Orcas

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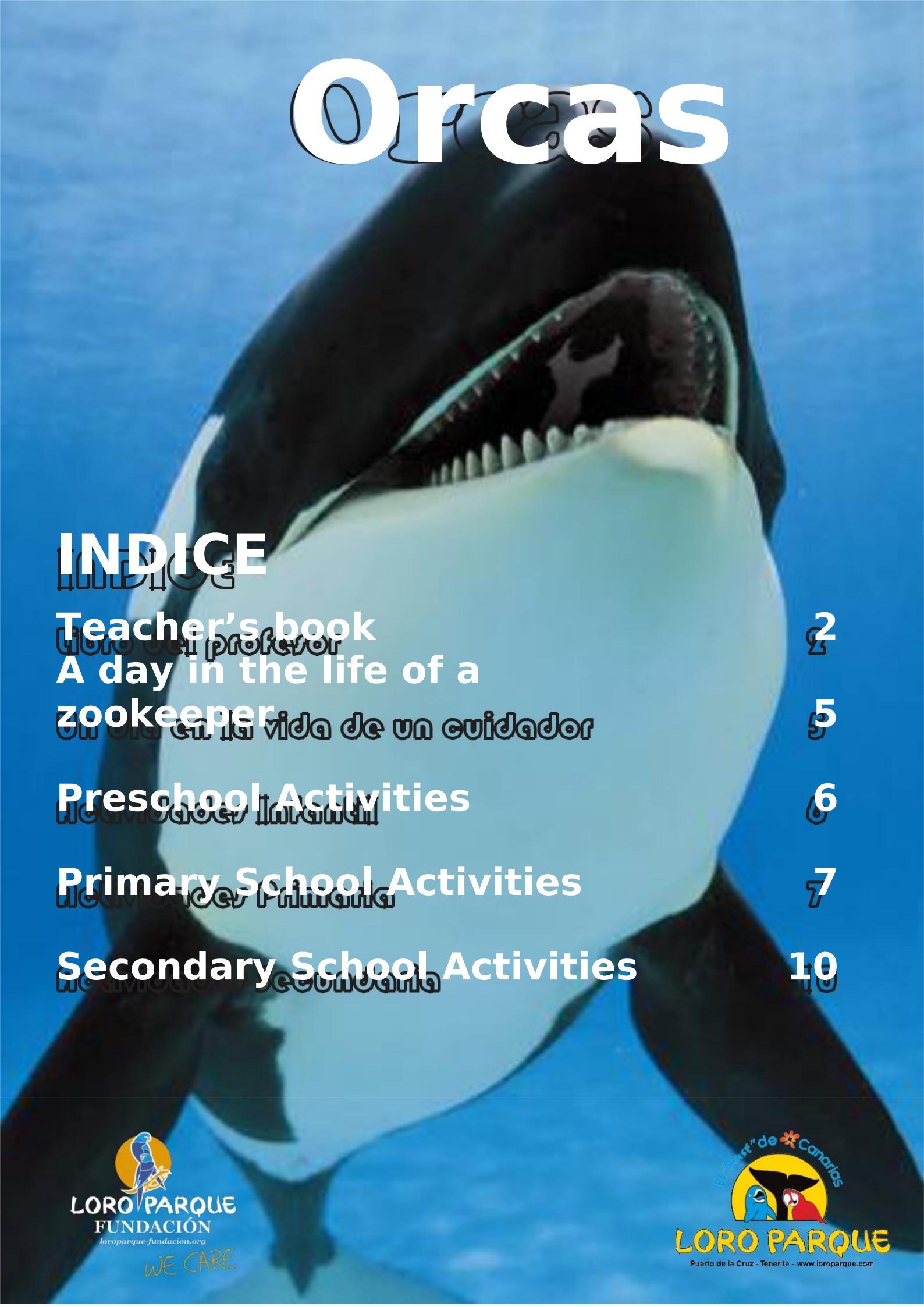


Teacher's Book

Orca facts

Killer whales or *Orcas* are one of the most easily identified cetaceans in the sea, and a certainly well-known animal to the public, as they sometimes appear either in dolphinarium shows or in the movies.

