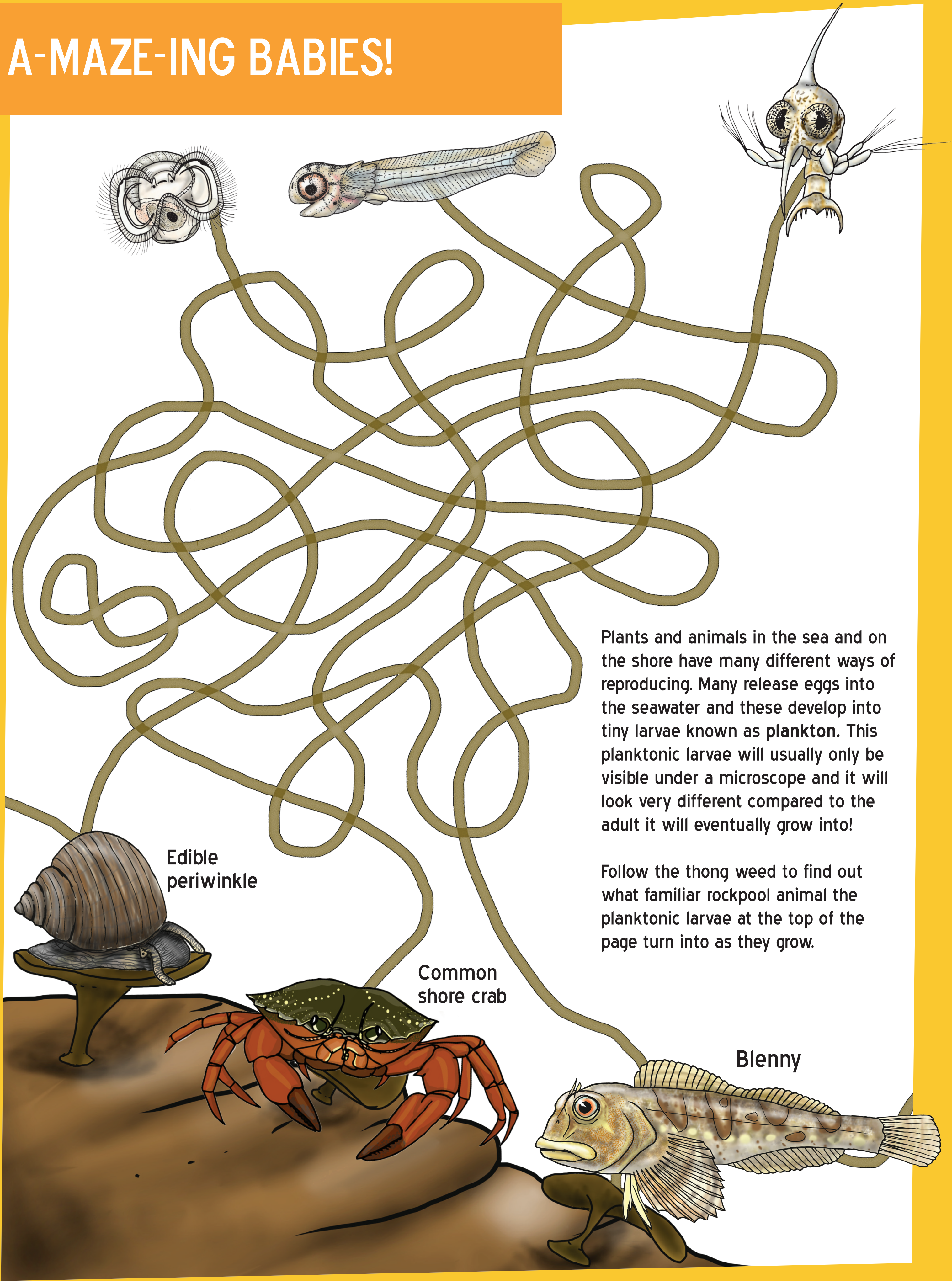
A-MAZE-ING BABIES!



Plants and animals in the sea and on the shore have many different ways of reproducing. Many release eggs into the seawater and these develop into tiny larvae known as **plankton.** This planktonic larvae will usually only be visible under a microscope and it will look very different compared to the adult it will eventually grow into!

Follow the thong weed to find out what familiar rockpool animal the planktonic larvae at the top of the page turn into as they grow.

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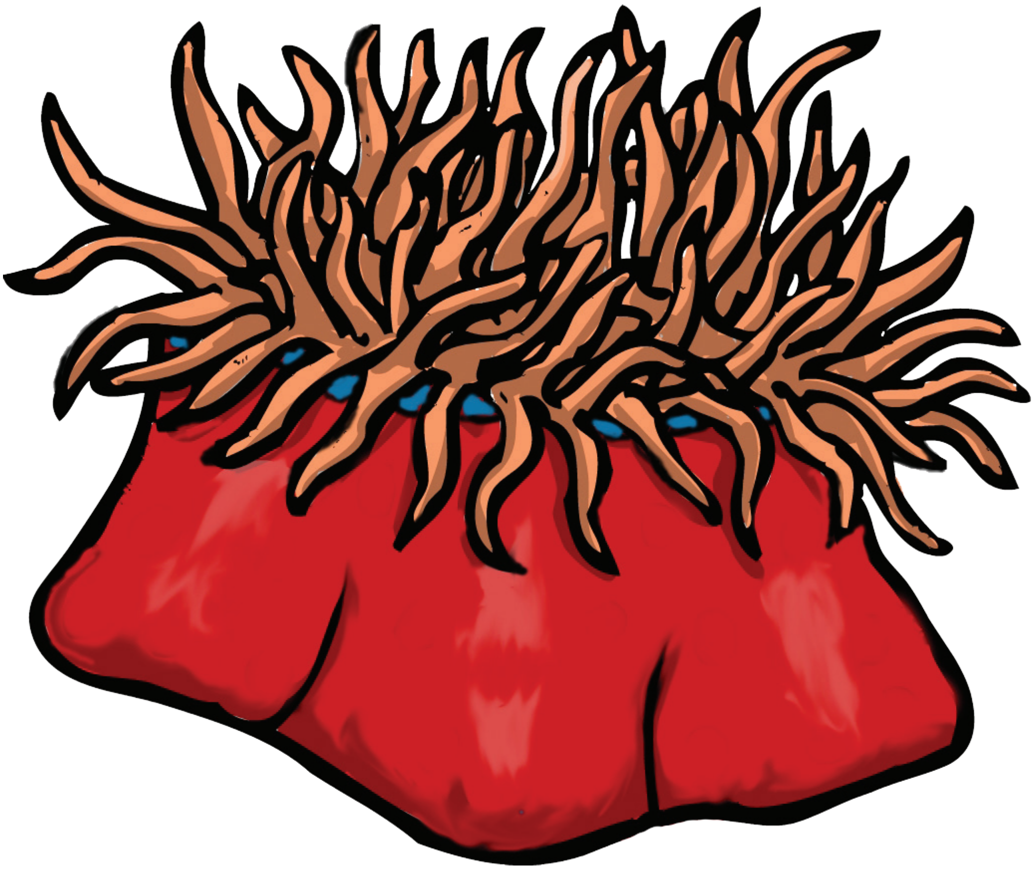
BE AN ANEMONE!

This activity introduces the life of sea anemones and how they are adapted to life on the shore through movement.

1. Ask each child to sit in a space. Ask them to imagine that they are a beadlet anemone, living attached to a rock on the Exmoor seashore using their tentacles to catch food. Pretend the tide is in and they are all underwater. Children should close their eyes (anemones cannot see) and imagine that their arms are tentacles, waving through the water.

2. Tell the children the tide is going out. As it does, they will be washed around by the waves and will need to cling on tight! At the same time, they will become exposed to the air and sun and so will dry out if they keep their tentacles extended. Ask the children to curl up, tucking their arms in and imagine they have to stay like this until the tide comes in!

