Wildlife in the MCZ

Ages 7-11

MARINE CONSERVATION SOCIETY

NORFOLK COAST
AREA OF OUTSTANDING NATURAL BEAUTY

seafarers UK
Supporting the maritime community

The Wash and North Norfolk Marine Partnership
Protecting Nature and Culture

Life

Wildlife in the MCZ

The wildlife of the MCZ offers an interesting context for teaching about habitats, classification and feeding relationships. There are some slides to introduce the wildlife of the MCZ before looking in more detail at a particular unit. Rockpooling sessions provide great hands-on learning experiences linked to science.

Science – National Curriculum links (ages 7-11):

Living things and their habitats

Year 4

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

Year 6

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics

Animals, including humans

Year 3

- Identify that some animals have skeletons and muscles for support, protection and movement.

Year 4

- Construct and interpret a variety of food chains, identifying producers, predators and prey.

Evolution and inheritance

Year 6

- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

English

- Non-chronological reports

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Activity 1 Skeletons

A field trip to some rockpools provides an ideal opportunity to embed children's learning about skeletons. Explore the rockpools at Sheringham or West Runton beach at low tide to find a variety of life.

After searching for sealife, ask the children to think about the skeleton types of the creatures they have seen. Have they seen examples of endoskeletons, exoskeletons and hydrostatic skeletons? For each creature consider how its skeleton provides support, protection and movement.

It's quite likely someone will find a shed crab exoskeleton - they look like a dead crab, but there are holes where the eyes should be.

Having an exoskeleton means they have to shed their skeleton in order to grow. This is called moulting. Moulting takes place at night, a few hours after an initial crack appears at the back of the crab shell. The crab then has to drink copiously to swell up and force the shell apart along the crack.

The crab that emerges is soft and slimy, and it is vulnerable to being eaten by fish for the first few days. The shell's texture changes from slimy, when the crab first emerges, to feeling like paper, thin card and then cardboard, before finally hardening within 3-4 weeks.

Activity 2 Grouping and classifying

A good place to start this topic is our Grouping Animals lesson.

Follow up by using the images of creatures found in the MCZ in the slides below. In groups, pupils should sort them into groups using their own criteria, and then share and discuss the criteria each group chose. Can they explain why they grouped them that way?

Groupings could include:

Number of legs
Shell/no shell
Movement types: swim/don't swim/crawl/slither/static
Vertebrates/invertebrates

Vertebrates could be further split into bird/fish/mammal, and skeleton type could be revisited and split into endoskeleton/exoskeleton and hydrostatic skeleton.

Activity 3 Food chains

Give the children copies of the food chain pictures. They should use the information to create a food chain and cut out the images, order them and draw arrows. The arrows must show the direction of the transfer of energy from the food.

Discuss the terms producer, predator, prey, herbivore, carnivore, omnivore. Children should then label the producers, predators and prey on their food chains. Afterwards, use the slides to check their food chains.

Food chains provided:

Seaweed - prawn - sea bass – seal
Plankton - mussels - starfish - herring gull
Algae - periwinkle - lobster – human
Algae - periwinkle - shore crab - sea bass – seal
Seaweed - limpet - dog whelk - edible crab - human

These food chains have been chosen to show the range of plants that support life in the sea. The reality is that these food chains are part of a very complex food web with many creatures eating a wide range of things.

Activity 4 Rockpooling

Year 4 – Using a key

Explore the rockpool habitat at Sheringham or West Runton beach at low tide to find a variety of life. Children could use a key to identify the creatures and plants they find. Encourage the children to carefully lift up rocks and seaweed to find creatures that are hidden, then return rocks to the position they were found.

Get started in the classroom with our Outdoor Rockpool Explorers lesson.

Guidance about rockpooling can be found here: NMMC How to rockpool.

The Field Studies Council have a great Rocky Shore Name Trail available to purchase.

It's a good idea to have a field guidebook with you too to find out more about the sealife you come across. Our Rockpool Fact File has some useful information to get you started.

Take a look at Essex Wildlife Trust's Shoreline Identification Guide.

Whiteboard and printable resources about rockpool species available here: Benny the Blenny rockpool poster

Norfolk Wildlife Trust and the National Trust at Sheringham Park also offer rockpooling sessions.

Year 6 – Adaptations

A good place to start this topic is the How do creatures adapt? lesson.

If you can get to a beach, you could also use the Outdoor Rockpool Explorers lesson and explore the rockpools at Sheringham or West Runton at low tide. If you can't get to the coast, use the Indoor Rockpool Explorers lesson.

Encourage the children to consider how each creature they find manages to survive in this habitat - a place that isn't always covered by the sea, sometimes has waves crashing onto it and temperatures can fluctuate. How are they adapted to this environment?

This could be a good opportunity to recap different types of skeleton (see Year 3 Skeleton session).

Examples below:

- Crabs: hard shell to protect from rocks and predators. Place one on wet sand and watch it bury itself!
- Mussels: anchored to the rock, they close up when not covered by the sea.
- Beadlet anemones: can curl up into a ball, attached to rock.
- Periwinkles, whelks and limpets: foot secures them to rock, tough shell protects them.
- Prawns: well camouflaged from predators. Live in rockpools.
- Shrimps: well camouflaged from predators. Live in sandy areas. Place one on wet sand and watch it bury itself!

