



SSC DIVE IN! CETACEANS



In collaboration with

sea watch
FOUNDATION





WELCOME!

Hello, and welcome to “SSC Dive In!”. Packs of resources providing some seaside fun directly into family homes and classrooms.

This pack’s theme: Cetaceans

Whale-come to this fin-tastic collection of resources on whales, dolphins and porpoises!

Not many people know that Scotland has some of the best whale and dolphin watching opportunities in Europe. Discover more about which species you can spot, how scientists are monitoring their numbers, fun facts, crafts and more inside.

Inside this pack:

- **Children’s blog: Flukes & Fins**
- **Fact file: Cetaceans**
- **Discovery sheets: Species information**
- **Guest blog: Become a cetacean citizen scientist with Sea Watch Foundation!**
- **Exhibit sneak-peak: Dolphin skull**
- **Craft instructions: Paper plate whale**
- **Experiment: Cetacean milk density**

Important note: *If you are going outdoors, please follow the social distancing protocols and government advice.*

We’d love to hear from you! If you’ve had fun having a go at activities, experiments and crafts, let us know. Any comments or pictures can be sent to marineengagement@seabird.org, or complete this short feedback survey [here](#). More resources available on our [website](#).

Enjoy using our packs and want to see more? The Scottish Seabird Centre is an environmental education and conservation charity. Every penny we raise helps us deliver our important education and conservation work. If you enjoy using our resources and would like to support our work, please consider making a donation to the our [JustGiving page](#). Thank you.

We hope you enjoy diving in to the pack!

Scottish Seabird Centre Learning Team

The Scottish Seabird Centre would like to thank the Sea Watch Foundation for their kind contributions to this pack.

sea watch
FOUNDATION



Discover more about their work here:

www.seawatchfoundation.org.uk • [blog](#) • [twitter](#) •
[youtube](#) • [facebook](#) • [instagram](#)

BLOG

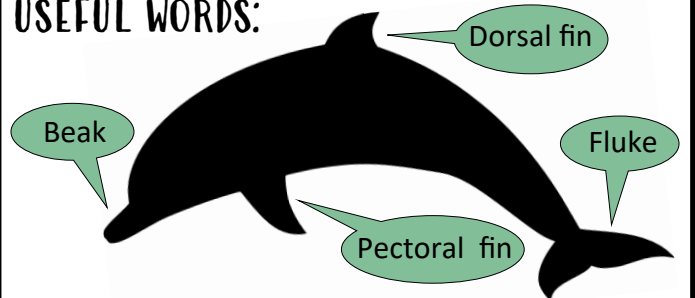


FLUKES & FINS

Have you ever seen a dolphin in the wild? What about a WHALE? Scotland is one of the best places in Europe (or maybe even in the **world**) to go watching for whales and dolphins. You don't even need to go on a boat! If you can find the right place and you are **very** patient you might be lucky enough to spot one of these amazing creatures from the coast!

The type of whale or dolphin you might see depends on where you are. Here in North Berwick we are sometimes lucky enough to see bottlenose dolphins as they pass by the Seabird Centre. Chunky and robust, Scottish bottlenose dolphins are especially adapted to live in cold water and can grow up to **4 metres in size**, much larger than other bottlenose dolphins around the world. A hooked, pointy dorsal fin sits in the centre of their back, often marked with unique scratches or rake marks which set individuals apart, a bit like our fingerprints. These dolphins are often seen at the surface of the water and can be amazing acrobats, jumping high into the air!

USEFUL WORDS:



CETACEAN – whales, dolphins and porpoises

POD – a group of cetaceans

However, some cetaceans aren't quite so keen to show off. The harbour porpoise has a 'shy' reputation and doesn't spend much time on the surface. They don't often approach boats or **breach** (jump) out of the water. However, I think this makes it even more exciting when you do see one surfacing, quietly rolling forward in the waves.

Another favourite around the Scottish coast is the orca. Although they are sometimes referred to as the 'killer whale', orca are actually the largest species of dolphin. They are BIG and usually spotted moving around in a **pod** on the North or West coast of Scotland, although they sometimes come and visit the East coast too. Their black and white patterning is really distinctive, and male orca have huge dorsal fins which sometimes grow to 1.8 metres tall (that's taller than most adults)!



