Explore the Seafloor

Activity Sheet 3: What animals live on the seafloor? KS4 Worksheet

KS4 Biology Case Study Review

Write an essay about why the ecological research of the Humber Regional Environmental Characterisation (REC) study was undertaken and what do the results tell us about sea animals on the seafloor. Include the following information:

- What is an REC?
- Why is it important to study ecology as part of the REC?
- Methodology of the ecological research.
- What did the ecological results produce?
- One example of a recommendation made by the ecologists.

Use and explain the following terms in the essay

- Benthic macrofauna
- Infauna
- Epifauna
- Hamon Grab
- Beam Trawl
- Seafloor Photography
- Biotope maps
- Aggregate dredging
- Desk Based Assessment
- Fieldwork

You can use images from our Image Bank to illustrate your essay.

Answer these questions:-

Why did the ecologists study benthic macrofauna over other types of sea animals?

What type of animals are Annelida?

What type of animals are Crustacea?

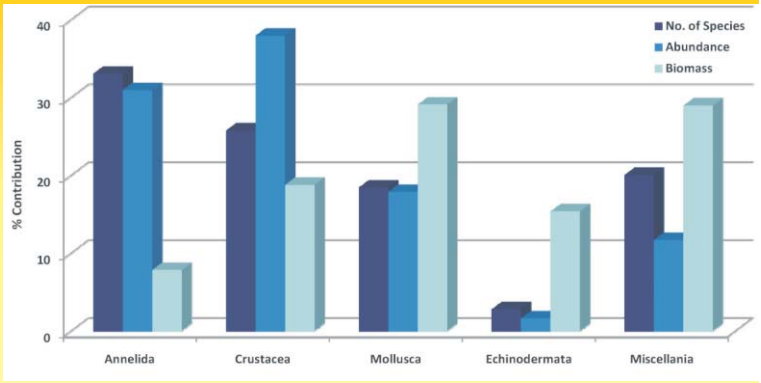
What was the Silver Pit and why did ecologists think it was important?

Explore the Seafloor

Activity Sheet 3: What animals live on the seafloor? KS4 Worksheet

Studying the results

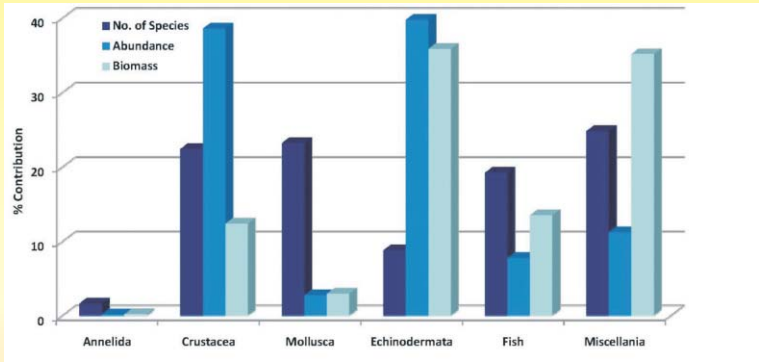
Examine this graph, which compares the diversity, biomass and abundance for the different animal types (phyla) collected using the **Hamon Grab**.



Graph 1

Write a paragraph explaining what this graph is measuring, and the results for the Hamon Grab sampling.

Compare the above graph to the one below, which compares the diversity, biomass and abundance for the different animal types (phyla) collected using the **Beam Trawl**.



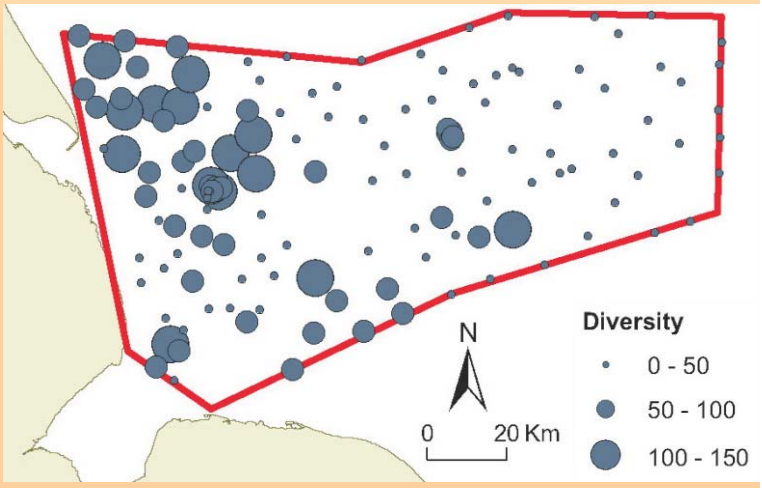
Graph 2

Write a paragraph explaining the results for the Beam trawl sampling.