If your group is lucky enough to find two or more different species of crab encourage the children to look closely and compare them. What is the same about them? What is different? Why might that be?

Activity 5 Reports

Non-chronological reports

Use English lessons to expand your pupils' understanding further by writing non-chronological reports about the creatures.

An example of a non-chronological report is provided for Parpal Dumplin (purple sponge). Blank non-chronological report formats are included for the following species:

1. Shore crab
2. Edible (brown) crab
3. Common Lobster
4. Beadlet anemone
5. Common starfish
6. (Dotted) Sea hare (Aplysia punctata)
7. Tompot blenny (Parablennius gattorugine)
8. Common whelk (Buccinum undatum)

Children can research their chosen species using the websites below to find facts about appearance, diet, survival and other 'did you know?' facts:

wildlifetrusts.org/wildlife-explorer/marine

marlin.ac.uk/species

britishseafishing.co.uk/fish-species/other-sea-creature-species/

Wildlife in the MCZ

Much of the wildlife in the Cromer Shoal Chalk Beds Marine Conservation Zone is hidden beneath the surface but it is pretty amazing! Over 350 species of marine animals and plants have been recorded in the MCZ.

Watch the videos on the next slides to see some of the amazing creatures that live there.

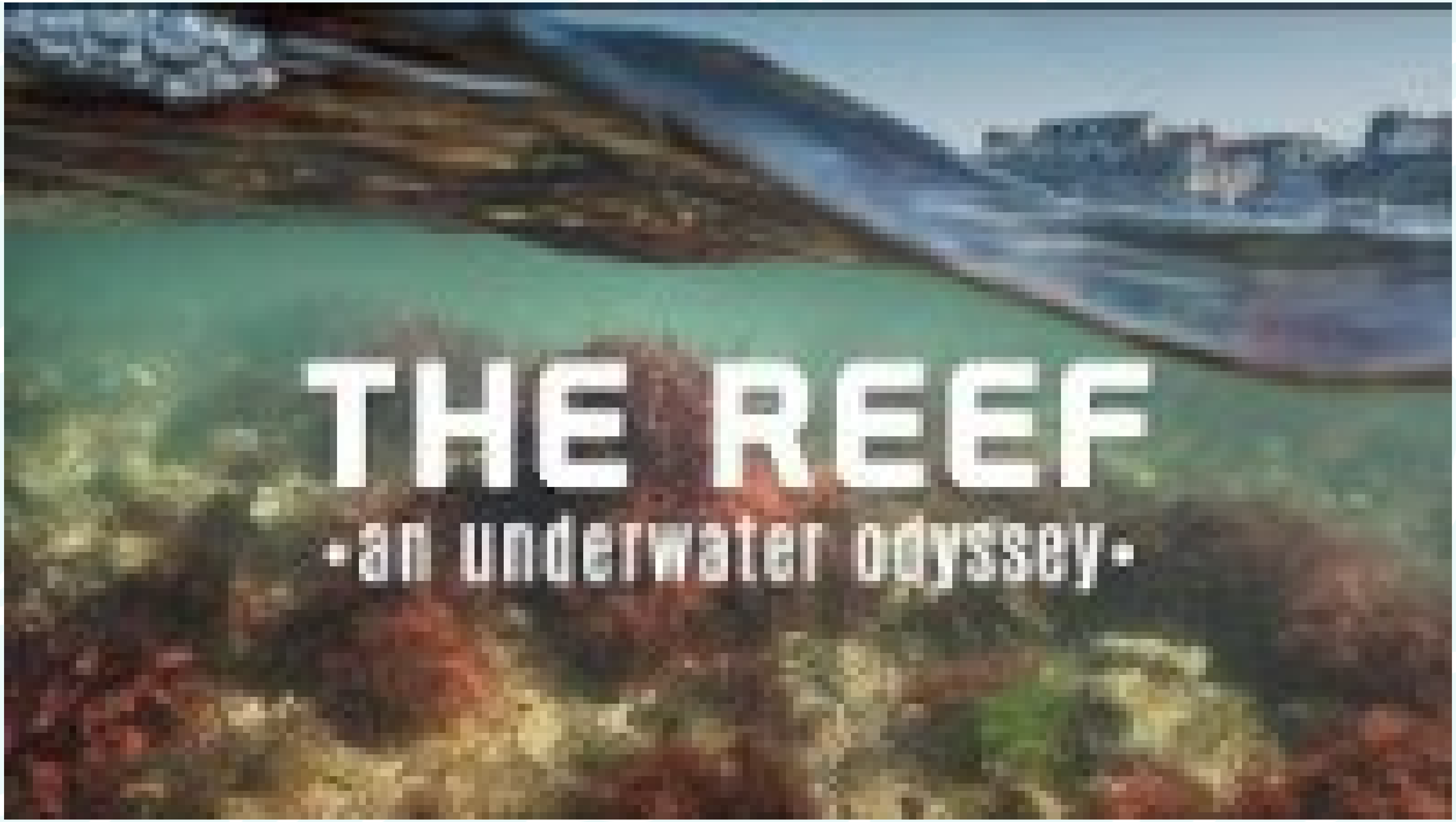
Photo: christaylorphoto.co.uk

Wildlife in the MCZ

3-minute video:

Wildlife in the MCZ

10-minute video:



Chalk seabed

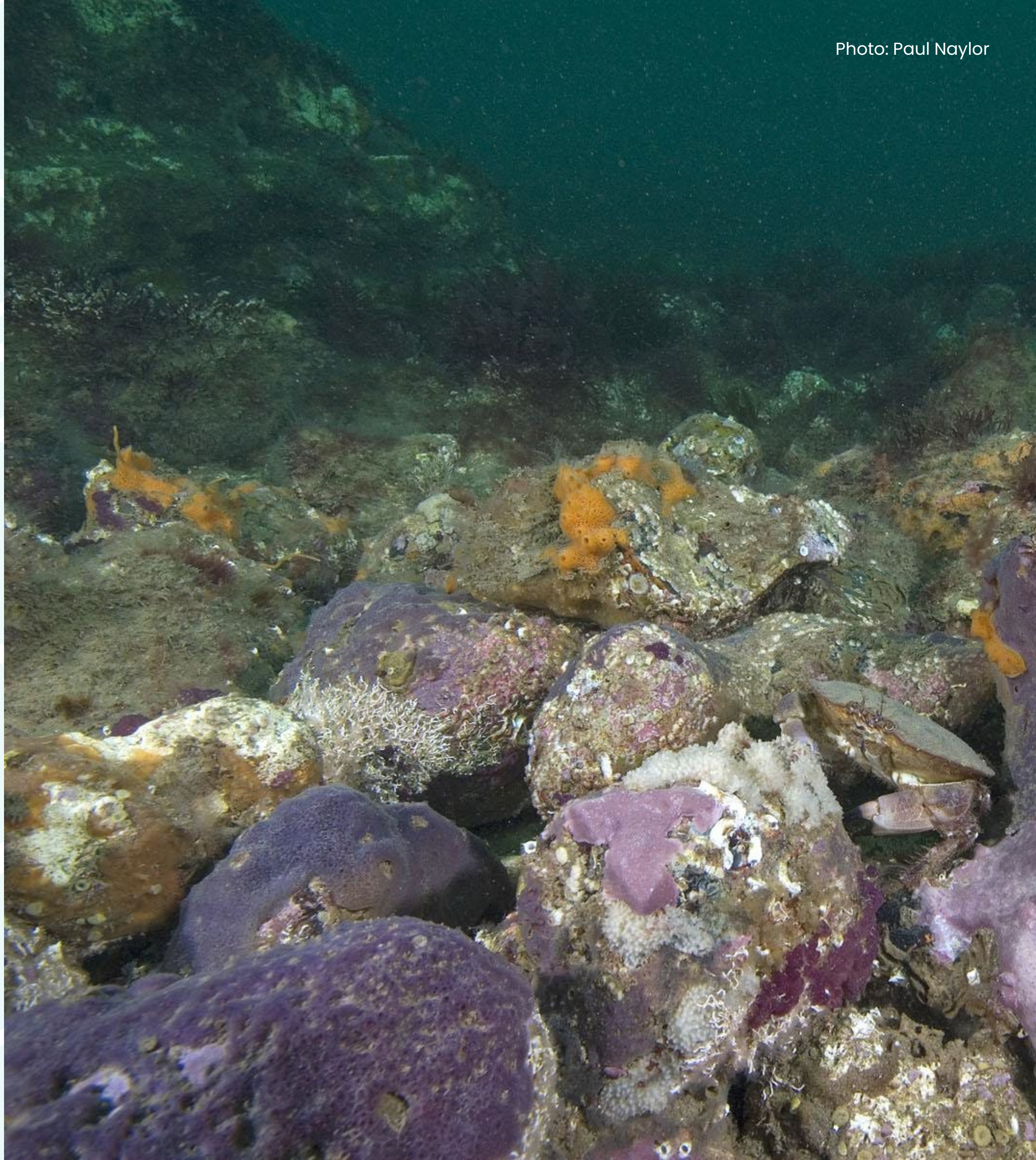
The chalk beds have holes, arches and ridges up to 3m high. These provide great places for wildlife to live and hide from predators.

The chalk provides a surface for seaweed and creatures to attach to. It is a different habitat to much of the seabed in the North Sea.

Parpal Dumplin

In 2011 some Seasearch divers noticed a purple sponge and with the help of scientists they realised it was new to science! It is the only place in the world where it is known to live.

In 2021 a competition was organised that a local school girl won. She named it **Parpal Dumplin** because it's purple and looks a bit like a dumpling!



Can you spot the crab?

These amazing spider crabs cut off and attach pieces of sponge to their shell to help them camouflage!

Threats to wildlife in the MCZ

Despite being hidden from view, the wildlife faces some threats.

The Marine Conservation Zone designation means that work is happening to protect the wildlife from these threats.