BOTTLENOSE DOLPHIN



ORCA



Then there are the ocean giants—the whales. Some truly amazing species of whale can be seen from Scotland including the second largest mammal on the planet, the fin whale. Fin whales are **mysticete** whales, meaning they have no teeth. Instead they have hundreds of hard, flexible plates of **baleen** inside their mouth. Each plate has a hair-like fringe on the inner edge which acts like a strainer to help the whale collect its food.

Other whales (like sperm whales) have enormous teeth and feed on larger fish to survive, using **echolocation** to navigate. Echolocation allows the animal to work out where things are around them (including fish), using reflected sound, building up a kind of sound-map in their mind.

HUMPBACK WHALE



When you're looking for cetaceans in the wild, patience is key. Unless you're very lucky, it can take a long time to spot anything at all. Even when you do spot a **fin** or a **fluke**, it can be really difficult to work out what you're looking at. Unless the whale or dolphin is surfacing near something else (like a boat or landmark), it can be tricky to work out how big it is or get an idea of what colour it might be. A pair of binoculars can really help! Once you've got a good view, it's all about looking for clues!

If you can, try to get a closer look at the **dorsal fin** on the animals back. If it's a whale, the fin will be around 3/4 of the way down its back. If it's a dolphin, the fin will be in the middle of its back. You should also keep an eye out for how it's behaving. Just like with the show-off bottlenose dolphins and the shy harbour porpoise, how a cetacean is behaving can give us lots of clues about what it is.

Like with birds or other wild animals, you'll need to use an ID guide or a book to help you to work out what it might be. However, with enough time, practice, and patience, you could be spotting these amazing creatures for yourself!

Do you want to find out more about cetaceans around the world and how you can help to protect them? Read on to find out, and don't forget to visit the [WHALE AND DOLPHIN CONSERVATION KIDZONE](#) and [SEAWATCH FOUNDATION'S WEBSITE](#).

DID YOU JUST BECOME A DOLPHIN DETECTIVE?

Find out how much you've learned by answering the following questions:

1. What is the fin found on the back of a cetacean called?
2. How big can Scottish bottlenose dolphins grow?





FACTFILE

CETACEANS

WHAT ARE CETACEANS?

'Cetacean' is the name given to the group of animals containing whales, dolphins and porpoises. They are grouped together because they share a lot of the same characteristics, including:

- They are fully aquatic, meaning they never come on land.
- They have large, streamlined bodies, with powerful tails that they move up and down to swim through the water.
- They are carnivores—they only eat other animals.

Cetaceans are also **marine mammals**, meaning they are warm-blooded, breathe air, give birth to live young, and produce milk.



Bottlenose dolphin © Pia Anderwald/Sea Watch Foundation

HOW MANY SPECIES ARE THERE IN SCOTLAND?

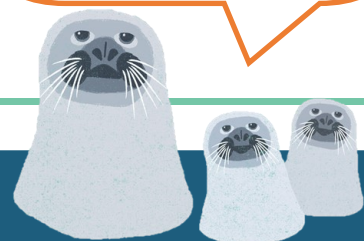
Over 20 species of cetacean can be spotted in Scottish waters, but some are more common than others. The commonest species in the Firth of Forth are [Bottlenose dolphin](#), [Harbour porpoise](#) and [Minke whale](#).

HOW DO I KNOW WHICH SPECIES IS WHICH?

It can be a little tricky to tell cetaceans apart because they're only at the surface for short periods of time and, even then, only the top of their bodies is showing most of the time! However, once you know what to look for, it gets a lot easier to identify them. Watch out for:

- Size of their bodies.
- Shape, position and size of their **dorsal fin**.
- Any colours and patterns on their bodies.
- Behaviour— are they calm or jumping around?

Use the handy guides in this pack to help work out which is which!





FACTFILE

CETACEANS (CONTINUED)

HOW DO CETACEANS BREATHE?

Just like you!

Take a breath—that's your body taking air into your **lungs**.

Breathe out—that's your body pushing air out of your lungs.

Lungs are an organ inside your body that take in **oxygen** (a gas used by our cells to make energy) and get rid of **carbon dioxide** (a waste gas).

Cetaceans are mammals, meaning they also breathe this way. Instead of breathing through their mouth and nose, cetaceans have evolved a '**blow hole**' on the top of their head to make it easier to catch a breath whilst swimming.

If you're close enough, you can see and hear cetaceans breathing — they create a puff of noise and a spout of mist called their '**blow**' when they breathe out at the surface.

