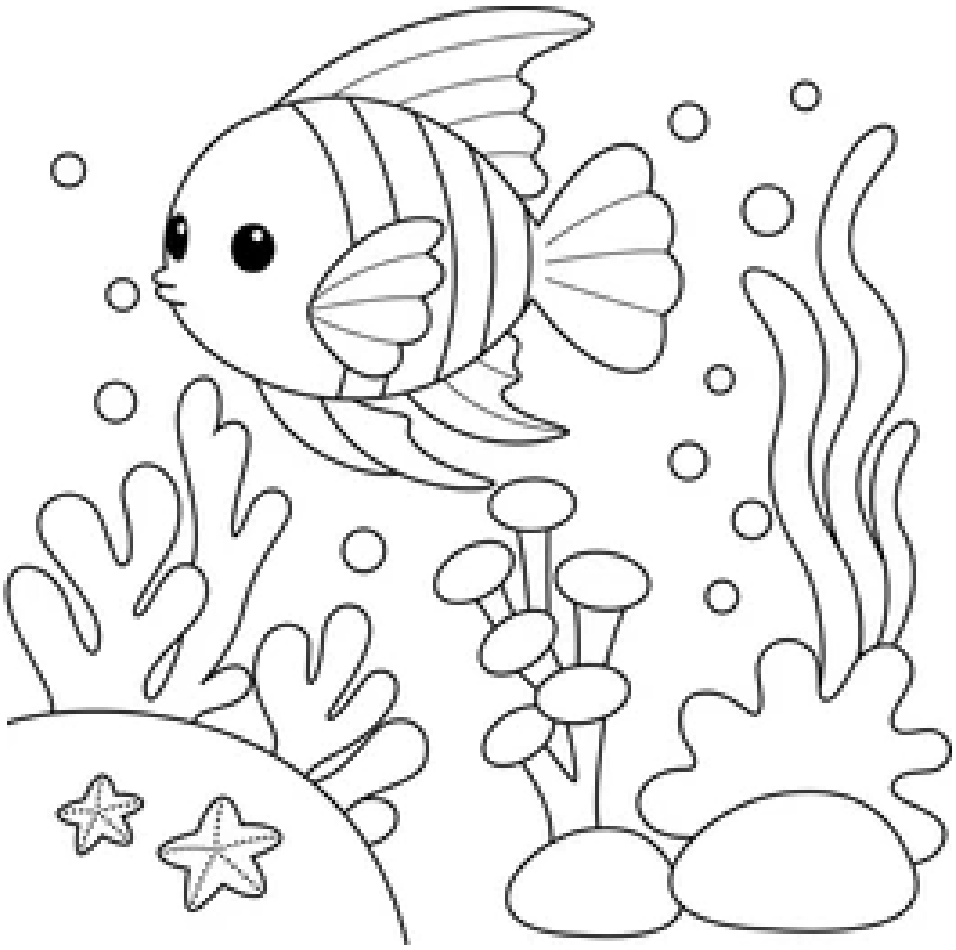
Summer Activity Pack

Sea: Beneath the waves



You could keep all your activities to show your teacher when you go back to school.

Week 1: The Sea

70% of the world is water and scientists reckon that since life began, we have had the same amount of water on the planet. If you think about it, that means the water from your tap could contain molecules that dinosaurs drank!



Imagine that the bucket of water represents the worlds water, only a tablespoon of that water would be okay for humans to drink. Why, because the rest of it is salty (or undrinkable).

Salt water is denser than fresh water, meaning it seems thicker. Some water has so much salt in it that nothing can live in it. Humans cannot drink salt water, it will kill them – plus it tastes horrible!

Breathing Underwater: We all know that fish live in the sea, and other animals do too, such as crabs, lobsters (crustaceans), jelly fish, coral (cnidarians), sea stars, sea cucumbers (echinoderms). But how do they breathe underwater?

Activity: You need a Coffee filter (kitchen towel), a spoon, warm water, a clear cup, a rubber band or hair tie, coffee grounds (emptied tea bag).