Potential threats include:

- Litter
- Wind farm development
- Coastal defence works
- Fishing

Litter

Beach clean organisers collect data about the litter collected. They can then identify where the litter is coming from and campaign to prevent it. Plastics are the main problem.

Plastic cotton buds were regularly found during beach cleans. Following campaign work, the government banned them from sale from 1st October 2020, along with plastic straws and stirrers. Now they are rarely found.

The sticks are now made from card, wood or bamboo which biodegrades naturally.

PhotoPisauikan

Plastics

Beach cleaners regularly collect litter from the beaches.

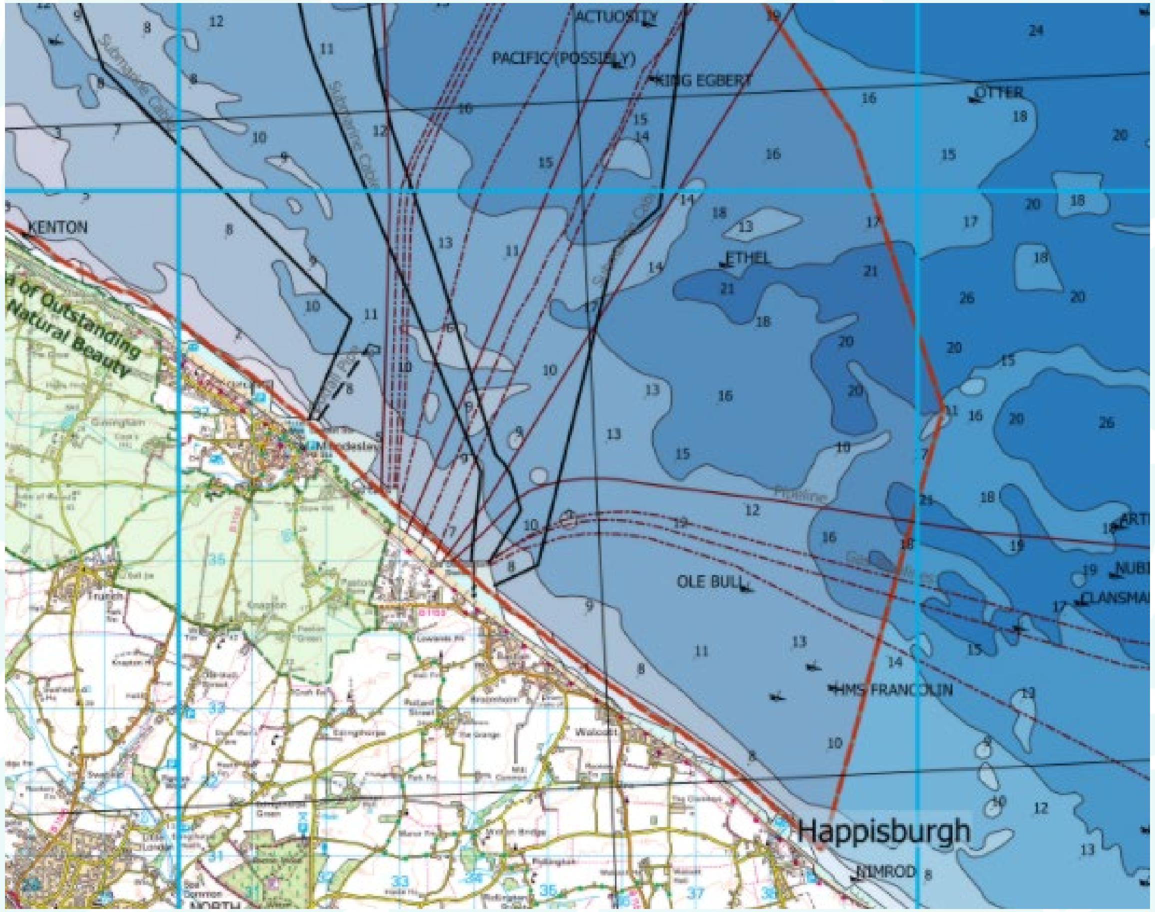
They have noticed lots of pieces of plastic edging from crab pots getting washed up on beaches. Use of plastic free, stainless-steel pots has the potential to remove this problem, but they are more expensive.

Photo: Rob Coleman

Oil, gas and windfarm development

The MCZ designation means extra considerations need to be made before permission is granted for development within the area.

A new wind farm altered its planned cable route to avoid the MCZ.



Coastal defence works

The North Norfolk coast is vulnerable to erosion as the cliffs wear away and fall into the sea causing the loss of farmland, housing and industry.