Different species hold their breath for different amounts of time. Deep-diving species like Sperm whales can hold their breath for **90 minutes!**

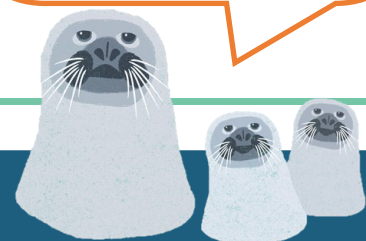


WHAT ARE BABY CETACEANS CALLED?

Females give birth to single miniature version of themselves called a '**calf**'. They are born tail first and swim quickly to the surface to take their first breath. At first they stay close to their mother for protection and feed regularly on their mother's **milk**. Once they are bigger and can catch their own food, they venture further afield. Some species stay with their mother's **pod** for their whole lives, whilst others leave to find a mate or make a new pod.



Fun fact: The biggest calf in the world is that of the Blue whale. When they're born, they weigh around **2,700kg** - about the same as an adult hippopotamus!





FACTFILE

CETACEANS (CONTINUED)

HOW DO CETACEANS EAT?

Different species feed in different ways. It depends on what they hunt!

Toothed whales, dolphins and porpoises, called '**Odontocetes**', catch prey such as fish and squid in their mouths filled with lots of teeth. Bottlenose dolphins have up to 100 pointy teeth, perfect for catching slippery fish. [Sperm whales](#) have the biggest teeth, reaching **20cm** in length!



'**Mysticetes**', on the other hand, are whales that take huge gulps of water containing smaller prey, such as [krill](#) and smaller fish, that form big swarms in the ocean. They then filter the food from the water through structures hanging from their top jaw, called **baleen plates**. The [Blue whale](#), the largest animal on the planet, can eat up to **500kg** of krill in one mouthful—that's the same weight as a grand piano!



Watch videos of baleen whales feeding [here](#) and [here](#).

Baleen plates have hair-like fringes to filter prey from the water and are made of the same material as your finger nails!

HOW DO CETACEANS COMMUNICATE?

In a variety of ways..

- Calls— different species make different sounds including whistles, clicks and songs.
- Body language—positioning their bodies in a certain way shows what mood they are in.
- Touch— just like us, cetaceans use to touch to build bonds and express their mood.
- Splashing—hitting their fins and tails on the surface is a good way to get attention and send a message.

Sound travels much further underwater than it does through air, so loud calls, like the songs of humpback whales, can travel miles through the sea. Listen to sounds on the next page!



DISCOVER



SPECIES INFORMATION

Click on the image below to be taken to pages of fun facts, information and sounds of different cetaceans!

A large blue rounded rectangle containing promotional text and logos. At the top right is the Scottish Seabird Centre logo. The main text reads 'The Whales, Dolphins & Porpoises of Scotland' in a white brushstroke font. Below this is 'Sounds' flanked by musical notes, followed by an ampersand and 'Descriptions & Fun facts' with a dolphin icon. At the bottom, it says 'In collaboration with the sea watch FOUNDATION' with a globe icon and a head with gears icon.

Scottish
Seabird
Centre

**The Whales, Dolphins &
Porpoises of Scotland**

♪ **Sounds** ♪

&

Descriptions & Fun facts

In collaboration with the
sea watch
FOUNDATION

DID YOU KNOW?

Bottlenose dolphins have a '**signature whistle**' - a unique call that identifies which dolphin is which, a bit like a name!





GUEST BLOG



BECOME A CETACEAN CITIZEN SCIENTIST WITH THE SEA WATCH FOUNDATION!

By Chiara Giulia Bertulli, Sightings Officer, Sea Watch Foundation.

Collecting data about our cetaceans has never been more important. Rising sea surface temperatures and human activities, such as fishing and drilling for oil, have been impacting marine species in the British waters for many years now.

To help, a project that uses **citizen scientists** (members of the public without science training) to collect data and learn more about cetaceans has been developed in the UK by the Director of [Sea Watch Foundation](#).

This organisation, dedicated to marine research, conservation and education, developed a nationwide citizen science project in the 1970s which trains people to identify cetaceans and report sightings from all around the UK. Their help is vital to improve our knowledge of the marine environment and the species that live there.



Photo: A citizen scientist watching for cetaceans @Sea Watch Foundation

No previous experience is needed; anyone who is in the UK and near the sea and wants to help can. All that people need to take part is safe access to the coast, patience, a lot of enthusiasm, binoculars, a copy of our recording forms and a cetacean identification guide (downloadable from the Sea Watch website [here](#)). Why not have a go with your family or class? Ask an adult or teacher for help to complete the form.