Explain why the results for Annelida and Crustacea are so different between Graph 1 and Graph 2?

Hamon Grab Results

The results for the Hamon Grab samples are plotted onto a map of the Humber REC study area. Write a sentence explaining what this map tells us about the biodiversity of the sea animals. Explain what diversity means.



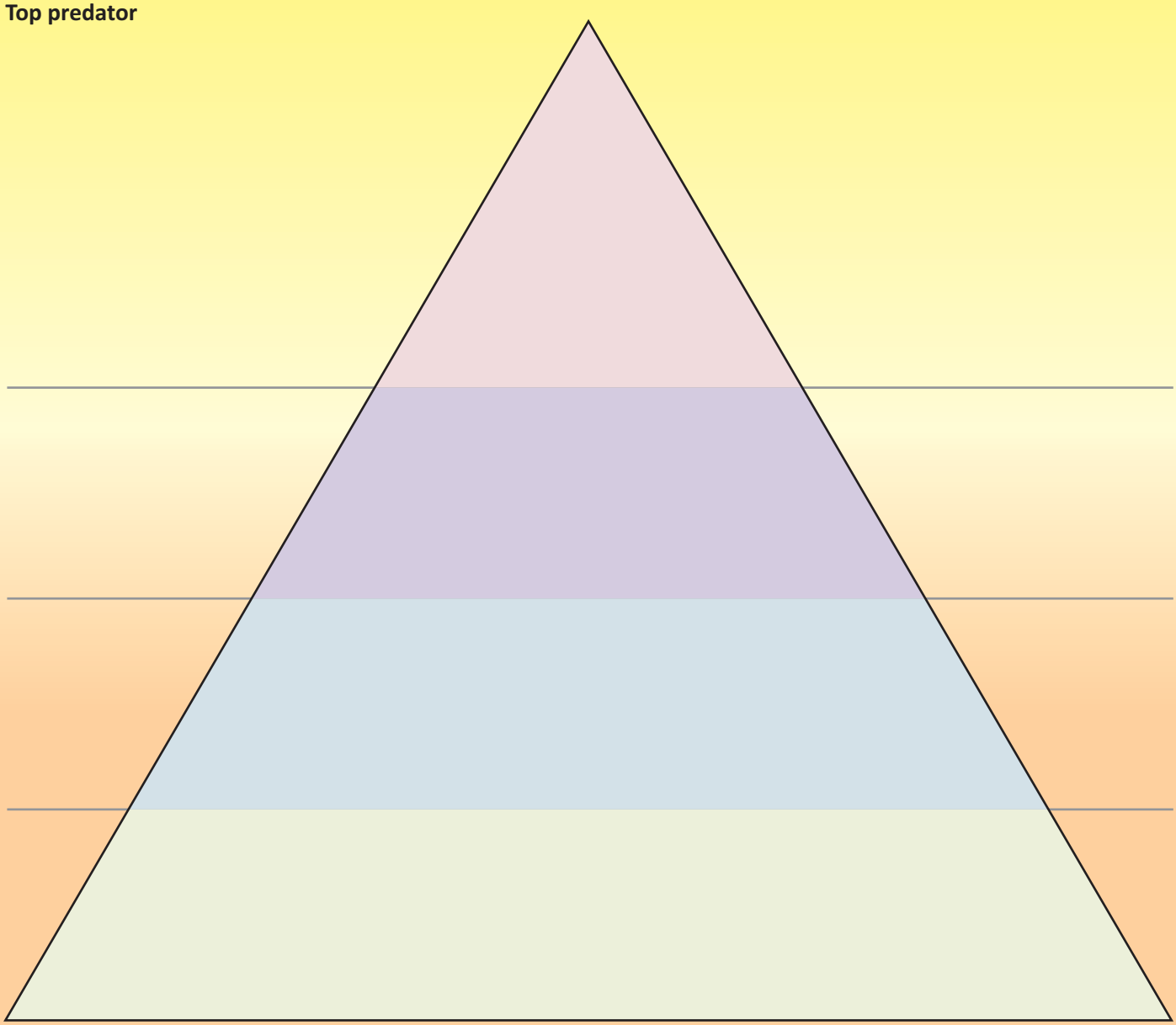
Explore the Seafloor

Activity Sheet 3: What animals live on the seafloor?