You can see various methods of coastal defence along the coast including:

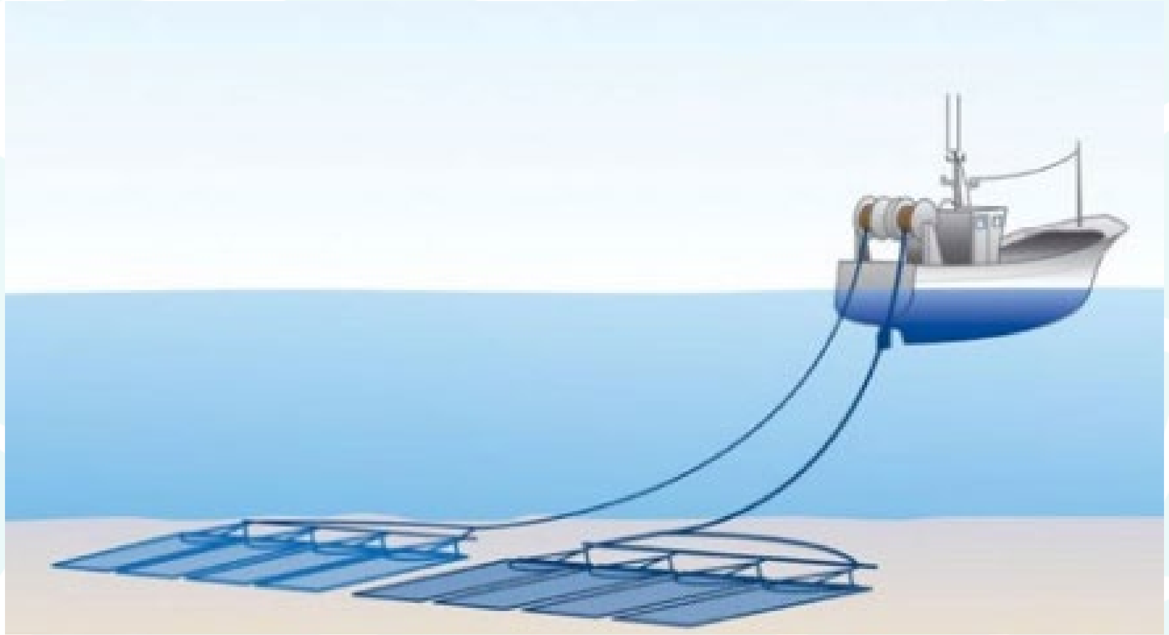
- Groynes
- Revetments
- Boulder barriers
- Sea walls
- Sandscaping

There was a big sandscaping project at Bacton in 2019 where 1.8 million cubic metres of sand were added to the beach.

These methods can all affect the seabed and the wildlife in the MCZ.

Damage from trawling and dredging

45% of the area was already a no-trawl and no-dredge area. A byelaw has extended this to 93% of the MCZ.



Overfishing

Overfishing is the catching of fish (or crabs!) faster than they can reproduce which causes numbers to decline.

Data about crab numbers and fishing effort is collected to monitor crab populations.

Some laws are in place to help prevent overfishing:

Fishers are not allowed to land crabs that are smaller than 115mm across their shell. This means they have at least one year to reproduce before being caught.

Berried crabs and lobsters (with eggs) are thrown back.

Environmental impact of potting in the MCZ

In 2019, a study found that potting fisheries were linked to physical damage to chalk outcrops.

Pots and ropes can scour the chalk as they move in the currents. This can damage the chalk and the life that is attached to it.

A code of practise has been written so fishermen minimise the impact of lost and stored pots.

Research to map the seabed and fishing activity is ongoing. This will improve understanding of the area and the impact of fishing on the chalk. Depending on findings, laws may be brought in to minimise impact.

Photo: Rob Coleman

Amazing wildlife

There are lots of amazing creatures living in the Marine Conservation Zone.

Threats to the wildlife that lives there are being monitored and new laws may be brought in to help the wildlife.


Photo: christaylorphoto.co.uk

Activity 1: Skeletons (Year 3)

A field trip to some rockpools provides an ideal opportunity to embed children's learning about skeletons. Explore the rockpools at Sheringham or West Runton beach at low tide to find a variety of life.

After searching for sealife, ask the children to think about the skeleton types of the creatures they have seen. Have they seen examples of endoskeletons, exoskeletons and hydrostatic skeletons? For each creature consider how its skeleton provides support, protection and movement.

It is quite likely someone will find a shed crab exoskeleton - they look like a dead crab, but there are holes where the eyes should be.

Having an exoskeleton means they have to shed their skeleton in order to grow.

Moulting takes place at night, a few hours after an initial crack appears at the back of the crab shell. The crab then has to drink copiously to swell up and force the shell apart along the crack. The crab that emerges is soft and slimy, and it is vulnerable to being eaten by fish for the first few days. The shell's texture changes from slimy, when the crab first emerges, to feeling like paper, thin card and then cardboard, before finally hardening within 3-4 weeks.

Endoskeleton	Exoskeleton	Hydrostatic skeleton
Fish Seals (common, grey) Humans	*Exoskeletons that are shed in order to grow:* Crabs (shore/green, edible/brown, velvet swimming) Lobster (common, squat) *Exoskeletons that grow with the creature:* Sea snails: whelks, winkles, mussels	Anemones Starfish (though the tiny bony plates underneath a tough outer skin act like an exoskeleton)

Activity 2: Grouping and classifying (Years 4 and 6)

A good place to start this topic is Lesson 7: Grouping animals in the Amazing Ocean series.

Follow up by using local selection of images of creatures found in the MCZ in the slides below.