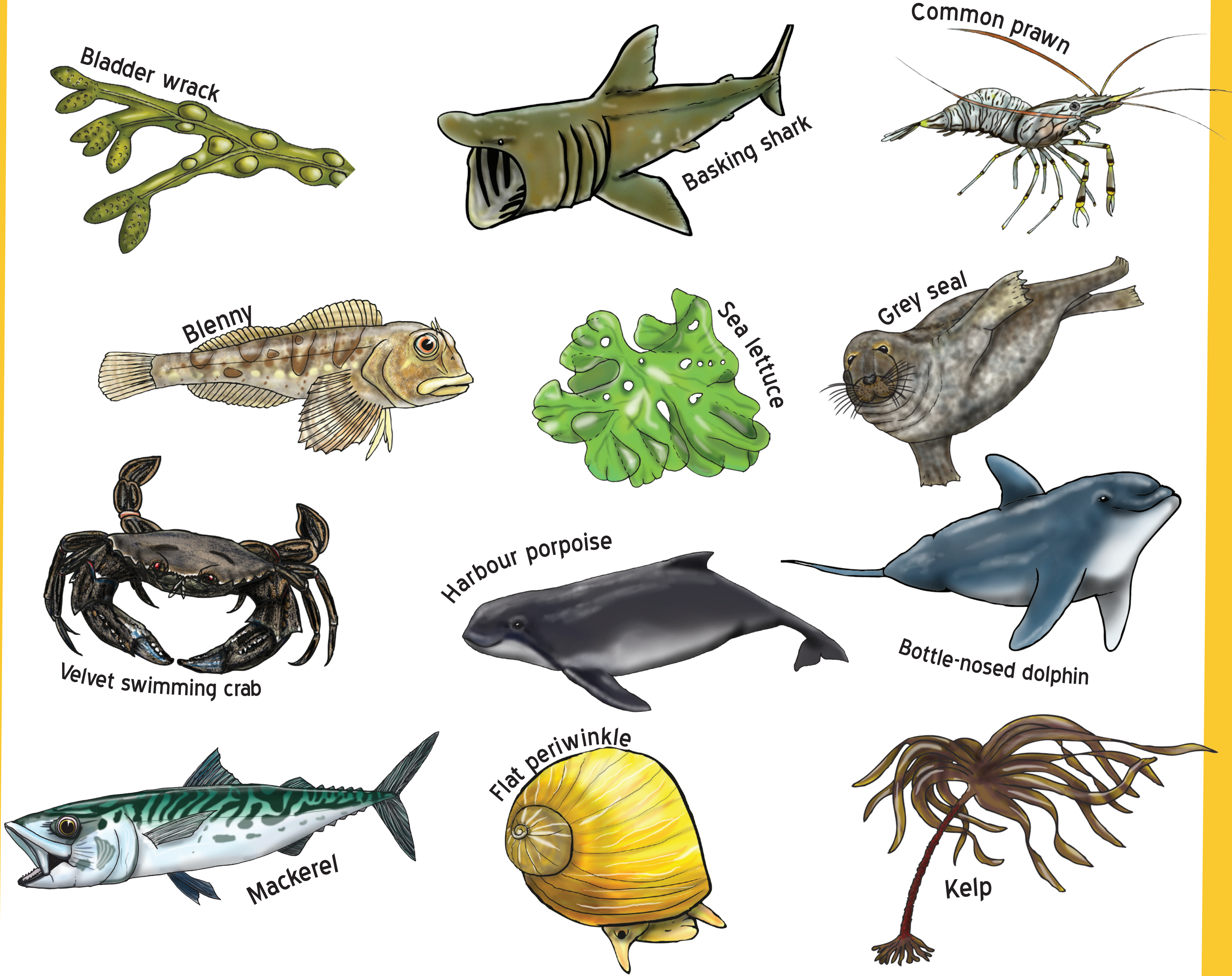
3. After a while the tide can come back in again and the children can uncurl, and wave their 'tentacles' around again.



Extension activity: Discuss the challenges this behaviour might create for the anemone.
Can anemones feed while their tentacles are retracted?
What might happen if an anemone is disturbed while it is exposed to the air (particularly if it is poked!)?
Discuss how the tide's rise and fall influences the behaviour of other animals.
Blow some bubbles and see if the children are able to catch the bubbles with their tentacles as they pass.
Follow this activity up with the Anemone Game!

CLASSIFICATION GAME

There are many different types of seaweeds and animals that live in the sea. One way of identifying living things is to separate them into groups. This is known as classification. Most plants that live in the sea are called **seaweed** or **algae**. **Mammals** are animals who, like us, are warm blooded and breathe air with lungs. **Fish** however, are cold blooded and have gills so that they don't need to come out of the water to breathe. The majority of animals in the sea are **Invertebrates**. They don't have a skeleton or bones like us, but often have a shell or are slimy! Have a look at the examples below and see if you can put the plants and animals in their correct group



Seaweed	Fish	Mammals	Invertebrates
1.	1.	1.	1.
2.	2.	2.	2.
3.	3.	3.	3.

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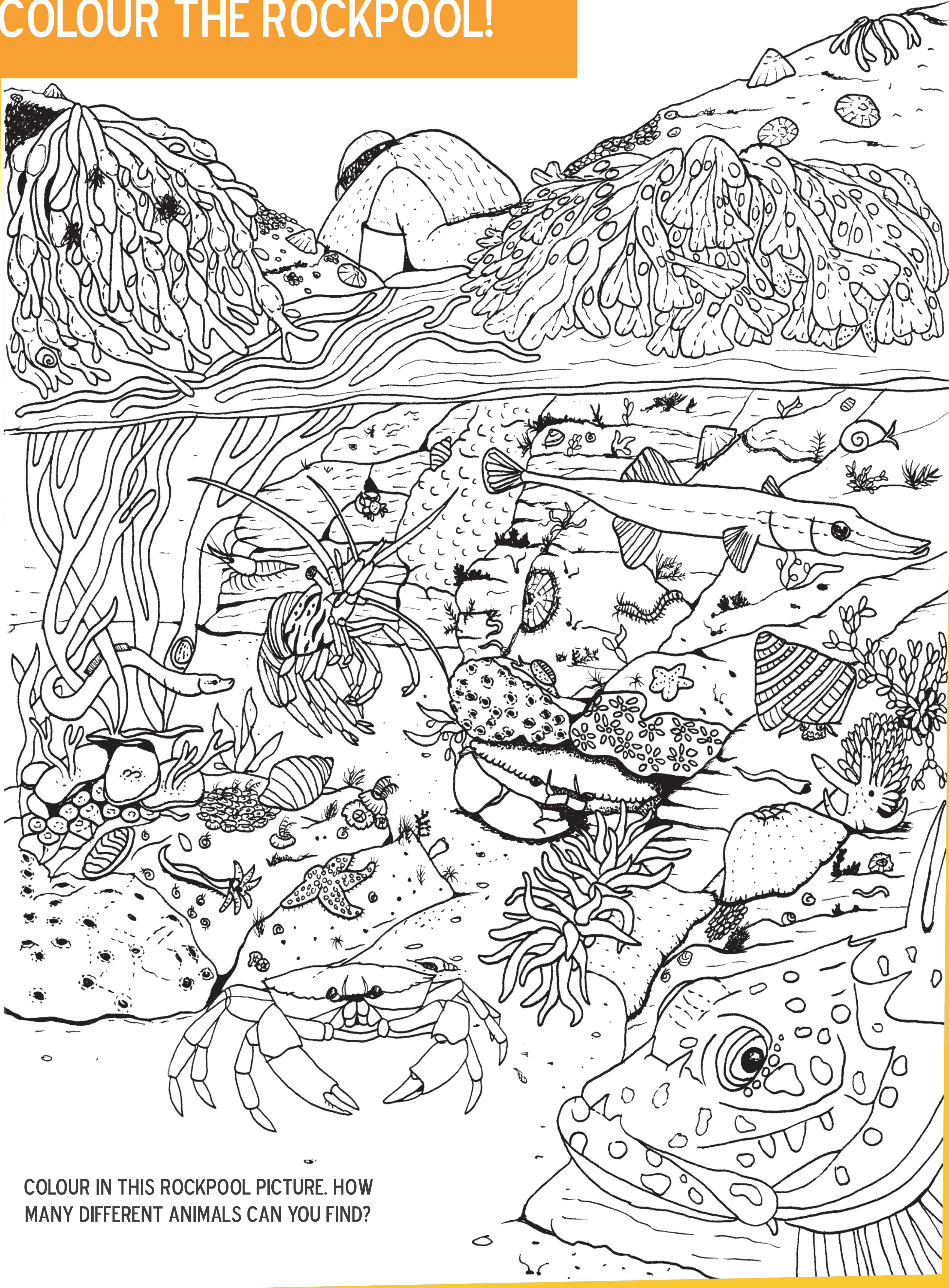
COLOUR THE ROCKPOOL!



COLOUR IN THIS ROCKPOOL PICTURE. HOW MANY DIFFERENT ANIMALS CAN YOU FIND?

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COOL CREVICES!

This investigation looks at the way many species survive on the shore by using crevices as a place to live or hide.