It is the largest cetacean in the world, with adult males reaching 9 m and females around 7 m in length. The weight of the former can reach up to 9 tons. Orcas inhabit all oceans, both offshore and inshore, but are most seen in waters up to 200 metres deep. They are seasonal migrants, because as fish migrate, they migrate to better feed themselves.

Although there are many groups of killer whales in the world, we do not know the number of them, but there are two types: those that remain close to the coasts and those that live in open sea. Depending on the area, killer whales vary in size and weight due to the group' s habits, but in all groups, males are larger than females.

They are very eye-catching animals because of their distinctive black and white colouring. They have a sharp and well-developed hearing, as well as eyesight (both in and out of the water), and sense of touch. They can dive between 30.5 and 61 metres deep and last four to five minutes underwater, then they return to the surface and take several breaths before diving again.

Orcas regulate their body temperature in cold waters, at 36.4ºC, through a system of counter-current heat exchange in the pectoral flippers, flukes, and dorsal fin, which allows them to maintain their body heat. Orcas live in groups called clans, which are an intimate and stable social unit.

Clans can range in size from 5 to 30 individuals, and are made up of males, females, and calves of different ages. These clans are identified as maternal groups, i.e., they consist of a mother and her offspring (not including her daughters with their own offspring).

However, it is fairly common to see several clans where the females are sisters and cousins. Therefore, it is said that the females - the oldest ones - are at the top of the group hierarchy.

Not much is known about the reproductive biology of this species. Females appear to reach sexual maturity at 8-10 years of age, earlier than males, which reach sexual maturity at 15-17 years of age. After a gestation period of about 15 months, a calf of about 2.5 m in length and 180 kg in weight is born. The lactation period lasts about 12 months. The calving interval is probably around 2 years.

This species is at the top of the food chain, it is a large marine predator. Its varied diet includes prey such as fish, cephalopods, sea turtles and birds, but also mammals such as seals or even some cetaceans; and they've also been known to attack blue whales. This fact has led to the name "killer whale", which is a common misconception, as animals kill simply out of conservation instinct, not with the intention of harming their prey. Very often, several killer whales cooperate with each other when attacking prey. It is estimated that orcas daily ingest about 5% of their body weight in fish.

Interesting Facts

The black and white colouring of orcas serves as camouflage in a marine environment, allowing them to approach their prey without being seen. When viewed from above, the black colour of their back blends in with the darker ocean depths, while when viewed from below, the lighter belly goes unnoticed under the brighter sea surface.

Just behind the dorsal fin, orcas have a greyish patch that is unique to each individual and allows biologists to identify them.

The white patch on either side of the head is known as the "eyespot." The actual eye is located just in front of the patch. They have highly developed vision both in and out of the water.

Unlike their pectoral flippers, which have bones, the flukes and dorsal fins are made of dense fibrous connective tissue (without bone or cartilage). Therefore, some orcas, both in the wild and under human care, may have curved or bent dorsal fins.

Whenever groups of orcas move, the females and calves travel in the centre of the group and the males surround them.

Mass strandings of orcas have been known to occur. As for other whales, it is not known why these strandings occur. In some regions, orcas glide over ice or sand in pursuit of prey. This behaviour is not regarded as stranding.

Captive Breeding

Breeding these animals in captivity is not difficult, as long as they feel comfortable.

Loro Parque and Loro Parque Fundación are working with SeaWorld USA on a project to breed orcas in captivity. Since 1985, when the first orca calf was born in a zoo, SeaWorld has been studying these animals and their reproductive behaviour. At Loro Parque's facilities we use the best techniques to continue with the project together with SeaWorld and to learn more about these animals every day.