In groups, pupils should sort them into groups using their own criteria and then share and discuss the criteria the different groups chose. Can they explain why they grouped them that way?

Give them time to group them using a different set of criteria.

Groupings could include:

- Number of legs
- Shell/no shell
- Movement types: Swim/don’t swim/crawl/slither/static
- Vertebrates/invertebrates
- Vertebrates could be further split into birds/fish/mammals
- Skeleton type could be revisited - endoskeleton/exoskeleton and hydrostatic skeleton

Grouping creatures from the MCZ

Grouping creatures from the MCZ

Grouping creatures from the MCZ

Grouping creatures from the MCZ

The phylums molluscs, crustaceans and echinoderms

Scientists group organisms to help classify and identify them. Sea creatures are particularly difficult to classify. DNA has helped scientists understand how different organisms are related and, in some cases, has meant they have changed the groups around!

Can you use the information below to sort the creatures into the three groups: molluscs, crustaceans and echinoderms?

Molluscs	Crustaceans	Echinoderms
A large, varied group! Soft bodied Some have shells Many have head, foot, main body Many have a rasping tongue (radula)	Hard exoskeleton Jointed legs Two pairs of antennae (feelers) Segmented body (though some are fused)	Tiny ‘plates’ covered with skin Five-rayed symmetry Many small tube feet

Answers: The phylums molluscs, crustaceans and echinoderms

Explain that scientists group organisms to help classify and identify them. DNA has helped scientists understand how different organisms are related and, in some cases, has meant they have changed the groups around!

Explain the criteria of the phylums mollusca, crustaceans and echinoderms. Then ask the children to sort the creatures into the three groups:

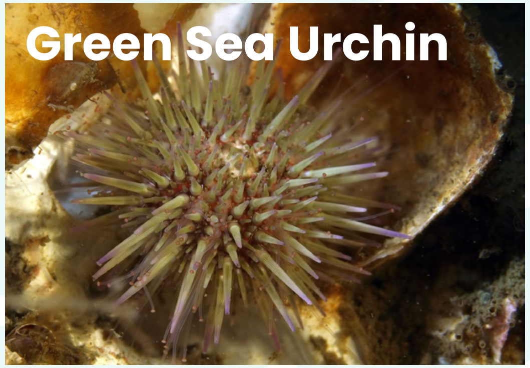
Molluscs	Crustaceans	Echinoderms
A large, varied group! Soft bodied Some have shells Many have head, foot, main body Many have a rasping tongue (radula) *Sea slugs* *Whelks* *Mussels* *Winkles* *Limpet* *Little cuttlefish*	Hard exoskeleton Jointed legs Two pairs of antennae (feelers) Segmented body (though some are fused) *Crabs* *Lobsters* *Shrimp* *Barnacles*	Tiny ‘plates’ covered with skin Five-rayed symmetry Many small tube feet *Starfish* *Urchins* *Sea cucumber*

The phylums molluscs, crustaceans and echinoderms

Molluscs

Crustaceans

Echinoderms



Food chains (Year 4)

Give the children copies of the food chain pictures. They should use the information to create a food chain - cut out the images, order them and draw arrows. The arrows must show the direction of the transfer of energy from the food.

Discuss the terms producer, predator, prey, herbivore, carnivore, omnivore. Children should then label the producers, predators and prey on their food chains. Afterwards, use the slides to check their food chains.

Food chains provided:

- Seaweed - prawn - sea bass - seal
- Plankton - mussels - starfish - herring gull
- Algae - periwinkle - lobster - human
- Algae - periwinkle - shore crab - sea bass - seal
- Seaweed - limpet - dog whelk - edible crab - human

These food chains have been chosen to show the range of plants that support life in the sea. The reality is that these food chains are part of a very complex food web with many creatures eating a wide range of things.

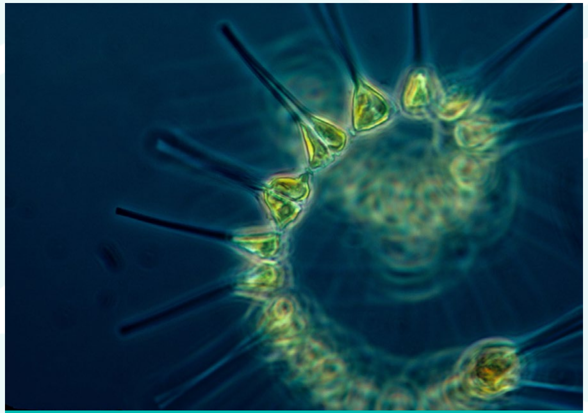
Sea bass
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

Seaweed
I get my energy from the sun. I am eaten by crabs, periwinkles, worms, prawns and shrimps.

Prawn
I get my energy from seaweed, carrion and small shrimp-like creatures. I am eaten by crabs, fish and sea anemones.

Seal
I get my energy from fish, crabs, squid and octopus. I don't have any predators.

Herring gull
I get my energy from eggs, starfish, crabs, fruit, grains and worms. I do not have any predators.



Phytoplankton
I get my energy from the sun. I am eaten by barnacles and mussels.