Directions:

1. In your cup of warm water, add in about a tablespoon of coffee grounds and mix!
2. For your second cup, place the coffee filter over the top and secure it with your rubber band or hair tie!
3. Next, slowly pour your coffee mixture over the top of the coffee filter and observe what happens!

How it works: Water is a liquid known as scientifically as H_2O, which means it contains two hydrogen atoms (H_2) and one oxygen atom (O).

Human beings have lungs to help them breathe, whereas fish have gills to breathe. As a fish takes in water through its mouth, the water is pumped over to the gills, which are organs that are made of very thin tissue material. As the water moves through the fish's gills, the oxygen atoms are captured from the water and placed into the fish's bloodstream. This occurs so that the oxygen can be transported all throughout the fish's body.

It helps to think of the bloodstream as a bus. It picks up the oxygen at the gills and drops it off at all of the cells that are located inside the fish!

Now, let's try to visualise this process by using the coffee filter experiment as an example. As you pour the coffee mixture into the filter, you can see that it is able to catch all of the little coffee grounds. In the same way, this represents how seawater (the coffee mixture) is pushed through a fish's gills (the coffee filter), which capture all of the little oxygen atoms (the coffee grounds)! Salt Water Experiment | Ocean Science for Kids • The Science Kiddo

Awesome!

But what about humans! Humans are mammals and need oxygen to breath too, but we cannot breathe underwater as our lungs are too small to make enough oxygen for us, plus our lungs are inside of our bodies. Dolphins, seals and whales are mammals too, which is why you see them take a gulp of fresh air.

2. Jelly Fish



Despite their name, jellyfish are not fish, but a type of invertebrate called a cnidarian. Their name comes from the ancient Greek word 'cnide' meaning "nettle". They sting their prey using cells on their tentacles called 'cnidocytes', which release powerful venom from microscopic barbed stingers whenever they're touched by a foreign object!

Some fun facts:

- Despite being living creatures, jellyfish don't have brains – or hearts.
- Jellyfish and a cucumber are each 95% water.
- Most species of jellyfish don't have eyes, but instead use light-sensitve cells around their bells called rhopalia, giving them a blurry sense of what's in front of them.
- Jellyfish use their tentacles to bring food to a hole on the underside of their bodies which acts as a mouth. Food enters their stomachs straight away, as the 'mouth' and stomach are connected. Once their meal has been broken down and the nutrients absorbed, jellyfish expel waste through the same hole.
- When there is an influx of jellyfish in an area, often in summer when there is more sunlight and plankton to feed on, this is called a 'bloom'.
- Jellyfish eat small crustaceans like shrimp and crabs, fish larvae, as well as plankton and algae. Jellyfish have no teeth and swallow their prey whole.
- They have balance organs called statocysts which keep them the right way.
- They do have a nervous system that act as sensory organs that detect touch, temperature and smells.

How many eyes! We learnt that most species of jellyfish don't have eyes, but the Box jellyfish, does, 24 of them! They can see all around them all of the time. No one can sneak up on them.