LAND-BASED EFFORT & SIGHTINGS RECORDING FORM



Day/Month/Year Site Name Latitude ° 'N Longitude ° ' W E
 Obs. Name/Address E-mail: Tel:

Effort and Environmental Data: make a new record when environmental conditions change or when there is a break in effort.

| Effort Time (GMT or BST?) Start | Effort Time (GMT or BST?) End | Sea state | Swell height | Wind direction | Visibility | Active Vessels within 5 km | Additional notes |
|------------------------------------|----------------------------------|-----------|--------------|----------------|------------|----------------------------|------------------|
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Sightings: make a new record for each sighting – start a new form if necessary.

| Sighting Time | | Species | Confidence | Group Size | Number of Calves | Number of Juveniles | Bearing to Animal | Distance to animal | Animal Heading | Behaviour | Associated Seabirds |
|---------------|-----------|---------|------------|------------|------------------|---------------------|-------------------|--------------------|----------------|-----------|---------------------|
| First seen | Last seen | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Photo: The recording form used to write down information about the cetaceans you see.





Cetaceans (whales, dolphins and porpoises) are not easy to see, and it is common to just see a small fin (particularly if it is a porpoise) far away. Don't give up hope, keep on scanning the sea surface with the naked eye and with your binoculars, and if you see something like a movement or splash, keep on looking in that spot for a minute or two. If it is actually a cetacean, it may take that long for it to reveal itself again. Indeed, some cetaceans may remain beneath the surface for several minutes by which time they could have moved some distance away.

If the cetacean re-surfaces again, take a note of the time and write a summary of the weather and sea conditions, and try to identify the species and how many individuals there are in the group. A note on the behaviour of the animal or animals is also helpful, such as whether they are calm or active (are they jumping? Chasing food?). Information about any associated birds is also useful.

If you decide to go land-watching, headlands, or coastlines overlooking bays or small islands are good sites, but even if your region doesn't have these features, don't be put off. Whales, dolphins and porpoises can appear in almost any area of the sea.

Boat-watching is also another way to collect vital information on whales, dolphins and porpoises and if you decided to go boat-watching choose one of the Sea Watch's [Recommended Boat Operators](#) which respects a marine code of conduct, minimize disturbance and educate passengers about local cetacean species.



Photo: Delighted people watching dolphins swimming in front of a boat. ©Newquay Sea Safaris

Photo: Dorsal fins of Risso's dolphins rising out of the water as they surface to breathe. ©PGH Evans/Sea Watch Foundation



Once in secondary school, volunteering is an excellent way of getting involved in marine **conservation**. We offer a number of [training courses](#) to volunteers and observers to teach them how to identify cetaceans in the wild, how to monitor them and contribute to their conservation. Education and engagement are an important part of what we do. We undertake [school visits](#), offer [career advice](#) and have a variety of student [research projects](#) available each year. [Click here](#) to see our upcoming events and how you can get involved, and here for how to become a [volunteer observer in the future!](#)



DISCOVER



FIN IDENTIFICATION GUIDE

The shape, size and position of the dorsal fin of a cetacean is one of the key features that can be used to tell species apart. This fin is the most visible part of the body, as it is located on the cetacean's back, pointing upwards. Sometimes the fin is all you will see as the animal breaks the surface of the sea.

BOTTLENOSE DOLPHIN

Tursiops truncatus



Dark grey in colour, this fin is quite large and is in the middle of the back. It is sickle-shaped (like a crescent curving backwards). If you are lucky you may see Bottlenose dolphin leaping out of the water!

HARBOUR PORPOISE

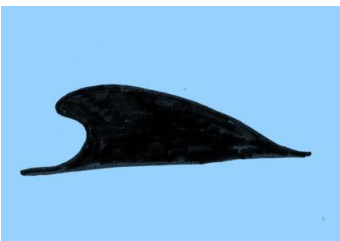
Phocoena phocoena



The fin of the Harbour porpoise is less prominent than the Bottlenose dolphin's. More triangular in shape, the fin's movement can appear 'circular' like a wheel turning.

LONG FINNED PILOT WHALE

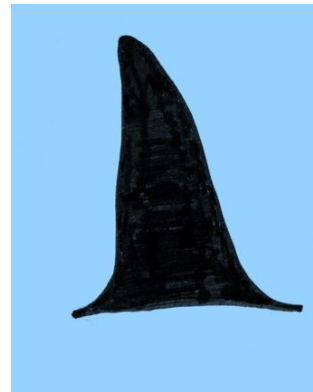
Globicephala melas



This dorsal fin has less height but is long and thick at its base and rounded backwards at the tip. Black or dark grey in colour, the fin is centrally located on the whale's chunky body.