1. Ask the group whether they expect to find more species in crevices than on open rock and why.

2. All find a crevice that is wide enough to look into, but enclosed enough to provide shelter.

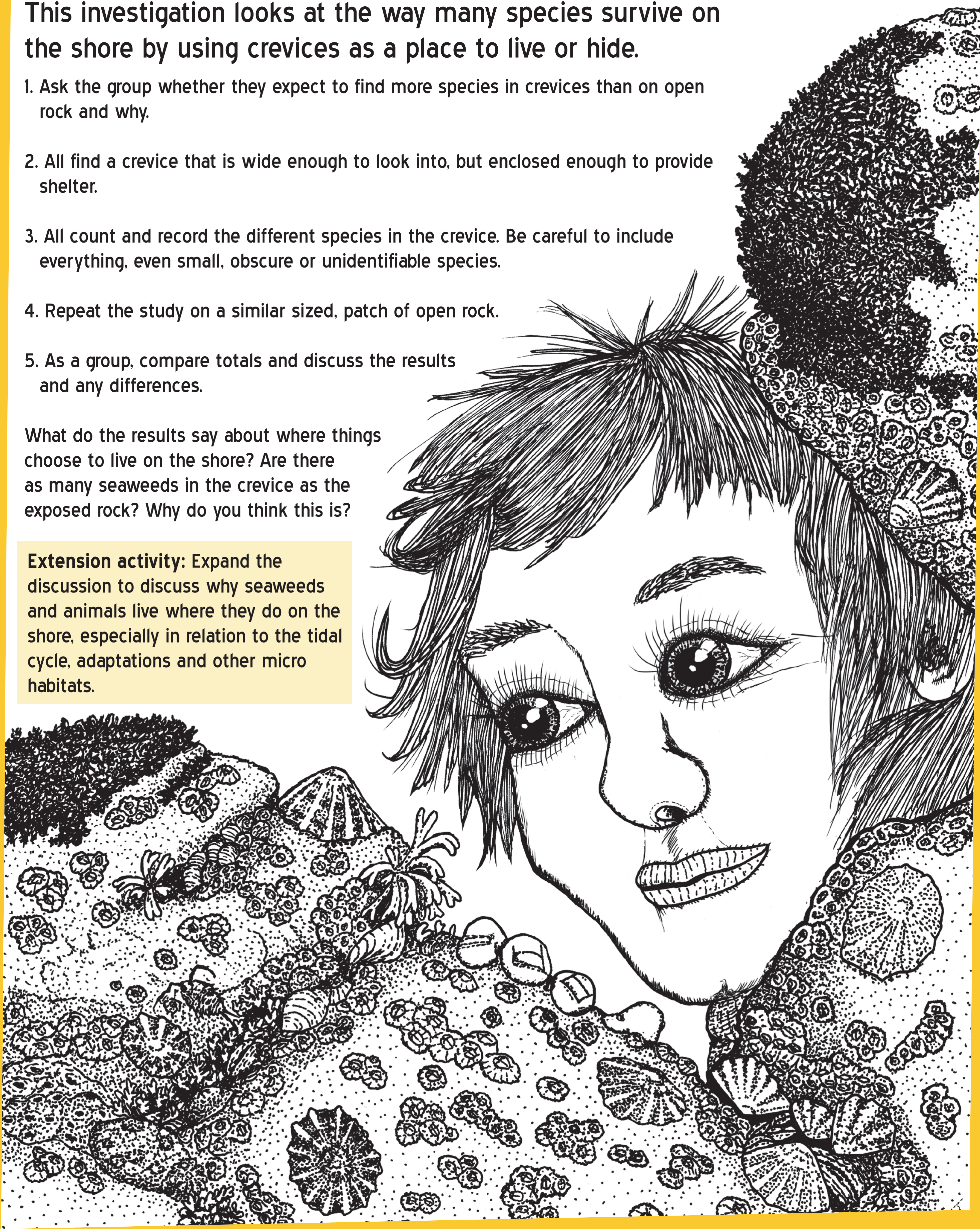
3. All count and record the different species in the crevice. Be careful to include everything, even small, obscure or unidentifiable species.

4. Repeat the study on a similar sized, patch of open rock.

5. As a group, compare totals and discuss the results and any differences.

What do the results say about where things choose to live on the shore? Are there as many seaweeds in the crevice as the exposed rock? Why do you think this is?

Extension activity: Expand the discussion to discuss why seaweeds and animals live where they do on the shore, especially in relation to the tidal cycle, adaptations and other micro habitats.



CREATURE CREATOR!

Plants and animals living on the rocky shore have to be very strong and well suited to their habitat in order to survive! They have to cope with being out of the water and exposed to the air for a certain amount of time each day, as well as spending time under water. For this reason they develop their bodies and their behaviour to allow them to do so.

These changes and developments are known as ADAPTATIONS.

Now design your own shore species!

Draw it in the box below with labels. It must be adapted for life on the seashore. Use your imagination and take inspiration from shore creatures you know about. Consider:

How does it breathe? (get oxygen from its environment)

How does it feed and what does it eat?

How is it protected from predators?

How is it adapted to live in and out of the water?

How does its colour help it survive on the shore?

Extension activity: Play a game to demonstrate **survival of the fittest**. Stand the whole class up and describe an event (such as the tide coming in). Those who do not have traits to help them survive (for example gills) must sit down. Carry on with new scenarios until only a small group of species remains. These survivors are the 'fittest'!

EGG-CELLENT CRABS!

Did you know a female shore crab can lay up to 185,000 eggs at a time!?

Many animals on the rocky shore, including crabs, starfish and certain fish, will look after their eggs until they hatch, rather than releasing them into the water.

Class Maths activity – How many eggs?

Give each child a sheet of graph paper and ask them to calculate how many of the smallest squares there are on their sheet. Then ask them to calculate how many sheets of graph paper would be needed to make 185,000 squares. Get the required number of children to stand in a row, holding their pieces of graph paper together. Alternatively arrange them around the classroom. Then ask each child to think of a number that is significant to them, e.g number of children in the class or in the school. Get them to colour in the relevant number of squares, perhaps calculating what percentage of the total it is.

185,000 shore crab's eggs make a ball about 2-3cm across which the female keeps on her belly, tucked under her tail. Ask the class to imagine how big a pile of 185,000 hens eggs would be!

Extension questions:

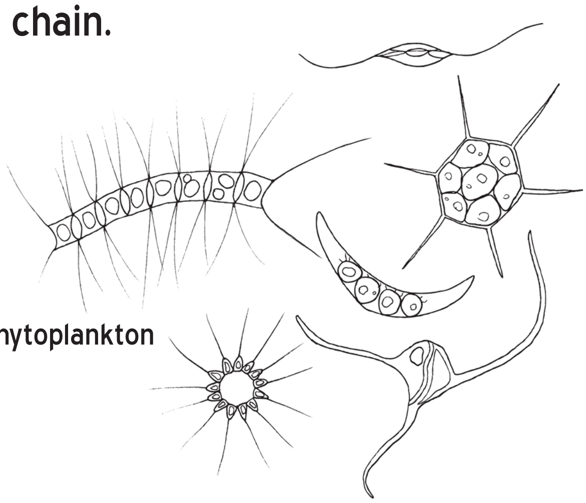
Q2. A free range hen lays around 200 eggs in a year. How many years would it take her to lay as many eggs as a crab does?

Q3. Why can't animals which lay larger eggs (for example a hen) lay the same number of eggs as a crab?

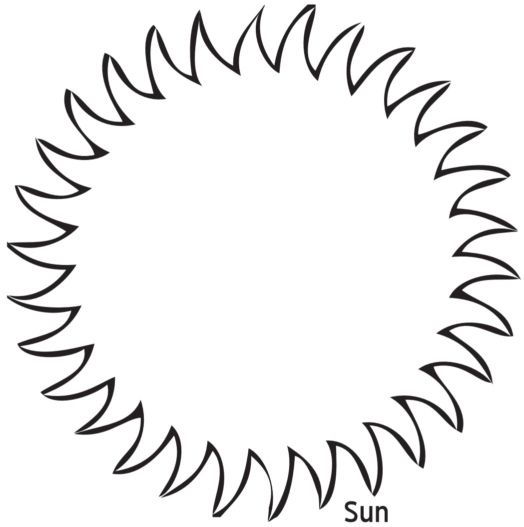
Q4. Why do crabs (and many other sea creatures) produce so many eggs?

FOOD CHAIN COLOURING

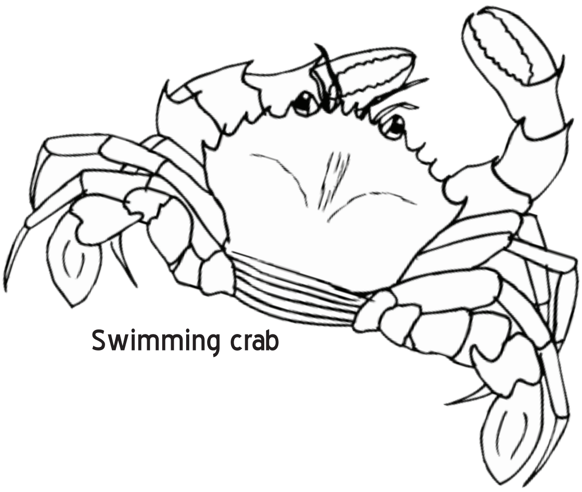
Colour the pictures below and draw lines to make a food chain.