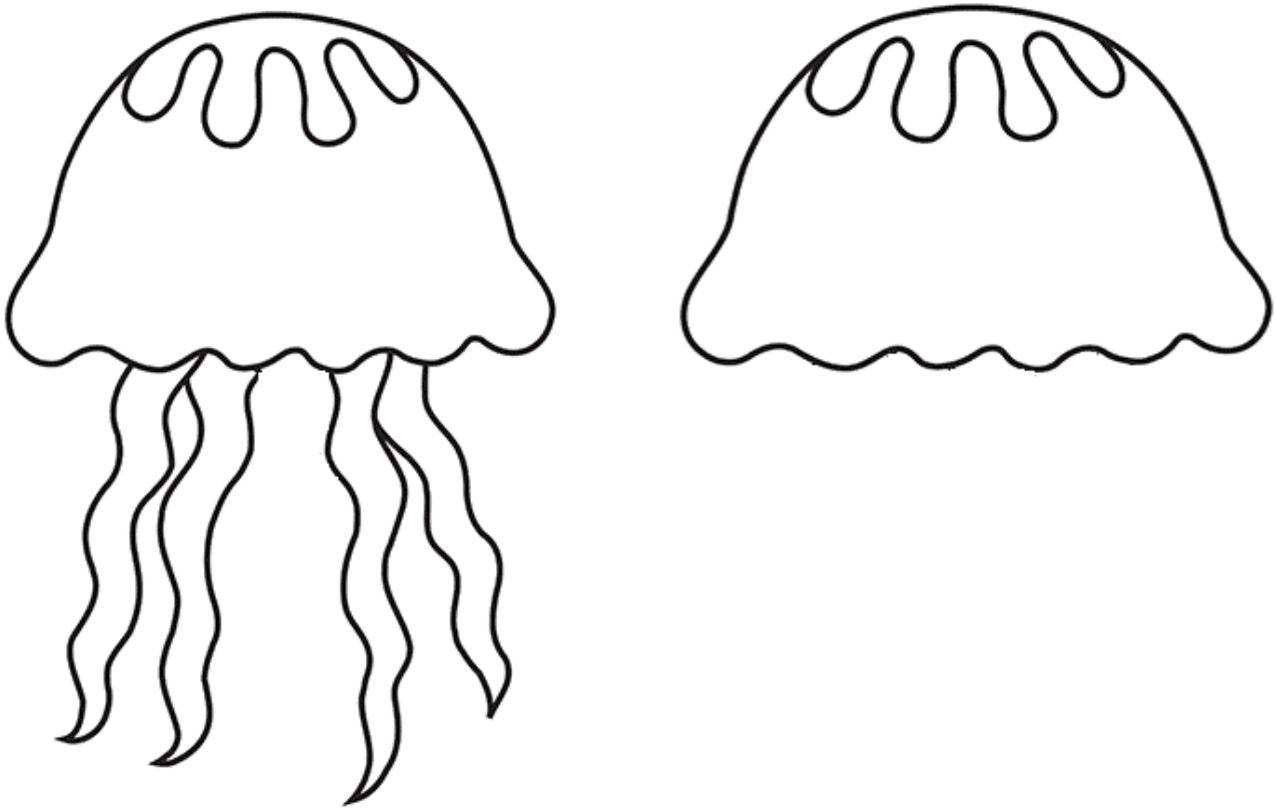
Activity: Where would you put 24 eyes, remember you have 2 already! Get a piece of paper and draw the front and back of you and find places for your eyes. Add why you would put eyes there? You might find that we would all put those extra eyes in different places!

Food Fun: Ask an adult to help you for this one. Make a jelly, and use a small bowl to pour it in. Then once it is set, you can plop it out in a plate so it looks like a small jelly fish – you can use a bigger bowl to make a big jellyfish – or even different sizes. What would you use to make tentacles? Remember, to eat it otherwise it would be a waste of food.

How many tentacle does a jellyfish have?

The number of tentacles varies by species. Many have four to eight tentacles hanging from their bell. But some species can have hundreds or thousands of tentacles.

The Irukandji Box jellyfish only has four tentacles, but the Lion's Mane jellyfish have up to 1,200! How many of the Lion's Mane jellyfish tentacles can you draw below?



3. Turtles



Credit: ACEgan via Shutterstock

Turtles, in particular the big Leatherback turtles, only feed on jellyfish. Leatherbacks turtles come to UK and Irish seas to feed on jellyfish blooms. You would be very fortunate to see one, but if you do then you should let the Marine Conservation Society know. (www.mcsuk.org)

This is bizarre, but like jellyfish - turtles have no teeth! Instead they have a beak, which is made from the same stuff as your finger nails. Their shells are bones which have joined together.

Turtles are reptiles, so also need air to breathe, but like all reptiles they lay eggs, which needs to be done on land. Interestingly, no amphibians i.e. frogs, live in the sea as they need fresh water.

Activity: Female turtles lay their eggs on the same beach that they were born on. How they find their way back is amazing. See if you can navigate back home after a day out – you'll have to ask the adult first.