The four orcas that we can enjoy in Loro Parque are in pools that are between 8 and 12 metres deep, 120 metres long and have 22 million litres of sea water. All the water is taken directly from the Atlantic Ocean, at a depth of 65 metres, is treated at a temperature of 13ºC and purified by sand filters at a speed of 6 million litres per hour, ensuring optimum living conditions for our orcas.

How to learn more about orcas?

One way of getting to know these animals is "Orca Ocean" - which offers researchers from all over the world the possibility of carrying out studies on feeding, communication, and behaviour, which is essential for conservation programmes.

All these studies are only possible because our orcas live in a controlled environment, which allows us not only to closely study them, but also to change various parameters to a greater or lesser extent and then compare them with data obtained from wild populations.

Some research studies carried out in our facilities are:

1. Research on the orca diet in the Strait of Gibraltar in comparison with the controlled diet of Orca Ocean individuals.
2. Analysis of the family group's vocalisations
3. Genome determination of this species
4. Toxicological analysis of their blood and blood samples in comparison with wild individuals to see to what extent the pollution of the sea influences them, which substances are the most harmful, etc.
5. Audiometry tests to determine what sounds the orcas hear and how much they can hear.

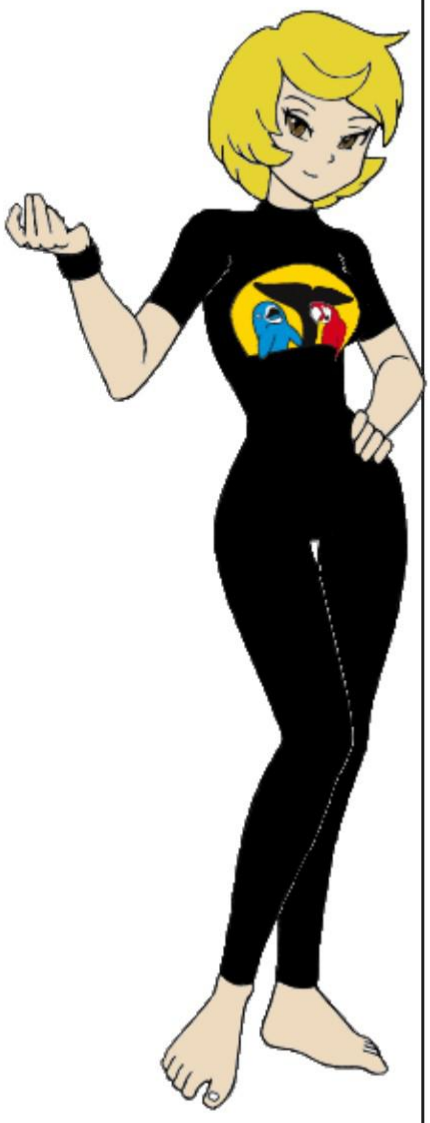
Animal Factsheet
Killer Whale
(Orcinus orca)

Kingdom: *Animalia*
Phylum: *Chordata*
Class: *Mammalia*
Order: *Cetacea*
Family: *Delphinidae*
Genus: *Orcinus*
Species: *orca*
Size: Males 5.6 to 9 m; females 4.9 to 6 m.
Weight: males 3,600 to 5,400 kg; females 1,300 to 3,600 kg. Calves are born weighing around 140kg.
Gestation: 15 to 18 months (only one calf)
Maximum age: Males around 50 years; females 50 to 80 years.
Distribution: all the world's oceans (greatest abundance in arctic and cold waters).

Although there is no direct threat, competition with the fishing industry, especially for herring and bluefin tuna, may threaten the survival of some orca populations.

Loro Parque Fundación has invested more than €200,000 in the conservation of the killer whale population in the Strait of Gibraltar, carrying out research to determine their degree of dependence on bluefin tuna, which is the main food source for killer whales in this area and is becoming increasingly scarce.

A DAY IN THE LIFE OF A ZOOKEPER



Hello everyone! My name is Renée, and I am one of the orca keepers at Orca Ocean.