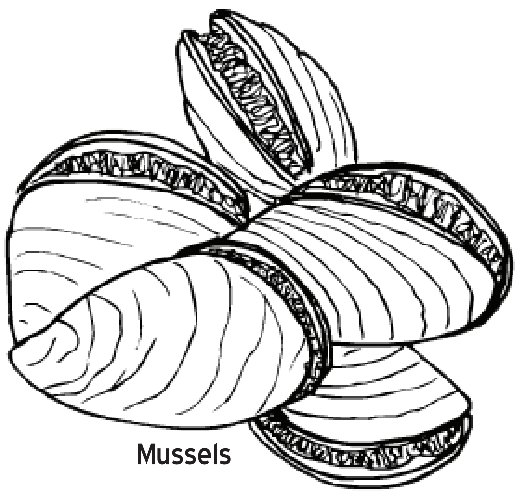
Phytoplankton



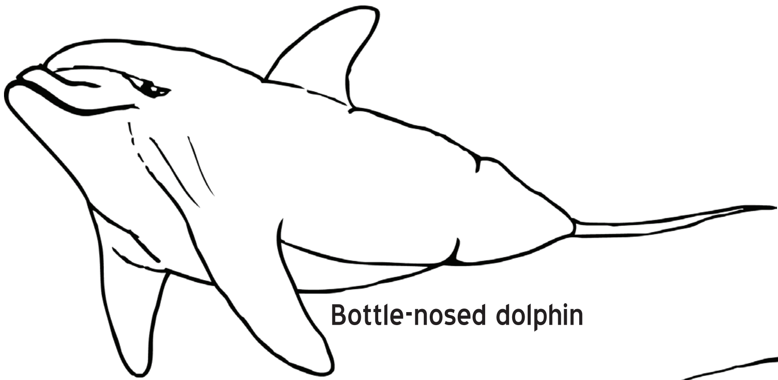
Sun



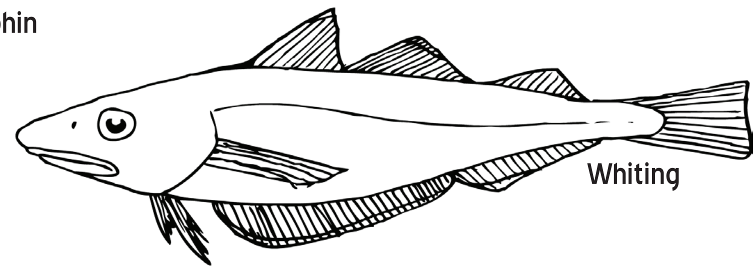
Swimming crab



Mussels



Bottle-nosed dolphin



Whiting

Extension activity: Cut out the pictures, stick them to card and connect with string or wool and tape. Then hang your food chain from the ceiling.

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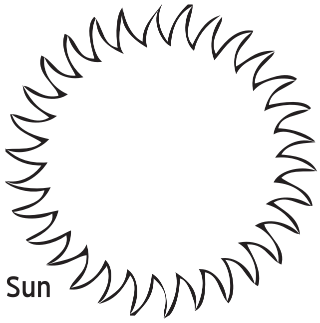
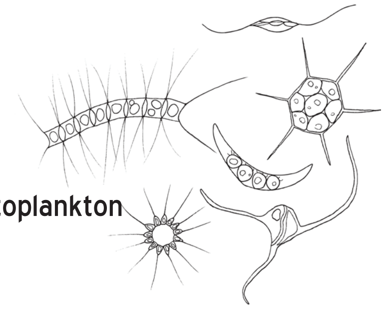
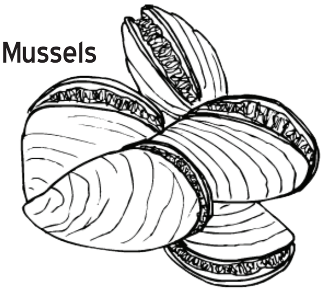
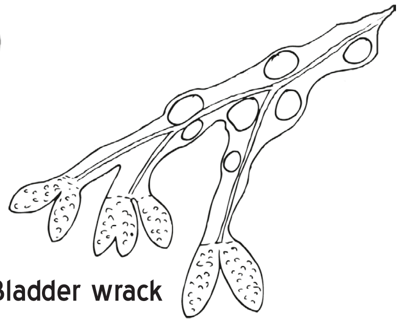
FOOD WEB COLOURING

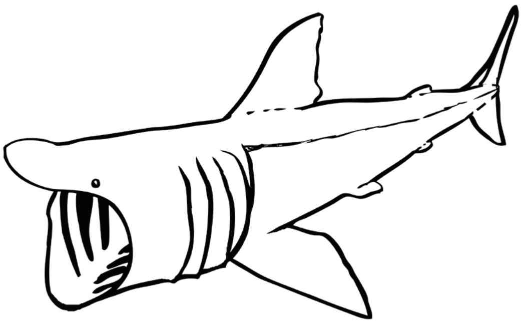
See if you can make a marine food web. Colour in and cut out the images below or draw lines to match predators to their prey! Don't forget, everything starts with the Sun!

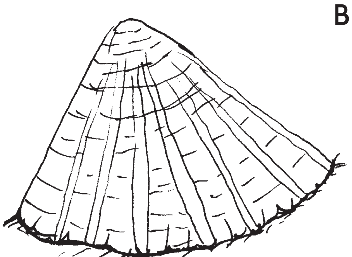

Sun

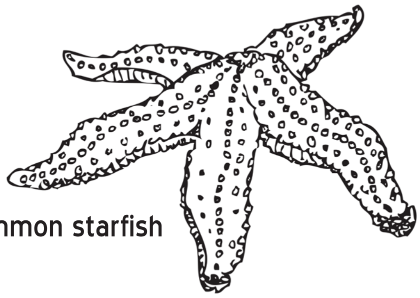

Phytoplankton

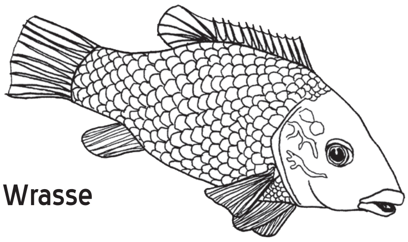

Mussels

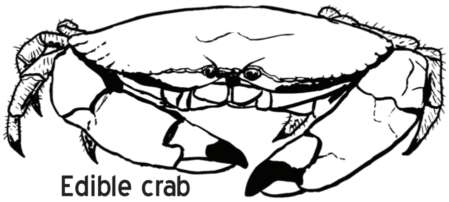

Bladder wrack

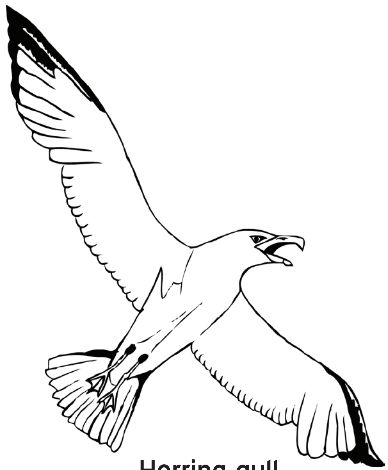

Basking shark

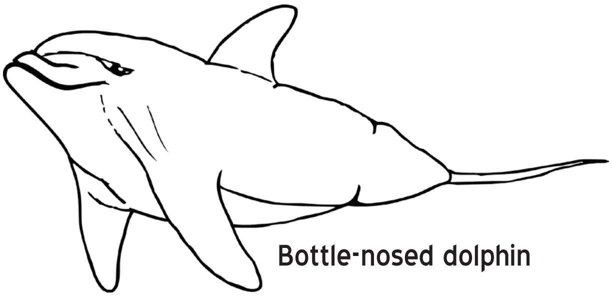

Limpet

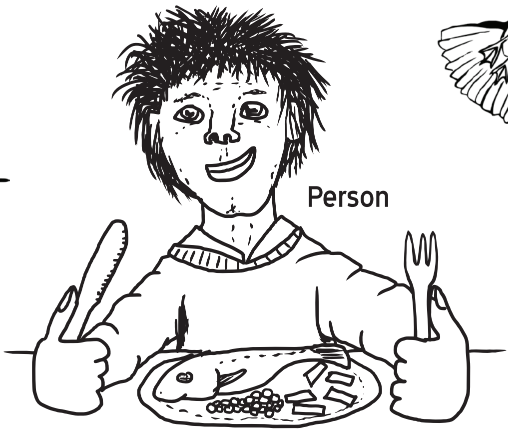

Common starfish


Wrasse


Edible crab


Herring gull


Bottle-nosed dolphin


Person

Extension activity: Stick the pictures onto card and connect with string or wool to coat hangers to create a food web mobile to hang from the ceiling.