Turtles v's Tortoises

Some of you might have a tortoise, and might be wondering if they are the same. Well, in some ways yes as they are both reptiles with a bone shell. However, there are two simple key differences, where they live and what they eat:

- Turtles live in the sea and eat meat
- Tortoises live on the land and eat vegetation

Look at these pictures and see if you can spot any other differences:







Activity: Time to make a turtle – You can use the template on the link to make your own turtle or you could try drawing one or use your jelly pot like we did!
3D Sea Turtle craft activity guide | Baker Ross

4. Shells

We learnt that turtles 'shells' are made of bone, so does this mean that shells on the beach are made of bone too?

Let's find out…



All the shells you see on a beach once had an animal in it, those animals are called Molluscs. To form a shell, the mollusc's body gives off substances that contain calcium carbonate. The substances harden into layers of shell. As the animal grows, its shell also gets bigger to make room for its body and provide protection.

Shells are also put together in various ways. Molluscs called univalves, such as snails and conchs have single shells in the shape of a twisted cone. Clams, oysters, scallops, and mussels have shells with two halves joined on one side, these molluscs are called bivalves. Chitons have shells made of eight overlapping plates.

Activity: Can you match the shells to the creatures?

Bivalve



Univalve



Chiton



The Ocean Conservancy organisation ask that people leave shells on the beach as it helps with the ecosystem and reduces damage to the shoreline. But it is okay to look at them, and that is what we need to do in the next activity.

Molluscs keep their shells and grow or expand them while they are intact or on their fleshy body. They keep the same shells throughout their lives. A bit like, us living in the same house, while building add-ons and extensions – and carrying it around all the time! If you look closely at a seashell, you can see these growth rings—similar to the growth rings on a tree trunk. This growth pattern allows scientists to determine the age of seashells. Pretty amazing, right!



Meet Ming. He was a clam or Ocean Quahog, who lived in the Atlantic. He broke the Guinness World Record as the oldest animal in the world.

Challenge: He was born in 1499 and died in 2006 – Can you work out how old he was? (Hint the sum is 2006 – 1499 = ???) They counted a lot of lines, didn't they! Are you wondering why he was called Ming? Well, Ming was the name of the Chinese imperial family that ruled at the time. In England in 1499, you would not have gone to school – instead, you were sent to work with your parents, from as young as 5. It was a hard, difficult and very different world to now.

Fab Fact: Are you left-handed? 1 person in 10 people are reckoned to be left handed. Did you know, that most seashells open to the right, but there are a few that open to the left!

Activity: As we should leave shells on the beach, how about trying to make some using salt dough

Recipe for Salt Dough	1 spoon salt 1 spoon water 2 spoons of flour

To make my two shells, I used 1 teaspoon salt, 1 teaspoon water and 2 teaspoons flour. I moulded them over the back of different spoons and using a fork marked the back. Then I waited for them to dry, before I decorated them. They were fragile and, as you can see, one of them broke slightly.



5. Sharks

We are often frightened by sharks, but there are only a few that are really dangerous and none of those have been sighted in British waters – phew! A falling coconut is more likely to hurt you than a shark. We didn't realise that rays are part of the shark family, as they look so different. Sharks are shaped to glide through the water with ease, whereas rays are flatter making it easier from them to hide on the sea floor.

The biggest of the sharks in British waters is the basking shark – which can be 12 metres long, that is bigger than a width of a swimming pool! They will not hurt you as they do not have any teeth! They spend most of their life swimming with its mouth wide open as it eats the smallest of creatures – plankton. Plankton can be up to 5cm long.

Activity: Draw a line 5 cm long:

To help understand all that we worked it out based on your equivalent height and you would only ever be eating food the size of a pea – all the time. That is a lot of peas!

Challenge: Sharks are silent creatures, because they do not have vocal chords – unlike dolphins and whales. It makes you wonder how they communicate with each other, or if they do? A challenge, with adult's permission, why not see if you could not speak for a set amount of time – could you last a day!