Our work starts very early in the morning. First, we do different tasks, like preparing the fish they eat, which is brought in frozen and stored in huge cold rooms.

Each orca is given a personalised diet according to its weight and needs. We feed the animals different types of fish: depending on the season, we give them capelin, sprat or herring, and squid. We divide the food into 9 different feeding times, as a single orca can eat up to 50kg of fish a day!

Although it may seem so, they do not exercise for food. In fact, they also love to be petted, get ice, jelly, etc. and, even when they do not participate in our public presentations, they always receive the daily food they need.

Daily, the keepers perform different exercises with the orcas: relationship exercises, show training, speed training, teaching them new behaviours, and playing games or medical training (weighing, measuring, blood and urine sampling, teeth brushing, etc.). When we arrive, the trainers get together and plan out different exercises every day so that the animals are active and don't get bored.

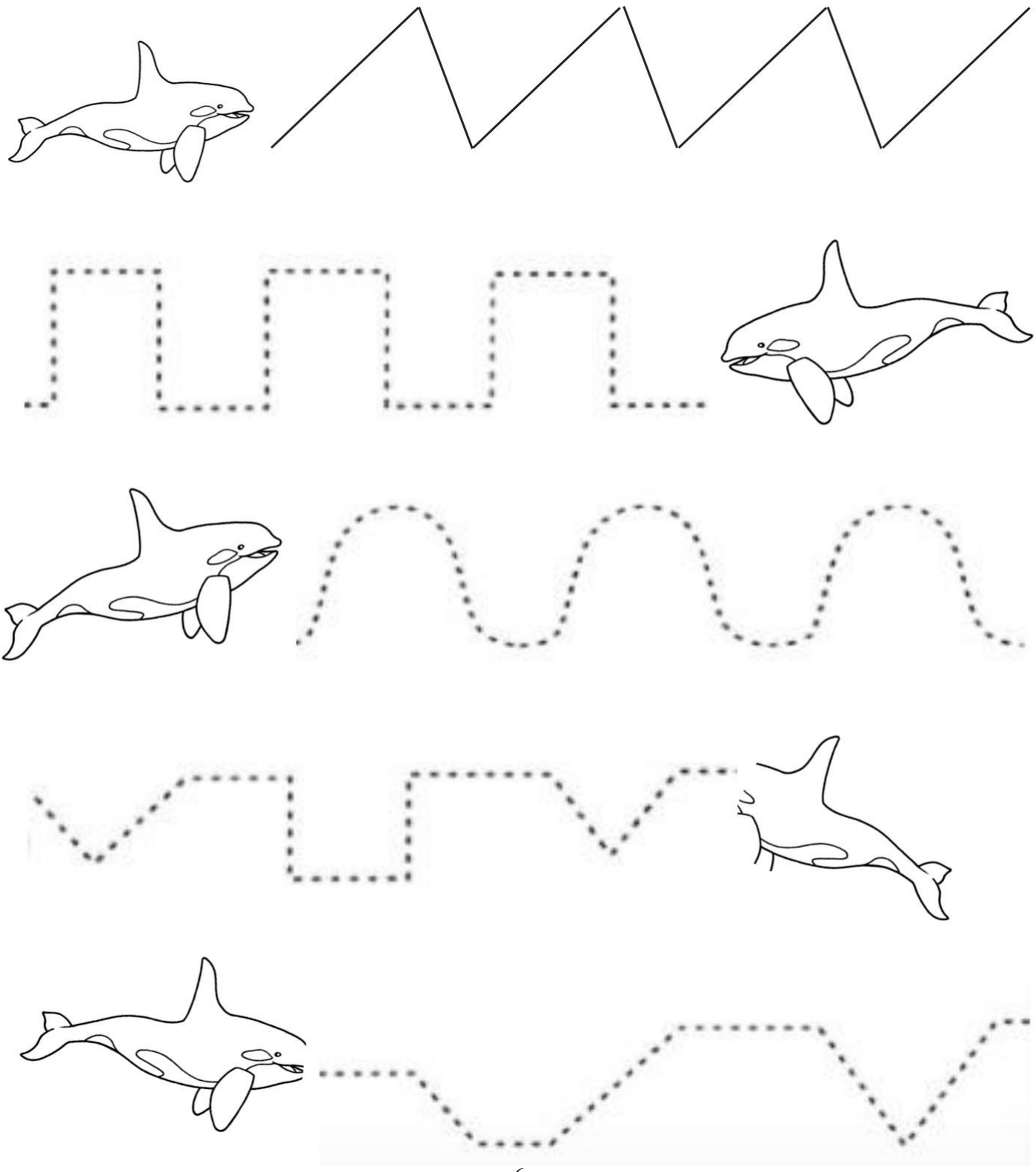
Besides, it's not all about work! Our orcas also have free time to play and socialise. They love very heavy toys and sinking them or throwing them up in the air.