KS4 Worksheet

Place the animals and classifications on the trophic pyramid below:

Crab, Phytoplankton, Sea Urchin, Squid, Tuna, Herbivore, Carnivore, Clam, Tertiary consumer, Primary producer, Kelp, Zooplankton, Seal, Autotrophs, Humans, Secondary consumer, Albatross, Haddock, Primary consumer, Top predator



Explore the Seafloor

Activity Sheet 3: What animals live on the seafloor? KS4 Worksheet

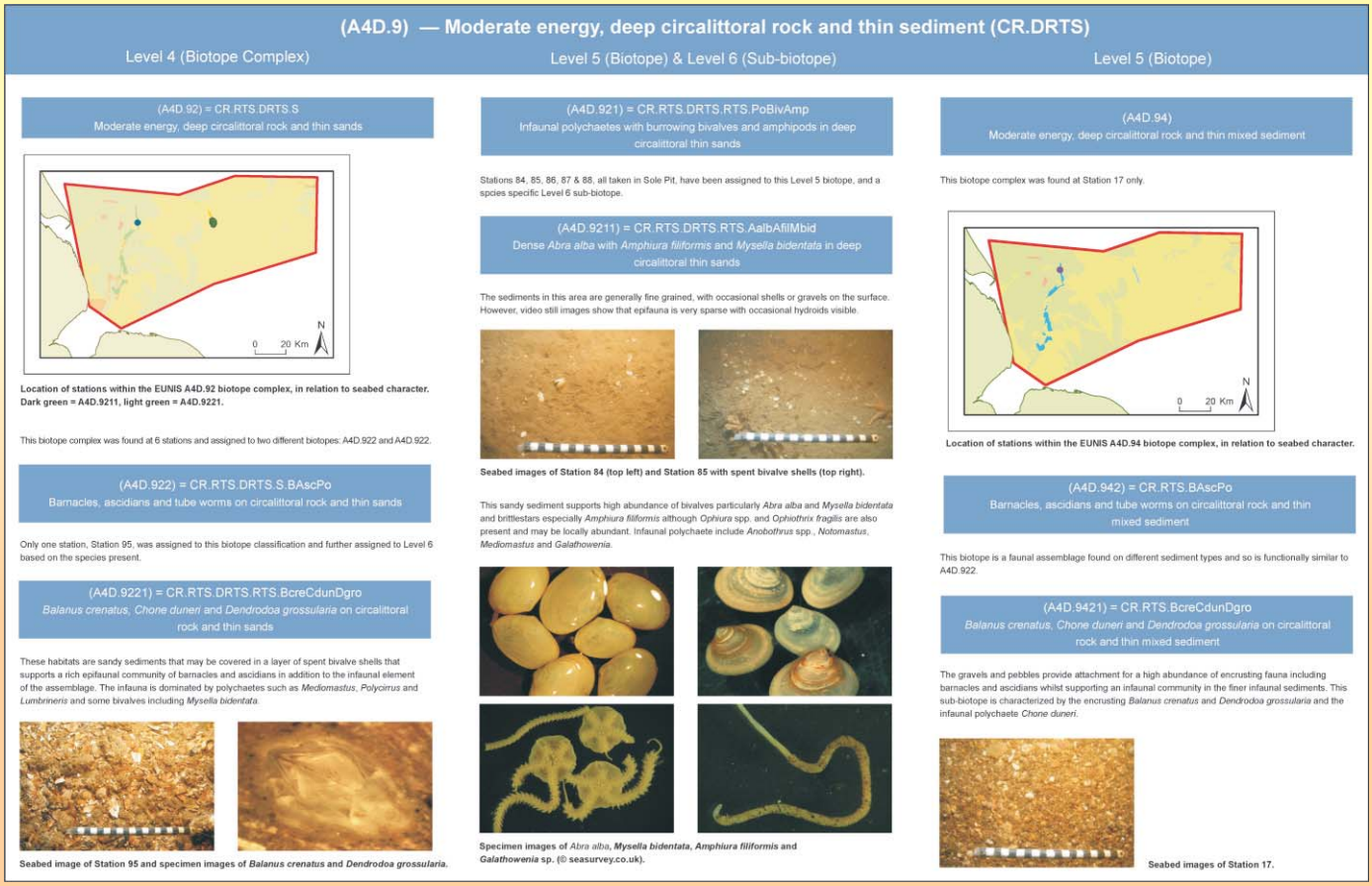
Biotopes

The marine environment is extremely complex and ecologists use the EUNIS classification system to describe it. Ecologists need a clear, standardised way of describing what lives on the sea floor and they do this by describing groups of similar habitats and animals.

EUNIS, which stands for the European Nature Information System, holds a list of such groups of habitats and associated animals.

These groups are called 'biotopes' - a biotope is a mixture of the habitat, such as rock or sand, and the animals that live there. Each biotope has its own code and description.

Biotopes descriptions are still very complex, have a look at this page from the ecology report for biotope A4D.9. You can download a larger version from http://ets.wessexarch.co.uk/teachers/biology/



(A4D.9) — Moderate energy, deep circalittoral rock and thin sediment (CR.DRTS)

Level 4 (Biotope Complex)

(A4D.92) = CR.RTS.DRTS.S
Moderate energy, deep circalittoral rock and thin sands

Location of stations within the EUNIS A4D.92 biotope complex, in relation to seabed character. Dark green = A4D.9211, light green = A4D.9221.

This biotope complex was found at 6 stations and assigned to two different biotopes: A4D.922 and A4D.922.

(A4D.922) = CR.RTS.DRTS.S.BAscPo
Barnacles, ascidians and tube worms on circalittoral rock and thin sands

Only one station, Station 95, was assigned to this biotope classification and further assigned to Level 6 based on the species present.

(A4D.9221) = CR.RTS.DRTS.RTS.BcreCdunDgro
Balanus crenatus, *Chone duneri* and *Dendrodoa grossularia* on circalittoral rock and thin sands