ORCA (KILLER WHALE)

Orchinus orca



The Orca has a really distinctive, tall, central dorsal fin. The fin of a male Orca can be 1.8 metres high. This species is unlikely to be confused with any other due to its large size.

MINKE WHALE

Balaenoptera acutorostrata



The Minke whale's dorsal fin is positioned two-thirds of the way down its back (closer to its tail). It is a small fin with broad base, which is sickle (or crescent) shaped like the Bottlenose dolphin. Can be confused with the Long finned pilot whale, so try to check how far down the body the fin is located.



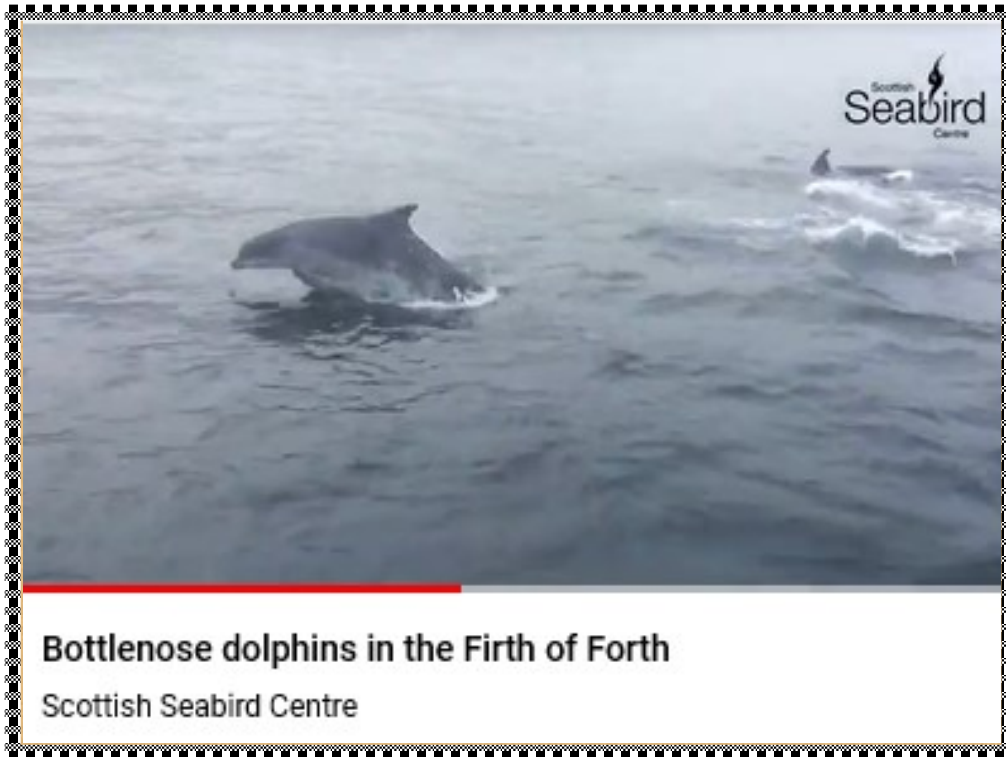
All of the species mentioned above can be seen around Scotland's seas but there are many more species of cetacean and you can learn more about them here:

<https://uk.whales.org/whales-dolphins/species-guide/>

FILM

DOLPHINS IN THE FIRTH OF FORTH

Click on the photo below to watch fantastic footage of Bottlenose dolphins swimming in our local Scottish waters!



SUPER SCIENCE SKILLS

Watch the video and see if you can answer the following...

1. How many dolphins can you count at the surface at one time? (This is how scientists record the number of individuals in a pod).
2. True or False—there is a calf in this video? (Calves are smaller and lighter grey than adults).





© Sean Bell

EXHIBIT

DOLPHIN SKULL



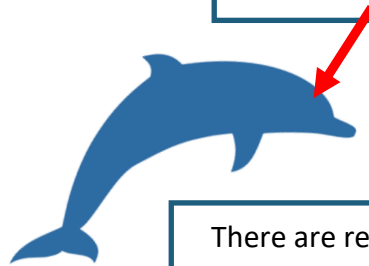
In our **Discovery Experience** exhibition at the **Scottish Seabird Centre** in North Berwick, we have a display all about cetaceans. It's entitled 'Ocean Giants' and you can learn more about whales, dolphins and porpoises.