Common starfish
I get my energy from periwinkle, mussels, barnacles and limpets. I am eaten by crabs, seabirds and fish.

Mussels
I get my energy from plankton. I am eaten by humans, dog whelks, seabirds and starfish.

Human

Lobster
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans.

Algae
I get my energy from the sun.
I am eaten by limpets and periwinkles

Periwinkle
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, lobsters, seabirds and fish.

Sea bass

I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

Shore crab

I get my energy from seaweed, carrion, sea snails, shrimps and small fish. I am eaten by other crabs, fish, lobsters and sea anemones

Algae

I get my energy from the sun. I am eaten by limpets and periwinkles

Periwinkle

I get my energy from algae on rocks and young seaweed. I am eaten by crabs, lobsters, seabirds and fish.

Seal

I get my energy from fish, crabs, squid and octopus. I don't have any predators.

Human

Limpet
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, seabirds, starfish, dog whelks and fish.

Edible crab
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans and lobsters.

Seaweed
I get my energy from the sun.
I am eaten by limpets, periwinkles, worms, prawns and shrimps.

Dog whelk
I get my energy from periwinkle, mussels, barnacles and limpets.
I am eaten by crabs, seabirds and fish..

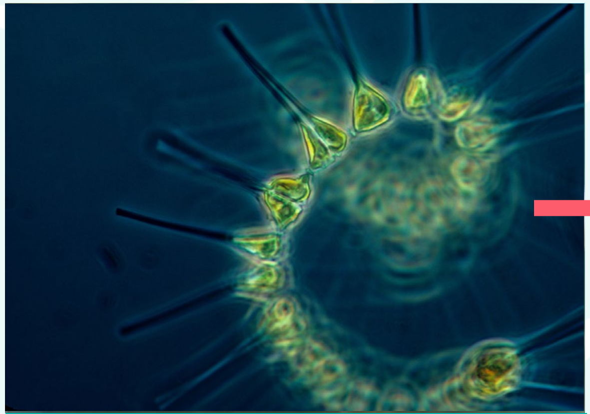
Seaweed
I get my energy from the sun.
I am eaten by crabs, periwinkles, worms, prawns and shrimps.

Prawn
I get my energy from seaweed, carrion and small shrimp-like creatures. I am eaten by crabs, fish and sea anemones.

Sea Bass
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

Seal
I get my energy from fish, crabs, squid and octopus. I don't have any predators.

Producer
Prey
Predator Prey
Predator



Phytoplankton
I get my energy from the sun.
I am eaten by barnacles and mussels.

Producer

Mussels
I get my energy from plankton.
I am eaten by humans, dog whelks, seabirds and starfish.

Prey

Common Starfish
I get my energy from periwinkle, mussels, barnacles and limpets.
I am eaten by crabs, seabirds and fish.

Predator Prey

Photo: Rob Coleman

Herring Gull
I get my energy from eggs, starfish, crabs, fruit, grains and worms. I do not have any predators.

Predator

Algae
I get my energy from the sun.
I am eaten by limpets and periwinkles

Producer

Periwinkle
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, lobsters, seabirds and fish.

Prey

Lobster
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans.

Predator Prey

Human

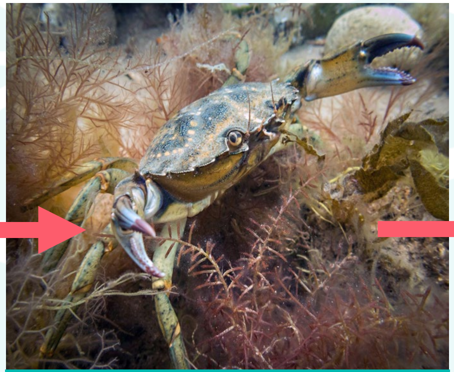
Predator

Algae
I get my energy from the sun.
I am eaten by limpets and periwinkles

Producer

Periwinkle
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, lobsters, seabirds and fish.

Prey



Shore Crab
I get my energy from seaweed, carrion, sea snails, shrimps and small fish. I am eaten by other crabs, fish, lobsters and sea anemones

Predator
Prey

Sea Bass
I get my energy from shrimps, periwinkles, prawns, crabs and smaller fish. I am eaten by seals and humans.

Predator
Prey

Seal
I get my energy from fish, crabs, squid and octopus. I don't have any predators.

Predator

Seaweed
I get my energy from the sun.
I am eaten by limpets, periwinkles, worms, prawns and shrimps.

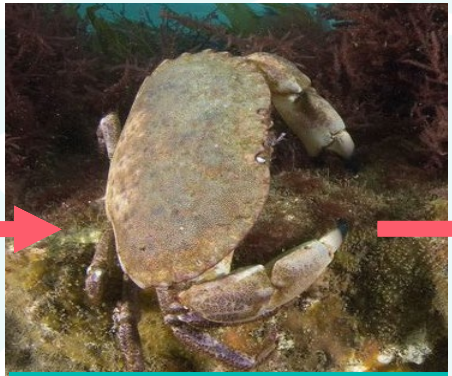
Producer

Limpet
I get my energy from algae on rocks and young seaweed.
I am eaten by crabs, seabirds, starfish, dog whelks and fish.