Do you like going to the dentist? Well, sharks would not need to as their teeth are very healthy. Our toothpaste has floride in it, to help keep our gums nice and clean. Sharks have floride on their teeth

Fab Facts: One thing we share with sharks, our teeth have the same density; meaning they are just as hard! Here are some more facts…

- Sharks usually lose at least one tooth a week, which can be replaced within a day of losing.
- We have a single row of teeth, sharks have 5-15 rows of teeth in each jaw, except the bull shark, who has 50!
- Shark teeth aren't attached to gums like human teeth are, nor do they have roots and are typically lost when they get stuck inside their prey.
- Sharks are born with complete sets of teeth and will immediately swim away from their mothers to begin hunting for food on their own.
- It takes around 10,000 years for a shark's tooth to fossilize. The most commonly found shark tooth fossils are from around 65,000 years ago!
- It's very easy to find shark teeth on the beach, seeing how each shark loses thousands of teeth in their lifetimes!
- Shark teeth are sharp enough that they were used as tools by ancient humans so they could hunt their food!

It turns out that stingrays can replace teeth too. They also have rows of them as their diet is mainly crabs, or crustaceans – so rows of teeth help with crushing the shells.



Stingrays teeth are a different shape to, as you can see (left). The shark's teeth are pointed, more triangular shaped and the stingray's are long and narrow. Each design suited for how and what it eats. Like us, our front teeth are sharper for biting and our back teeth are better for chewing.

Fab Fact: Stingrays and sharks have no bones in their bodies! Their skeleton is made up of flexible cartilage (the bendy stuff that your ears and nose are made from), although theirs is much stronger. What do you think would happen to you if your bones were made of cartilage?

Activity: Let's make a sting ray. We are going to use papier machė, which is torn strips of newspaper and then use a mixture of water and glue. Turn a dinner plate upside down, and put a piece of cling film over it. Then cover with the paper and water and glue mixture. Some rays are round, so this shape works. We put an old paint brush in the tail so the tail didn't break, but a think stick would also work.



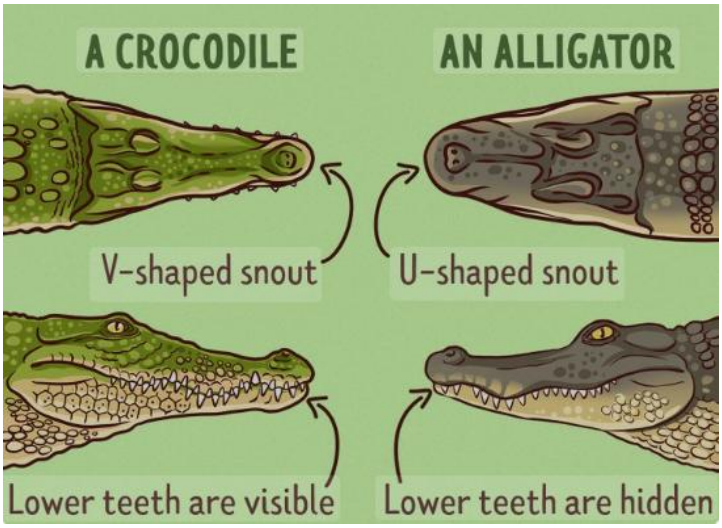
You can see the cling film on the dinner plate. I had to wait overnight for it to dry. I did build up two eyes, so they were slightly raised (not in photo)

My finished stingray! The eyes are bits of paper with a black felt tip pen. I painted the other side as well.



6. Crocodiles

Are you surprised to see that crocodiles live in the sea? We often see them on TV by rivers edges, but there are some two species that live in saltwater. The largest of which is the Australian Saltwater crocodile. Interestingly, no alligators can survive in the sea. Crocodiles and alligators are both reptiles and look very similar, yet they are two different creatures – like a cat and dog!



Crocodiles have separate toes, whereas alligators have web-skin between their toes – not that you should get that close to one!

Crocodiles would beat an alligator in a battle 9 / 10 times!

Both crocodile and alligator mean ‘lizard’ in different languages!

