator: Meanwhile, the lifeboat service at Bamburgh has also spotted the *SS Forfarshire*.

Surviviors: Help! Help! Help!

The rider sees the survivors and gallops off to the lifeboat crew

Rider: There is a shipwreck off the coast, you must launch the lifeboat!

The lifeboat crew, including Grace's Brother, run to the lifeboat and row frantically

Narrator: The lifeboat launches from Seahouses. Seahouses was the first place to have a specially adapted Northumbrian Coble, designed by Lionel Lukin, to be an "unimmergible" boat. It was built in 1785. Amongst the crew of the lifeboat is one of Grace's brothers, also named William Darling.

Grace's brother waves

Crew: Row! Row! Row!

Narrator: As the Seahouses lifeboat crew launches their coble, Grace and her father reach the stranded survivors on the rocks. Grace holds their boat steady in the rough seas with the oars whilst William jumps onto the rocks. There he finds eight men, one of whom is badly injured, and one woman.

Grace continues to row backwards and forwards, struggling against the heavy seas, to keep the boat steady; William jumps onto the rocks with the survivors

Worksheet 23 – Grace Darling role play

(Continued)

Narrator: William decides they will need to take two trips to collect all the survivors.

William: I will take the woman, the badly injured man and two of the fittest men. We will leave the woman, the injured man and Grace at the lighthouse. You two men will help me row back to collect the others.

William and all the survivors climb into the boat which Grace is still managing to hold steady, and begin to row back to the lighthouse

Narrator: At the lighthouse. Grace stays to care for the survivors with her family and her father returns for the rest of the survivors with the two crew members.

Grace cares for the injured man

Narrator: Meanwhile, the lifeboat crew have reached the rock where the shipwreck is. As the sea was so treacherous, it took them several hours of hard rowing. They reached it only 30 minutes after William Darling had left for the second time with the rest of the survivors.

Grace's brother: There is no one here! Are we too late? It is too dangerous and far to row back to Seahouses. My family lives at the lighthouse and its only half a mile away. Let's row there and we can stay until the weather is better and the sea calmer.

The lifeboat crew row to the lighthouse where William, Grace and the survivors are

Narrator: The lifeboat crew were astonished to find the survivors at the lighthouse.

The lifeboat crew act surprised to see the survivors at the lighthouse

Narrator: But now there were the Darling Family, nine survivors and six men from the lifeboat crew at the lighthouse and there was not at lot of room. Three days later the lifeboat crew could return to mainland with the survivors.

Overnight Grace became a hero. Even Queen Victoria wrote her a letter of recognition and sent her £50. The RNLI awarded both Grace and William Darling the Silver Gallantry medals

Four years later, Grace died, aged just 26, from tuberculosis. She was buried at St Aiden's in Bamburgh, a mile north of Seahouses. The RNLI have a museum there dedicated to her memory and bravery.

Worksheet 24a – Ship bingo

Fill in your grid on Worksheet 24b with vessels of your choice from the list, then play a game of ship bingo.

Ship bingo is slightly more complicated than normal bingo! Fill in your grid (on Worksheet 24b) with the names of nine of the ships in the list below. Try to pick from different categories; but you might like to double-up as your leader might be sneaky and ask the same question more than once!

When you have filled in your grid, listen carefully to the questions asked by your leader. If you have a vessel which is a correct answer to the question, you can cross it off your grid. The winner is the first person to cross off all of their ships.

Abbreviations:

HMS – Her/His Majesty's Ship (Royal Navy)
SS – Steam Ship
RMS – Royal Mail Ship (ship which carried post as well as passengers)
HMY – Her/His Majesty's Yacht (The Queen/King's personal ship)

Prehistoric boats: Ferriby Boats, Dover boat, Brigg raft

Local variations for river use: Thames sailing barge, Humber keel, Mersey flat, Northumberland coble

Fictional boats and ships: *Jolly Roger* (*Peter Pan*), *Hispaniola* (*Treasure Island*), *Swallow* (*Swallows and Amazons*)

Medieval and Elizabethan ships: Newport ship (medieval), *Mary Rose* (medieval), Gresham ship (Elizabethan)

Ships used by explorers and scientists: *Golden Hind* (Sir Francis Drake), *HMS Endeavour* (Captain Cook), *HMS Beagle* (Charles Darwin), *Discovery* (Robert Falcon Scott)

Warships used during the Napoleonic Wars: *HMS Badger*, *HMS Triumph*, *HMS Victory*

Submarines: *Holland*, U-Boats

Iron and steel hulled ships: *SS Great Britain* (iron), *RMS Titanic* (steel), *RMS Lusitania* (steel)

Lifeboats: *Original* (River Tyne), *Tyne* (River Tyne), *Zetland* (Yorkshire)

Royal Yachts: *HMY Britannia*, *HMY Victoria and Albert*

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Worksheet 24b – Ship bingo

Fill in your grid with vessels of your choice from the list on Worksheet 24a, then play a game of ship bingo.

Name: _____