These habitats are sandy sediments that may be covered in a layer of spent bivalve shells that supports a rich epifaunal community of barnacles and ascidians in addition to the infaunal element of the assemblage. The infauna is dominated by polychaetes such as *Mediomastus*, *Polycirrus* and *Lumbrineris* and some bivalves including *Mysella bidentata*.

Seabed image of Station 95 and specimen images of *Balanus crenatus* and *Dendrodoa grossularia*.

Level 5 (Biotope) & Level 6 (Sub-biotope)

(A4D.921) = CR.RTS.DRTS.RTS.PoBivAmp
Infaunal polychaetes with burrowing bivalves and amphipods in deep circalittoral thin sands

Stations 84, 85, 86, 87 & 88, all taken in Sole Pit, have been assigned to this Level 5 biotope, and a spcies specific Level 6 sub-biotope.

(A4D.9211) = CR.RTS.DRTS.RTS.AalbAfilMbid
Dense *Abra alba* with *Amphiura filiformis* and *Mysella bidentata* in deep circalittoral thin sands

The sediments in this area are generally fine grained, with occasional shells or gravels on the surface. However, video still images show that epifauna is very sparse with occasional hydroids visible.

Seabed images of Station 84 (top left) and Station 85 with spent bivalve shells (top right).

This sandy sediment supports high abundance of bivalves particularly *Abra alba* and *Mysella bidentata* and brittlestars especially *Amphiura filiformis* although *Ophiura* spp. and *Ophiothrix fragilis* are also present and may be locally abundant. Infaunal polychaete include *Anobothrus* spp., *Notomastus*, *Mediomastus* and *Galathowenia*.

Specimen images of *Abra alba*, ***Mysella bidentata***, ***Amphiura filiformis*** and ***Galathowenia* sp.** (© seasurvey.co.uk).

Level 5 (Biotope)

(A4D.94)
Moderate energy, deep circalittoral rock and thin mixed sediment

This biotope complex was found at Station 17 only.

Location of stations within the EUNIS A4D.94 biotope complex, in relation to seabed character.

(A4D.942) = CR.RTS.BAscPo
Barnacles, ascidians and tube worms on circalittoral rock and thin mixed sediment

This biotope is a faunal assemblage found on different sediment types and so is functionally similar to A4D.922.