- “crocodile” comes from the ancient Greek word “krokódilos”
- “alligator” comes from the Spanish term "el lagarto"

Are crocodile’s dinosaurs? Although they were around 250million years ago, with dinosaurs, they are not considered dinosaurs. Many scientists believe that crocs are closer to birds than they are to reptiles!



The saltwater crocodile is often mentioned as the animal with the strongest bite on Earth. In a 2012 study, the bite of one individual was recorded at 16,414 Newtons or 3,689 pounds of force—making it the strongest recorded bite of any individual animal.

That sounds like a big number, and it is when you learn that humans use 70 to 150 Newtons of force to bit a carrot or a piece of meat. Crocodiles have quite a bite! Scientists reckon a T-rex bite would be 35 000–57 000 Newtons.

Like sharks and rays, crocodiles lose their teeth and each tooth can be replaced up to 50 times during their life time. Considering crocodiles can live up to 75 years there is a chance that a crocodile might lose them all!

Activity: How big do you think crocodiles are compared to the basking shark?
a) same size b) bigger c) smaller Guess how long a saltwater croc is :_____m

Big Facts: The Australian saltwater crocodile are the largest type of crocodiles and are only found in South-east Asia, eastern India and parts of Australia. Nowhere near us.

- The largest crocodile ever held in captivity was a saltwater-Siamese crocodile called Yai. It was born in 1972 at the Samutprakarn Crocodile Farm and Zoo in Thailand. It grew to be 6 metres long and weighed 1200 kilograms.
- The world's longest crocodile was called Lolong. It was a saltwater crocodile that measured 6.17 metres long, so just a bit longer, but it only weighed 1075 kilograms when it was found in the Philippines in 2011.

Famous Crocodiles – We can think of two famous crocodiles, Tick-Tock the crocodile, who appears in the Disney film Peter Pan, and the Enormous Crocodile a book written by Roald Dahl, which tells the story of a huge, hungry crocodile trying to eat human children whilst wearing disguises that don't quite work. The other animals have had enough of his cunning tricks, so they scheme to get the better of this foul fiend, once and for all!

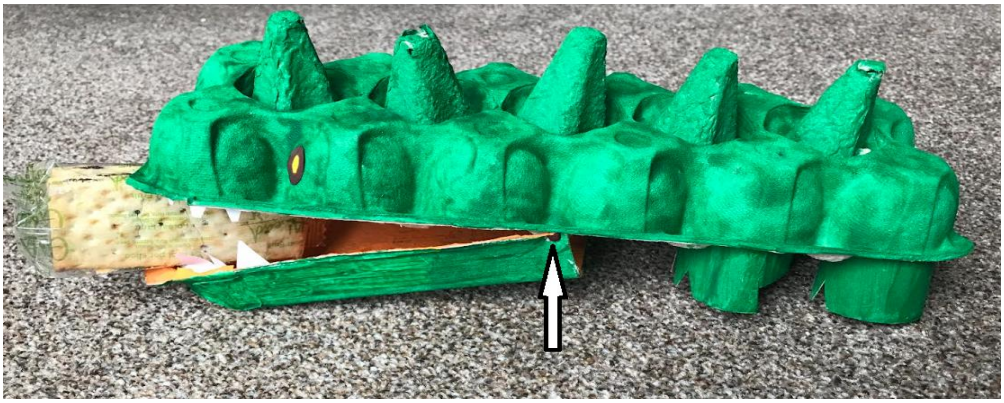
Activity: Using a twelve egg box, why not have a go at making your own friendly crocodile. You could turn it into a puppet and write a story for it, or a snappy poem!



You need: 1x12 egg box, 2 toilet roll inners, 2 split pins (if making a puppet), glue, paints and patience!

Cut the lid (A) so the edge can fix on to point (B), otherwise your crocodile jaw will not work so well.

Paint everything, make some teeth out of white paper and then put it all together!



Most of us will never see these creatures in the wild.
However, there are webcams to allow you to see them from your settee. Here are a just a few to view with adult permission:

Best underwater live fish, shark, penguin, seal and turtle cams 2021 | MadeForMums

National Aquarium - Livestreams

Live cams | Monterey Bay Aquarium

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