The photograph below from our exhibition shows our real dolphin skull. It shows visitors how a dolphin uses **echolocation** to hunt, navigate and avoid predators underwater. Dolphins make 'clicks' and 'whistles' that are focussed by a fatty mass at the front of their heads called a **melon**. In turn, sound waves are transported to the dolphin's inner ear via the lower jaw.



© Helen Pugh

The **melon** is located in the dolphin's forehead and helps with communication and echolocation.



There are resident Bottlenose dolphin populations on both the west and east coasts of Scotland. Groups of dolphins (**pods**) can sometimes be seen close to the shore, including from North Berwick!

If you are able to visit the **Discovery Experience**, you can also listen to the sounds of a Bottlenose dolphin and a Humpback whale at our 'Ocean Sounds' exhibit.



© Helen Pugh



CRAFT

PAPER PLATE WHALE



WHAT DO I NEED?

- Plain paper
- Paper plate
- Glue
- Scissors
- Coloured pens, pencils or paints

1



Fold the paper plate in half, with the plate base on the outside.

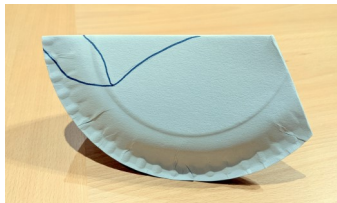
Fold one corner of the folded plate over as shown to begin to form the whale's forehead.

2



Tuck this folded corner inside the main fold of the whole plate, as shown in the picture.

3



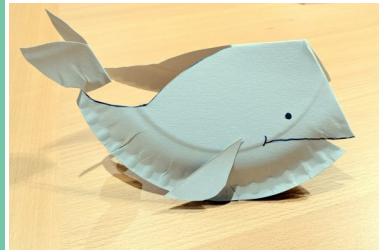
Now draw on the outline of the whale's back and tail.

Then cut along these lines but do **not** cut all the way along the lower line of the tail at arrow (this should stay connected).

Remove the cut section between head and tail.



4



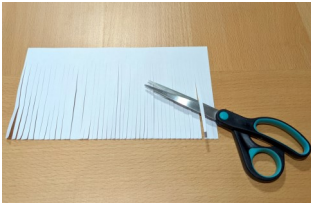
Flip out the tail by turning it inside out.

Draw on the whale's eye and mouth on each side.

You can add flippers by reshaping the piece you removed from the top of the back. Glue these on.

INSTRUCTIONS CONTINUED OVERLEAF...

5



To make a blow spraying from the whale's blowhole, cut a piece of plain white paper to around 20cm x 10cm. Make a fringe by cutting thin strips about 3/4 of the way up the paper as shown.

6



Roll up the fringed paper tightly and secure with glue or tape at the uncut end. Make a slot in the top of the whale's head and secure the spray within it. Now you can decorate your whale!

We used watered down blue watercolour paint to colour our whale.
You can experiment with colour, art materials and facial features. Have fun!



We'd love to see any whales you've made! Send photographs to
marineengagement@seabird.org.



EXPERIMENT

CETACEAN MILK DENSITY



QUESTION: WHAT IS SPECIAL ABOUT CETACEAN MILK?

Cetaceans are mammals, so the females produce milk for their young. Feeding takes place in water rather than on land. As both baby and mother must surface regularly for air, feeding has to be done quickly. So how does cetacean milk differ from other mammals?

TEST

Test to see how **dense** (thick / heavy) different milk types are.

WHAT DO I NEED?


2 tall glasses Water
Double cream A measuring syringe (see picture)
Milk



- 1 Pour water into the glasses about two-thirds full.
- 2 Using the syringe, add a little milk into one glass and a little cream into the other glass.
- 3 Look carefully at what happens. Which mixes faster with the water? Why do you think that is?



ANSWER: CETACEAN MILK IS MORE DENSE THAN MOST OTHER MAMMALS

In the experiment above, the milk mixes faster with the water than the cream does. But why? 

Cream has a higher fat content than milk. Double cream has around a 36% fat content, while whole cow's milk has around 3.5% fat. Fat and water do not mix well. The higher the fat content, the less mixing will take place. Cetaceans milk can have a fat content of up to 50% (variable by species).

As cetacean babies need to feed quickly, the milk from their mothers is dense with nutrients and is richer and fattier than the milk of most mammals on land.