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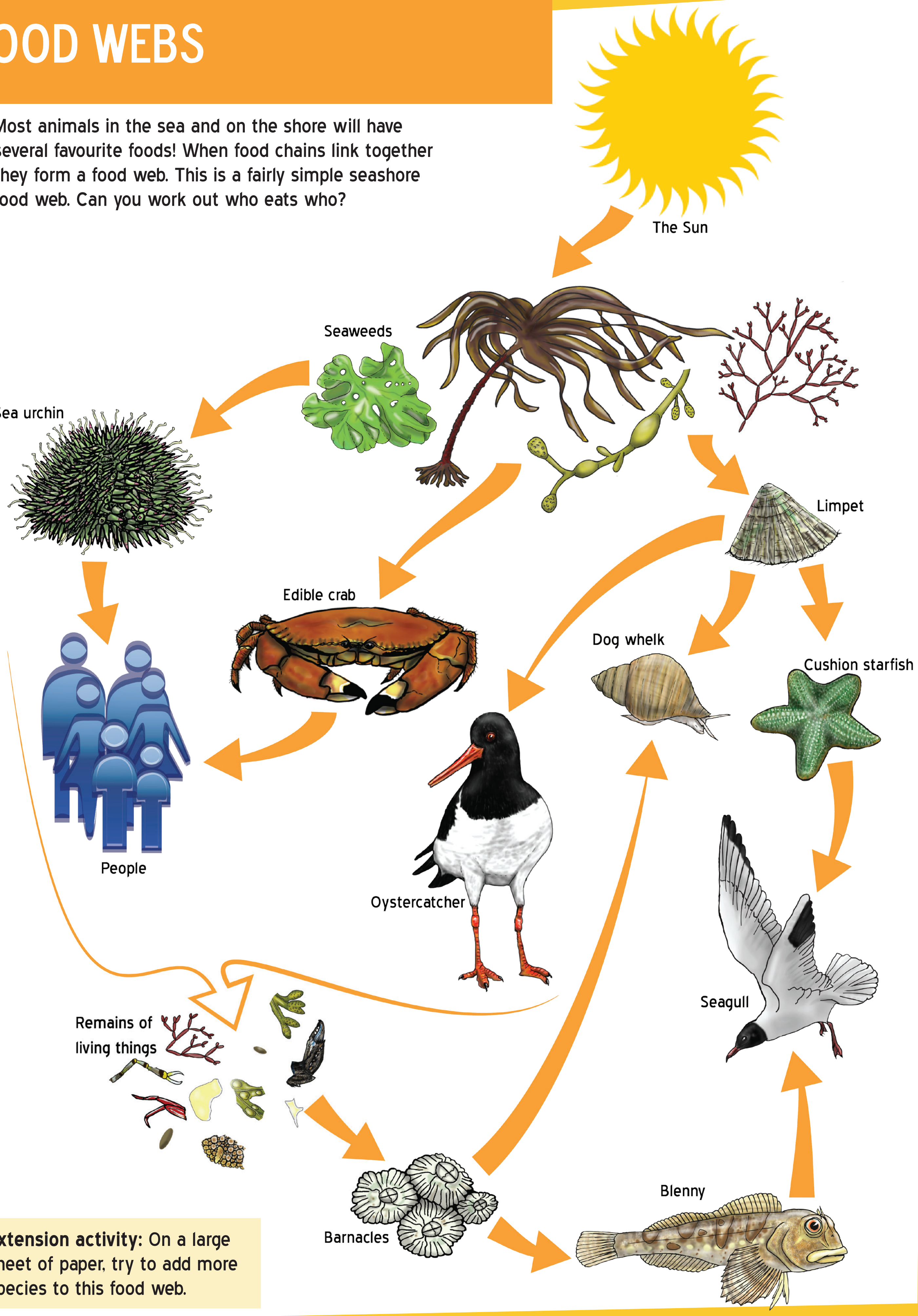
FOOD WEBS

Most animals in the sea and on the shore will have several favourite foods! When food chains link together they form a food web. This is a fairly simple seashore food web. Can you work out who eats who?



Extension activity: On a large sheet of paper, try to add more species to this food web.

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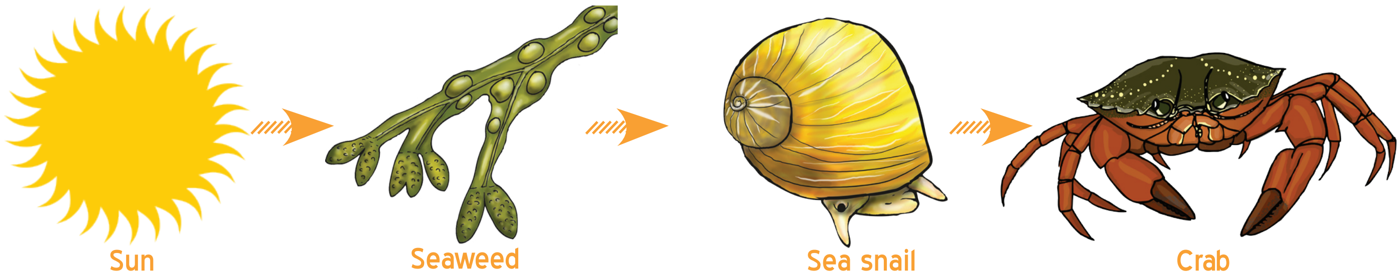
MARINE FOOD CHAINS

All life in the sea and on the shore depend on something in order to survive. Most often it is one another! Food chains in the sea differ to ones on land, but nearly all food chains on earth start off with the same thing... the SUN!

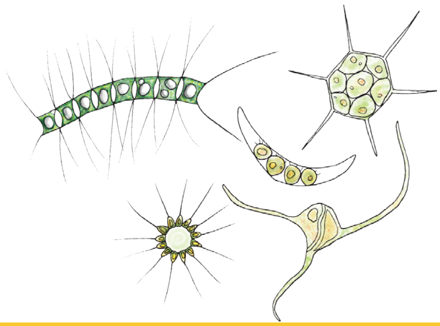
The sun gives light energy to producers such as plants, who use this energy along with water and carbon dioxide, to grow. This process is called photosynthesis. Seaweeds are an example of a producer. Primary consumers are animals like sea snails. These are also called herbivores, who eat the producers to get their energy. Secondary consumers, called Predators eat primary consumers, who then become Prey!



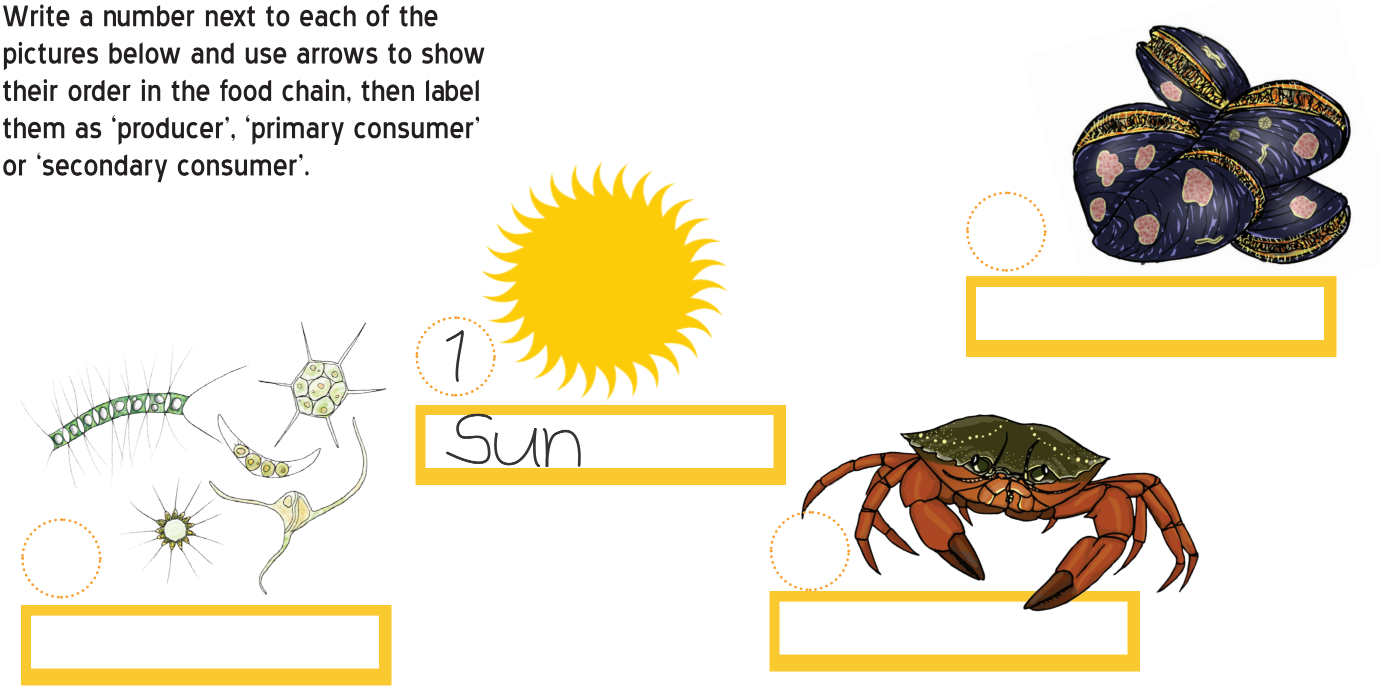
1. Use the examples above to Fill in these boxes

Producer	Primary Consumer	Secondary Consumer

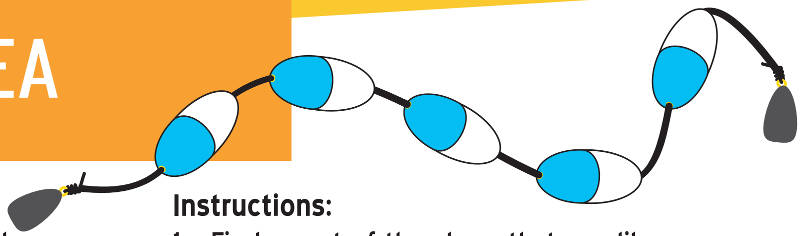
In the sea, it is not only seaweeds that photosynthesise. Tiny microscopic algae floating on the surface, called Phytoplankton also do! This makes them producers too. They are filtered from the water and eaten by a number of larger animals, including mussels and barnacles.



Write a number next to each of the pictures below and use arrows to show their order in the food chain, then label them as 'producer', 'primary consumer' or 'secondary consumer'.



MY PROTECTED AREA



Aim:

To make your own marine protected area on the shore. Vist www.wildlifetrusts.org/mpa for background information.