It is so important for them to do new things every day, that we even offer them different bedtime activities: we put them in different pools, together, separately, in pairs, etc. Night guards, who watch the orcas during the night, note down their condition so that we can plan the next day's activities.

Another fundamental part of our work is cleaning. We collect water samples (also from the pool walls and the outside of the enclosure) several times a day to measure pH levels, nitrites, nitrates, etc. to make sure that everything is OK.

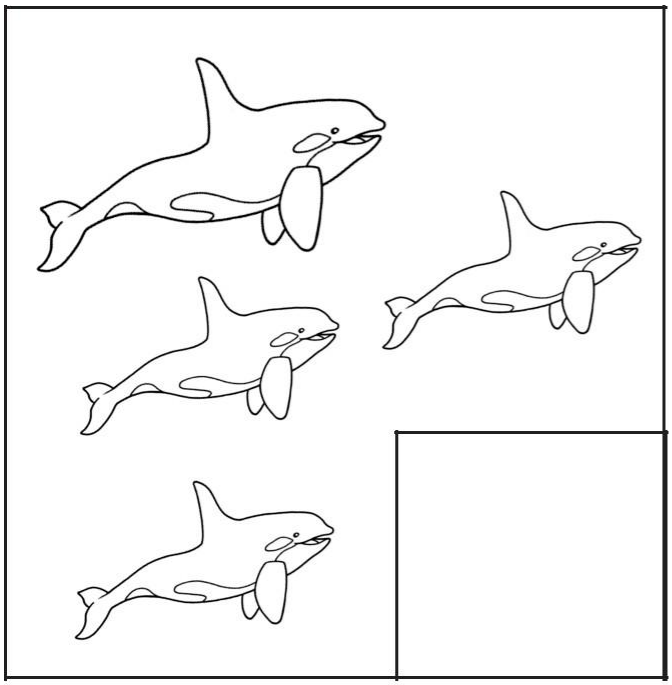
PRESCHOOL ACTIVITIES

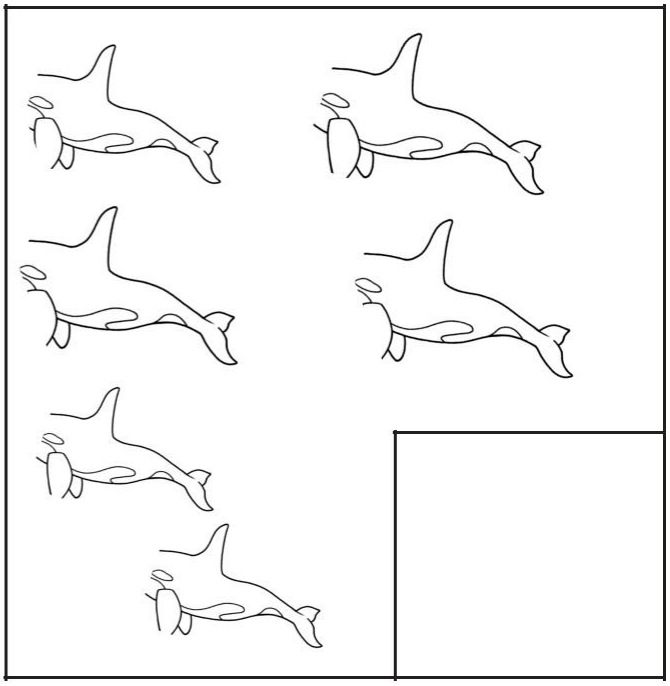
Go over the dotted line to mark the path for the orca to follow.