(A4D.9421) = CR.RTS.BcreCdunDgro
Balanus crenatus, *Chone duneri* and *Dendrodoa grossularia* on circalittoral rock and thin mixed sediment

The gravels and pebbles provide attachment for a high abundance of encrusting fauna including barnacles and ascidians whilst supporting an infaunal community in the finer infaunal sediments. This sub-biotope is characterized by the encrusting *Balanus crenatus* and *Dendrodoa grossularia* and the infaunal polychaete *Chone duneri*.

Seabed images of Station 17.

Answer these questions:

Write a paragraph describing the Level 5 A4D.921 and Level 6 A4D.9211 biotopes. What is the habitat like? What sea animals are common for this biotope?

Why do you think biotopes are a useful for ecologists?

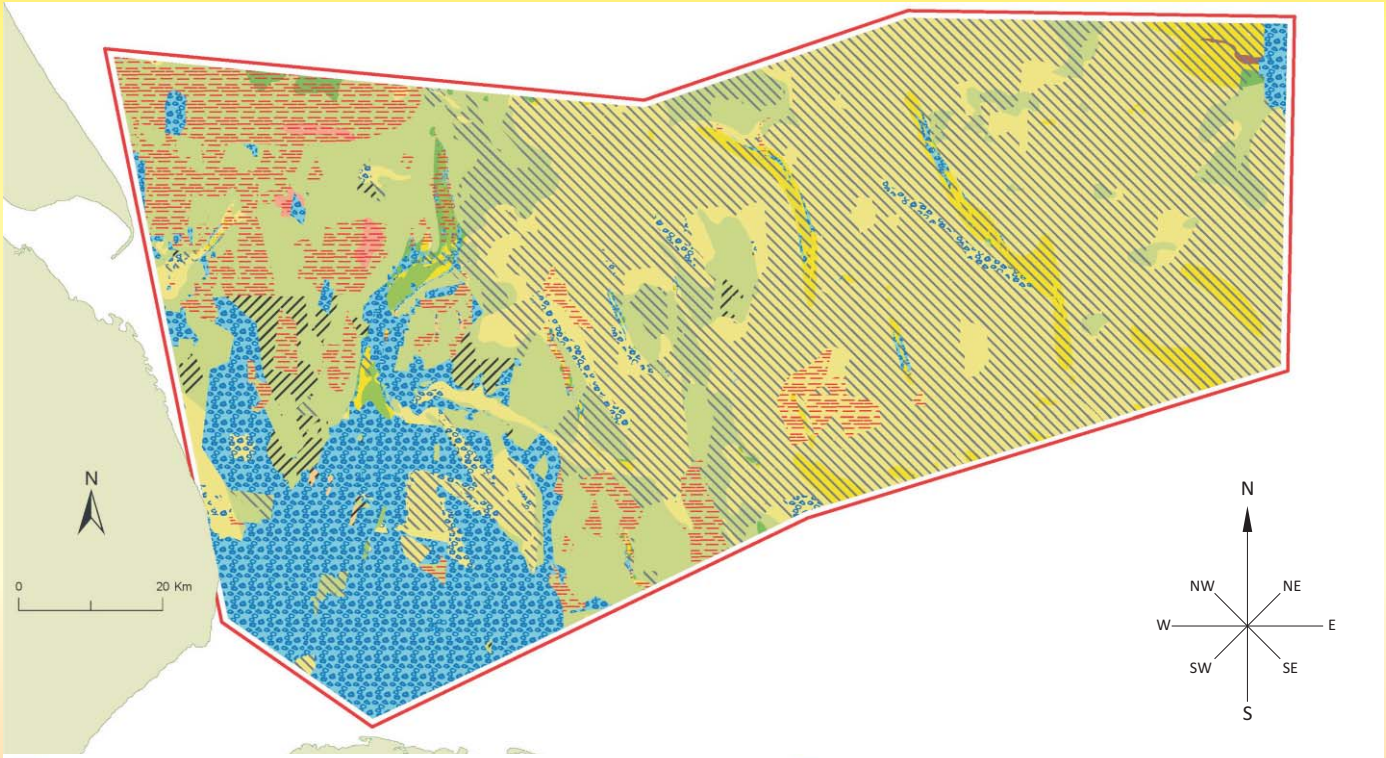
Explore the Seafloor

Activity Sheet 3: What animals live on the seafloor? KS4 Worksheet

Biotope maps

The next stage is to map the different biotopes. The Humber REC biotope map shows the location and extent of all the biotopes.