You Will Need:

1. Weighted float line (thread corks or floats onto a piece of cord and tie rocks or weights to the ends) or hula hoop.
2. Camera.
3. Recording sheet and clipboard.

Instructions:

1. Find a part of the shore that you like - you may think it looks nice or you may like the wildlife in it.
2. Use the float line to mark out your special place
3. Take photographs, or draw your special place.
4. Use this sheet to record why your chosen place is so special.
5. Use your notes and pictures to explain to others why you have chosen to protect your area.

1. Describe or sketch your chosen protected area (use additional sheets if needed).

2. Why did you choose this area?

3. What special wildlife or habitats can be found in your area?

4. How could your area be damaged? what does it need protecting from?

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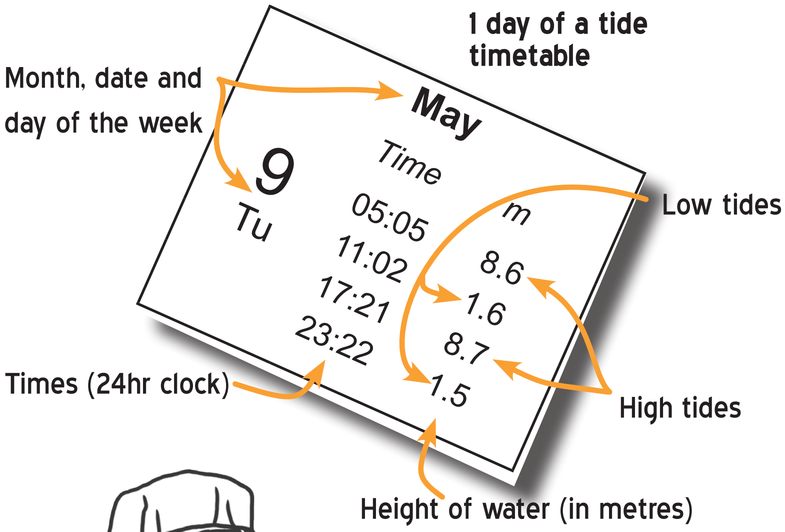
SAFETY FIRST!

Tides

Always check that the tides are suitable for the day and time you want to visit. The best time for rockpooling and exploring beach habitats is around low tide. Keep an eye on the tide at all times and make sure you don't get cut off!
You can check the tides by looking on the internet or in a newspaper, or by buying a tide table from your local shop.



Weather

The weather at the beach can change very quickly, so it's important you come prepared!

- Always check the weather forecast before your visit.
- Always wear wellies or waterproof shoes with a grip.
- Bring plenty of warm clothes, including a waterproof coat.
- In the summer time, make sure you bring a sun hat and put sun cream on before you leave home.
- Always bring food and water to the beach.
- Always stay with your adults and don't run off.

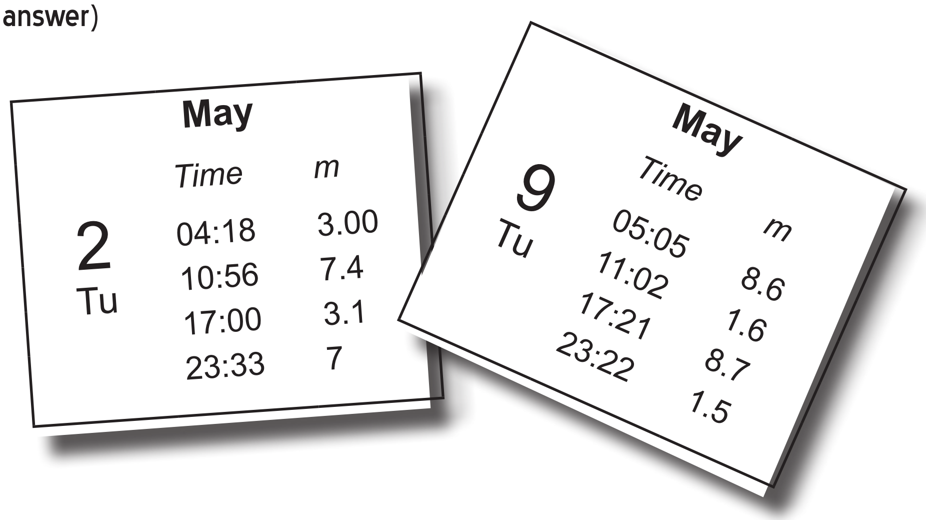
Colour in all of the things you need to bring with you to the shore.

SEASHORE SAFETY QUIZ

Q1. When is it safest to visit the beach? (circle the correct answer)

HIGH TIDE LOW TIDE

Q2. Which of these days is best to go to the beach if you want to rockpool with your class? (circle the correct answer)



Q3. Circle the items below that you think are important to bring with you to the beach for a school trip where you will be rockpooling (not a visit with your family)?

bucket and spade	fishing net	flip flops	sun hat
waterproof coat	swimming costume	sunglasses	Sun cream
spare clothes	food & drink	welly boots/ beach shoes	

Q4. Name 3 parts of the seashore code:

a. ....

....

b. ....

....

c. ....

....

Q5. What should you leave at the beach at the end of the day when you leave?

....

....

SEASHORE WORD PUZZLES

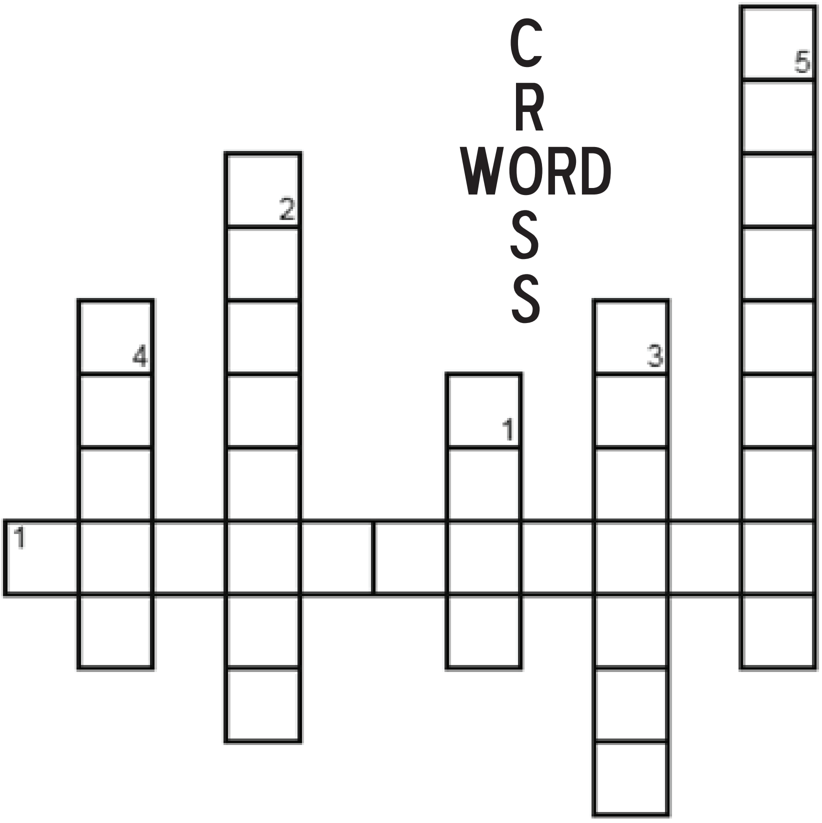
CROSSWORD

Across

1. Word for 'drying'

Down

1. Opposite of a Spring Tide
2. Different species in different zones
3. Different places where species live on the shore
4. Caused by wind blowing over the sea
5. Area between high and low tide (5,4)



WORD SEARCH

N	W	Z	D	H	Y	T	N	Z	L	N	R	P	A	V
J	S	A	N	S	C	T	O	S	O	E	U	R	I	F
E	Z	G	V	E	P	N	I	I	I	A	R	E	G	I
V	Z	V	P	E	A	L	T	V	W	P	P	D	N	X
L	Y	S	X	T	S	I	A	K	A	V	K	A	I	Y
I	A	K	I	T	T	U	C	S	O	R	Q	T	R	P
B	R	O	W	E	N	M	C	T	H	W	G	O	P	F
X	N	P	P	H	J	L	I	C	N	Z	O	R	S	B
V	X	M	T	I	D	E	S	X	B	B	O	S	T	Y
G	O	T	G	C	A	Z	E	D	B	V	R	N	R	P
C	Z	S	T	R	A	N	D	L	I	N	E	L	E	G
O	J	R	R	E	X	Z	F	O	X	T	P	K	T	H
G	T	A	T	I	B	A	H	D	V	P	A	A	U	A
Y	V	Z	W	H	L	F	D	Z	C	N	W	B	I	P
J	O	W	C	Z	R	A	K	W	X	A	O	E	U	B

ASPECT
GRAVITY
PREDATORS
STRANDLINE
ZONATION
COMPETITION
HABITAT
SPLASHZONE
TIDES
DESICCATION
NEAP
SPRING
WAVES

SEASHORE WORD PUZZLES

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1. Word for ‘drying’