Prey

Dog Whelk
I get my energy from periwinkle, mussels, barnacles and limpets.
I am eaten by crabs, seabirds and fish..

Predator
Prey



Edible Crab
I get my energy from crabs, sea snails, sea urchins and starfish.
I am eaten by humans and lobsters.

Predator
Prey

Human

Predator

Rockpooling – Using a key (Year 4)

Explore the rockpool habitat at Sheringham or West Runton beach at low tide to find a variety of life. Children could use a key to identify the creatures and plants they find. Encourage the children to carefully lift up rocks and seaweed to find creatures that are hidden, then return rocks to the position they were found.

Get started in the classroom with Lesson 5: Outdoor Rockpool Explorers.

Guidance about rockpooling can be found here: NMMC How to rockpool.

The Field Studies Council have a great Rocky Shore Name Trail available to purchase.

It's a good idea to have a field guidebook with you too to find out more information about the sealife you come across. Our Rockpool Fact File has some useful information to get you started.

Take a look at Essex Wildlife Trust's Shoreline Identification Guide.

Whiteboard and printable resources about rockpool species available here: Benny the Blenny rockpool poster

Norfolk Wildlife Trust and the National Trust at Sheringham Park also offer rockpooling sessions.

Rockpooling – Adaptations (Year 6)

A good place to start this topic is Lesson 3: How do creatures adapt? in the Amazing Ocean series.

If you can get to a beach, you could also use Lesson 5: Outdoor Rockpool Explorers and explore the rockpools at Sheringham or West Runton at low tide. If you can't get to the coast, use Lesson 6: Indoor Rockpool Explorers.

Encourage the children to consider how each creature they find manages to survive in this habitat - a place that isn't always covered by the sea, sometimes has waves crashing onto it and temperatures can fluctuate. How are they adapted to this environment?

This could be a good opportunity to recap different types of skeleton (see Year 3 Skeleton session). Examples below:

- Crabs: hard shell to protect from rocks and predators. Place one on wet sand and watch it bury itself!
- Mussels: anchored to the rock, they close up when not covered by the sea.
- Beadlet anemones: can curl up into a ball, attached to rock.
- Periwinkles, whelks and limpets: foot secures them to rock, tough shell protects them.
- Prawns: well camouflaged from predators. Live in rockpools.
- Shrimps: well camouflaged from predators. Live in sandy areas. Place one on wet sand and watch it bury itself!

If your group is lucky enough to find two or more different species of crab encourage the children to look closely and compare them. What is the same about them? What is different? Why might that be?

Rockpooling – Adaptations

Plants

Don't forget about the plants!

Seaweed lives on the rocks but doesn't have roots to hold it in place. Seaweeds anchor to the rocks with 'holdfasts.' Ask the children to look closely at some.

Notice how some seaweeds have bubbles in them (e.g. bladderwrack). Why do they have this? The bubbles are full of air to help them float up towards the light.

Non-chronological reports

Use English lessons to expand your pupils' understanding further by writing non-chronological reports about the creatures. An example of a non-chronological report is provided for Parpal Dumplin (purple sponge). Blank non-chronological report formats are included for the following species:

1. Shore crab
2. Edible (brown) crab
3. Common Lobster
4. Beadlet anemone
5. Common starfish
6. (Dotted) Sea hare (Aplysia punctata)
7. Tompot blenny (Parablennius gattorugine)
8. Common whelk (Buccinum undatum)

Children can research their chosen species using the websites below to find facts about appearance, diet, survival and other 'did you know?' facts:

wildlifetrusts.org/wildlife-explorer/marine

marlin.ac.uk/species

britishseafishing.co.uk/fish-species/other-sea-creature-species/

Parpal Dumplin (purple sponge)

Appearance

Parpal Dumplin was given its name because it is purple and looks a bit like a dumpling!
It is a type of encrusting sponge which means it forms a crust or layer over the rock on which it lives. Its shape depends on the shape of the rock. The distinctive purple colour of this sponge is quite unusual.

Survival

Sponges are animals that do not move! They are simple animals that form colonies.
They have toxins that make them unpalatable, so few animals eat them. Some sea slugs are able to eat them and incorporate the toxins into their own bodies for defence!
Some spider crabs tear off small pieces and use them to camouflage their backs where the sponge then grows!

Diet

Sponges are filter feeders. Tiny holes or pores cover the sponge and draw the sea water in. They take tiny pieces of food (mainly phytoplankton) out of the water that drifts by so help to keep sea water clear.

Did you know?

This sponge was only discovered in 2011 by some divers. It was new to science!

Edible crab

Appearance

Survival

Diet

Did you know?

Shore crab

Appearance

Survival

Diet

Did you know?

Common lobster

Appearance

Survival

Diet

Did you know?

Beadlet Anemone

Appearance

Survival

Diet

Did you know?

Common Starfish

Appearance

Survival

Diet

Did you know?

Sea hare (Aplysia punctata)

Appearance

Survival

Diet

Did you know?

Dog whelk (Nucella lapillus)

Appearance

Survival

Diet

Did you know?