Why do you think it is important to map biotopes? What will the maps be used for?



- (A4.94) - Moderate energy circalittoral rock and thin mixed sediments
- (A4.941) - Infaunal polychaetes with burrowing bivalves and amphipods in moderate energy circalittoral thin mixed sediments over rock
- (A4D.92) - Moderate energy deep circalittoral rock and thin sands
- (A4D.921) - Infaunal polychaetes with burrowing bivalves and amphipods in moderate energy deep circalittoral thin sands over rock
- (A4D.922) - Barnacles, ascidians and tube worms on moderate energy deep circalittoral thin sands over rock
- A4D.94 - Moderate energy deep circalittoral rock and thin mixed sediments
- (A4D.941) - Infaunal polychaetes with burrowing bivalves and amphipods in moderate energy deep circalittoral thin mixed sediments over rock
- (A4D.942) - Barnacles, ascidians and tube worms on moderate energy deep circalittoral thin mixed sediments over rock
- A5.14 - Circalittoral coarse sediments
- A5.14(7) - Infaunal polychaetes with burrowing bivalves and amphipods in circalittoral coarse sediments
- A5.14(8) - Barnacles, ascidians and tube worms on circalittoral coarse sediments
- A5.25* - Circalittoral fine sand
- A5.25(4) - Infaunal polychaetes with burrowing bivalves and amphipods in circalittoral fine sand
- A5.25(5) - Barnacles, ascidians and tube worms on circalittoral fine sand
- A5.25(7) - Sparse fauna in circalittoral fine sand
- A5.26 - Circalittoral muddy sand
- A5.26(4) - Barnacles, ascidians and tube worms on circalittoral muddy sand
- A5.26(5) - Sparse fauna in circalittoral muddy sand
- A5.27 - Deep circalittoral sand
- A5.27(4) - Infaunal polychaetes with burrowing bivalves and amphipods in deep circalittoral sand
- A5.27(5) - Barnacles, ascidians and tube worms on deep circalittoral sand
- A5.27(6) - Sparse fauna in deep circalittoral sand
- A5.37 - Deep circalittoral mud
- A5.37(9) - Infaunal polychaetes with burrowing bivalves and amphipods in deep circalittoral mud
- A5.44 - Circalittoral mixed sediments
- A5.44(7) - Infaunal polychaetes with burrowing bivalves and amphipods in circalittoral mixed sediments
- A5.44(8) - Barnacles, ascidians and tube worms on circalittoral mixed sediments
- A5.44(A) - Sparse fauna in circalittoral mixed sediments
- A5.45 - Deep circalittoral mixed sediments
- A5.45(2) - Infaunal polychaetes with burrowing bivalves and amphipods in deep circalittoral mixed sediments
- A5.45(3) - Barnacles, ascidians and tube worms on deep circalittoral mixed sediments
- A5.45(5) - Sparse fauna in deep circalittoral mixed sediments
- A5.611** - *Sabellaria spinulosa* on stable circalittoral mixed sediments

Activity Sheet 3: What animals live on the seafloor? KS4 Worksheet

Biotope maps

Look at the biotope map and legend. Write a sentence explaining the kind of habits and the locations in the Humber REC study area of the following Benthic assemblages

Clue; use the compass for describing locations.

Example: A4D.921 is a biotope with polycheate worms and burrowing bivalves and amphipods in moderate energy deep circalittoral rock with thin mixed sediments over rock. This biotope is located primarily in the east half of the Humber REC study area. It is also found in small patches in the west half. This biotope is very common.

Now you try:- A4D.942, A5.25(5), A5.37(9), A5.611

Homework Extension

Do you think that identifying biotopes is an easy task? Explain you decision?

Biology Images http://ets.wessexarch.co.uk/resources/imagebank/

Chose one of the biotopes you located on the map and see if you can find out more about it from the original scientific report.

Why not download the Humber REC report from

http://www.cefas.defra.gov.uk/alsf/projects/natural-seabed-resources/rec-0803/final-report.aspx

look at pages 258 to 274 OR Use images of these pages from the Explore the Seafloor Image Bank – KS3 and KS4