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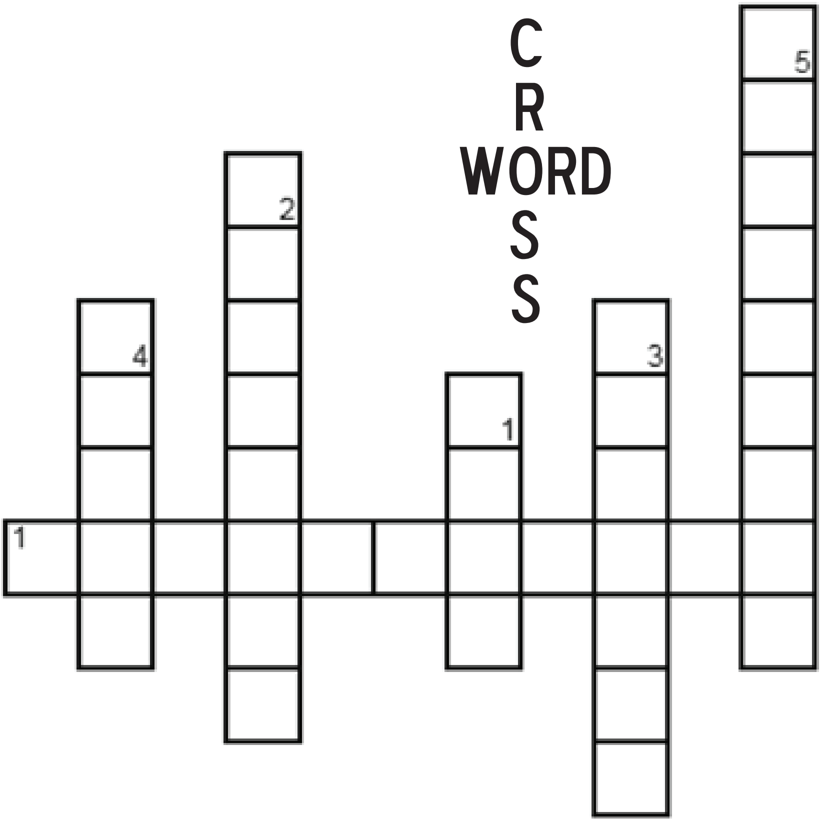


WORD SEARCH

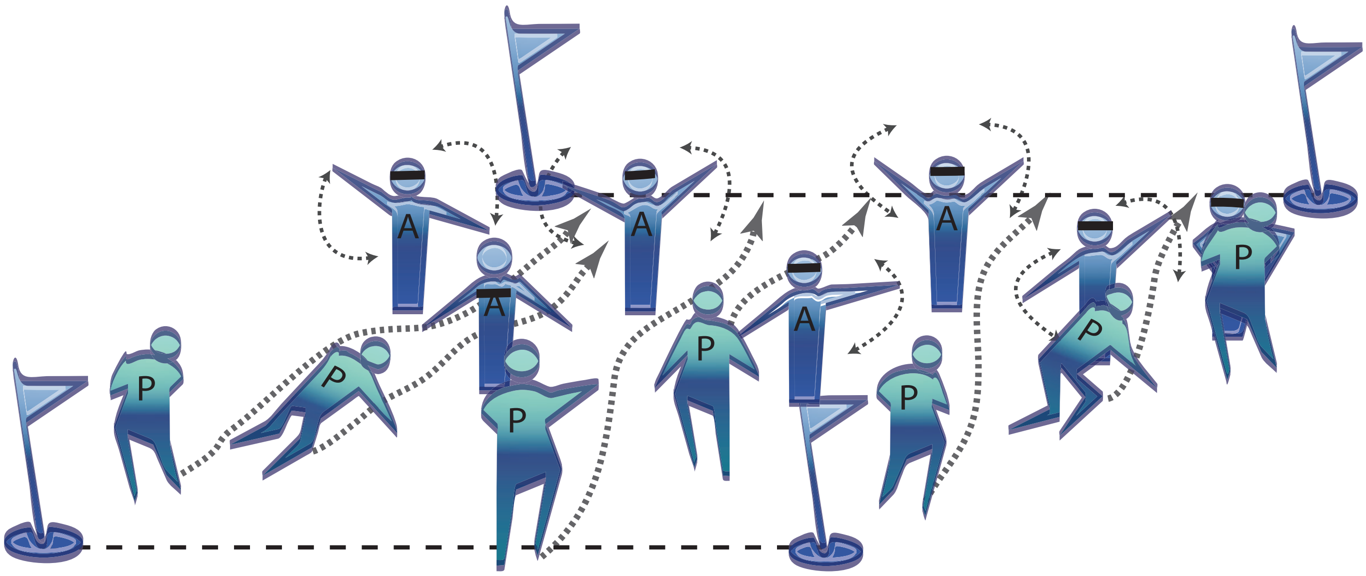
N	W	Z	D	H	Y	T	N	Z	L	N	R	P	A	V
J	S	A	N	S	C	T	O	S	O	E	U	R	I	F
E	Z	G	V	E	P	N	I	I	I	A	R	E	G	I
V	Z	V	P	E	A	L	T	V	W	P	P	D	N	X
L	Y	S	X	T	S	I	A	K	A	V	K	A	I	Y
I	A	K	I	T	T	U	C	S	O	R	Q	T	R	P
B	R	O	W	E	N	M	C	T	H	W	G	O	P	F
X	N	P	P	H	J	L	I	C	N	Z	O	R	S	B
V	X	M	T	I	D	E	S	X	B	B	O	S	T	Y
G	O	T	G	C	A	Z	E	D	B	V	R	N	R	P
C	Z	S	T	R	A	N	D	L	I	N	E	L	E	G
O	J	R	R	E	X	Z	F	O	X	T	P	K	T	H
G	T	A	T	I	B	A	H	D	V	P	A	A	U	A
Y	V	Z	W	H	L	F	D	Z	C	N	W	B	I	P
J	O	W	C	Z	R	A	K	W	X	A	O	E	U	B

ASPECT
GRAVITY
PREDATORS
STRANDLINE
ZONATION
COMPETITION
HABITAT
SPLASHZONE
TIDES
DESICCATION
NEAP
SPRING
WAVES

THE ANEMONE GAME

A game to introduce how sea anemones are predators that are well adapted to catch their prey. It can be played on the beach or any other large safe area, such as a field, hall or a playground.

1. Split the group into two teams – one group will be anemones (predators), the other will be prawns (prey).
2. Anemones should be blindfolded and should stand an arm's length apart from each other in a play zone, forming a barrier between two 'home' lines, roughly 20m apart.
3. The 'prawns' must try to move from one line to the other, without being touched by the anemone's stinging tentacles.
4. Each anemone must wave its arms gently around. If it touches a 'prawn' then the anemone must grab it and hold it until the rest of the prawns have passed or been caught.
5. Let each team be the anemones in turn and see who are the best hunters!

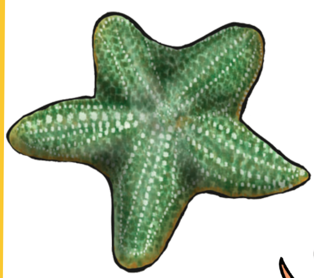


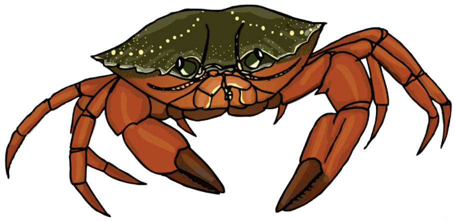
Extension activity: Discuss the advantages and disadvantages of sitting and waiting for your food to come to you.
How would the game be different if the anemones actively hunted their prey? Try this then discuss how the anemones feel after running around.
How much energy do they think they have used compared to sitting and waiting? Did they catch as much prey?

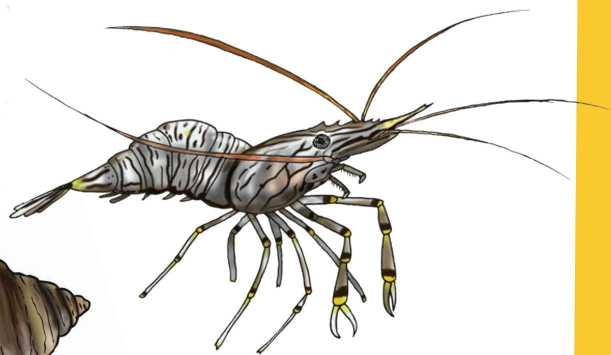
PRODUCED BY DEVON WILDLIFE TRUST, SOMERSET WILDLIFE TRUST AND THE MARINE BIOLOGICAL ASSOCIATION ON BEHALF OF EXMOOR NATIONAL PARK

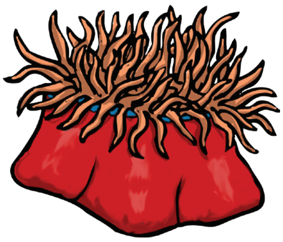
CLASSIFICATION - WHAT IS IT?

Answer the questions below for each animal pictured. Begin at the top and follow the arrows down until you reach the bottom to correctly identify your animal. When you are sure you are right, draw your animal in the correct box!









Does the animal have legs with joints?

YES → Does it have 2 large claws?

- YES → Common shore crab
- NO → Common prawn

NO → Does it have a shell?

- YES → Dog whelk
- NO → Does it have 5 'points' or 'arms'
  - YES → Cushion starfish
  - NO → Beadlet anemone

Common shore crab

Common prawn

Cushion starfish

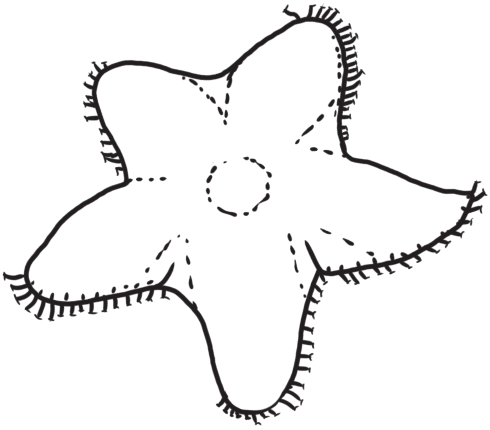
Beadlet anemone

Dog whelk

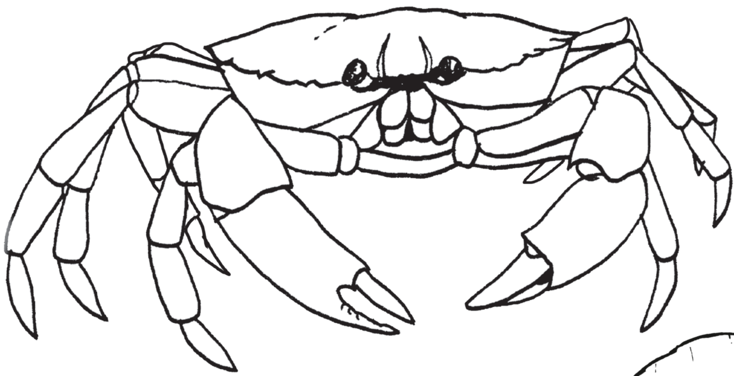
This list of questions is called a KEY. It can help you sort lots of plants and animals into groups. **Extension activity:** Why not try making your own key?

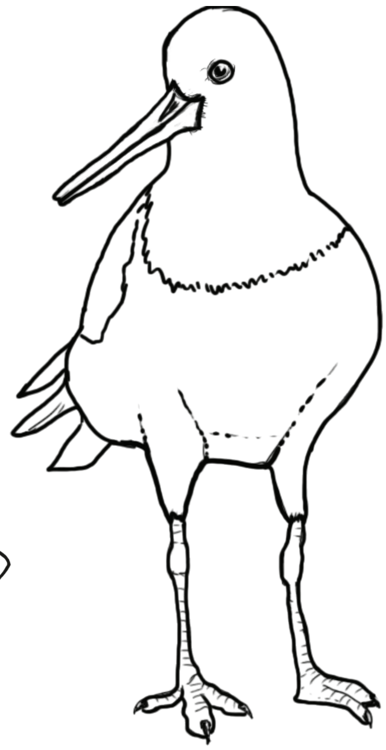
CLASSIFICATION - WHO AM I?

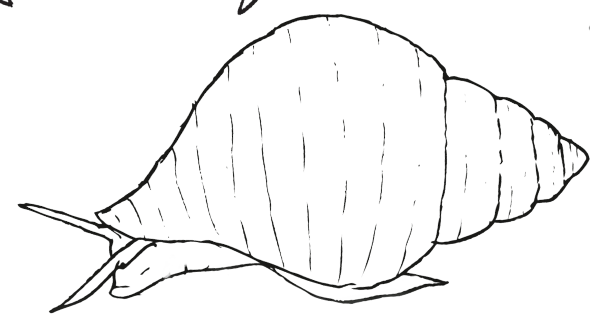
Fill in the missing letters to find out the name of these animals that are all found along Exmoor's coast. Then colour them in!



C_S___N S___F___	_A_BO__ _O_P__S_	B_AD___ _N__O_E







C_M_O__H__E C__B	_O_ W__L_	_Y__ER C_T___R

ANSWER SHEET

Sheet 3: 0 hours = High Tide 6 hours = Low Tide 12 hours = High Tide 18 hours = Low Tide

Sheet 4: Q1: 6 Hours.

Q2: DAY 1 = Neaps (not very big tides). Day 2 = Springs (big tides)

Q3: At right angles for neaps (pulling in different directions).

Q4: In line for Springs (pulling in the same direction).

Q5. Day 2. 10.38am

Sheet 5: Q1: Blenny A

Q2: A. extremes of salinity, temperature, desiccation predation by birds B. Competition for space and food; predation by fish.

Q3: B. would seem to be the most favourable habitat. However, as the blenny is adapted to cope with the harsh conditions of the upper/middle shore, the reduced competition might make it a more favourable place to live.

Sheet 7: Not enough space - lower

Too much salt - upper

extreme heat - upper

competition for food - lower

freezing - upper

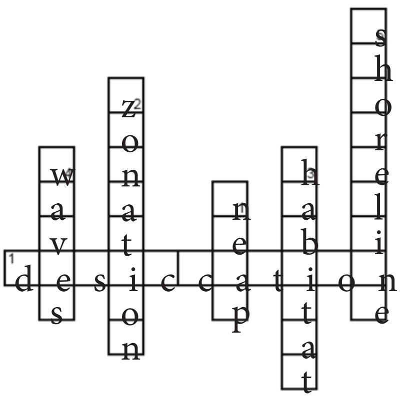
not salty enough - upper

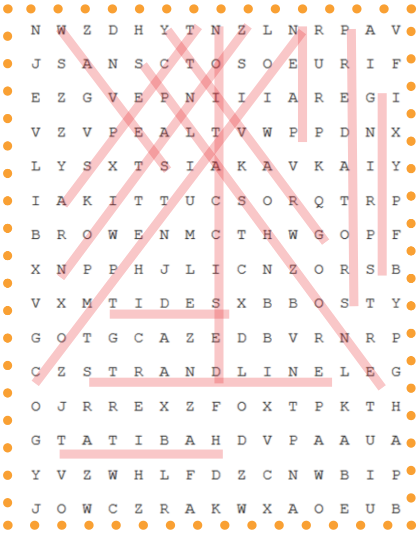
Drying Out - upper

Not enough light - Lower

Order of labels (top to bottom): splash zone; upper shore; middle shore; lower shore; subtidal zone

Sheet 8:

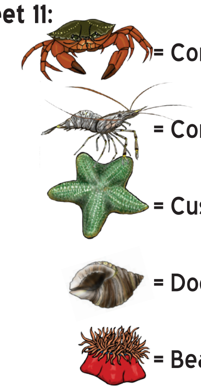




Sheet 9: At least 33

Sheet 10: Cushionstarfish; harbour porpoise; beadlet anemone; common shore crab; dog whelk; oyster catcher

Sheet 11:



= Common Shore Crab

= Common prawn

= Cushion starfish

= Dog whelk

= Beadlet anemone

Sheet 12:

Seaweed: Bladder wrack; Kelp; Sea lettuce

Fish: Basking Shark; Blenny; mackerel

Mammals: Grey seal; Harbour porpoise; Bottle-nosed dolphin

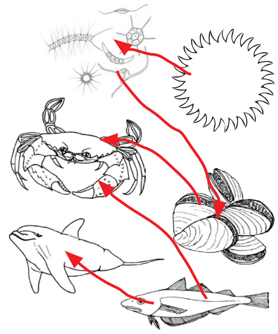
Invertebrates: Velvet swimming crab; Common prawn; Flat perriwinkle

Sheet 15:

1. Producer = Seaweed; Primary consumer= sea snail; Secondary consumer = crab

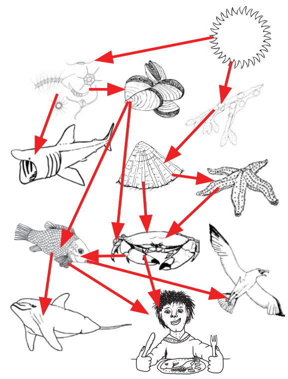
2. (left to right) 2 producer; 1 Sun (example); 4 secondary consumer; 3 primary consumer.

Sheet 16:



Sheet 17: The arrows point from the food/ energy source to its consumer

Sheet 18:



Sheet 19:

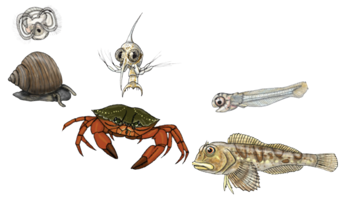
Q1: Situation dependent answer

Q2: 925 years!

Q3: Because animals use a lot of energy and resources to make large eggs making huge numbers would be impossible.

Q4: To increase dispersal and counter very low survival rates.

Sheet 20:



Sheet 26:

Q1: Low Tide

Q2: May 9th

Q3: sun hat; waterproof coat; sunglasses; Sun cream; spare clothes; food & drink; welly boots/ beach shoes

Q4: Any 3 from sheet 24

Q5: Anything that was already there when you arrived, especially living things. "Leave only footprints"