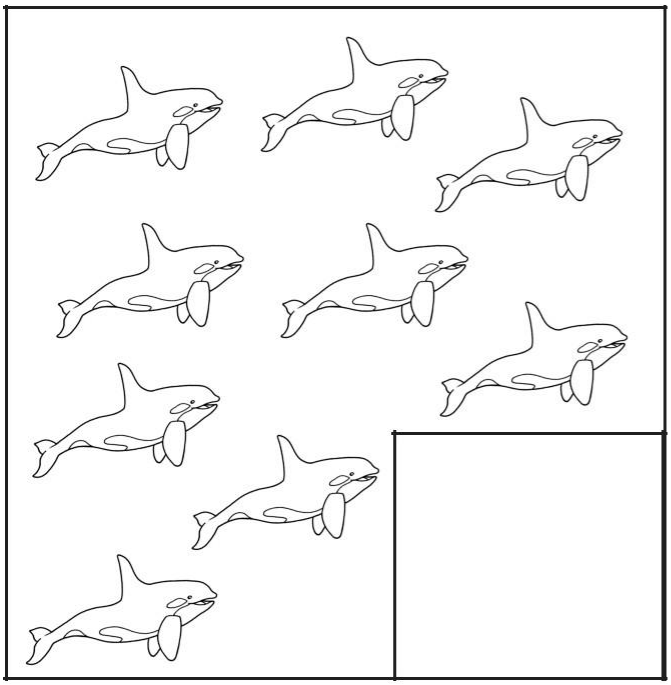


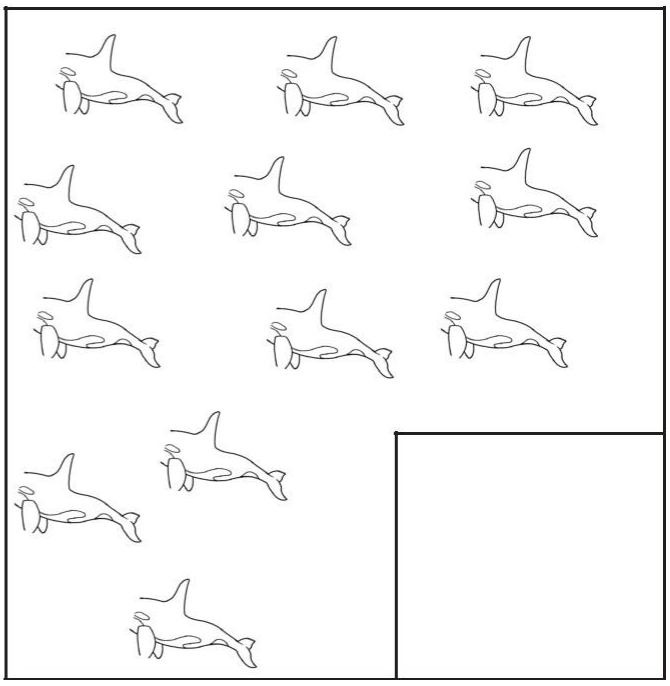
PRIMARY SCHOOL ACTIVITIES

How many orcas are there in each family? Count them and write the number in the box.









Colour in the family with the most orcas.

PRIMARY SCHOOL ACTIVITIES

Fill in the blank with the following words:

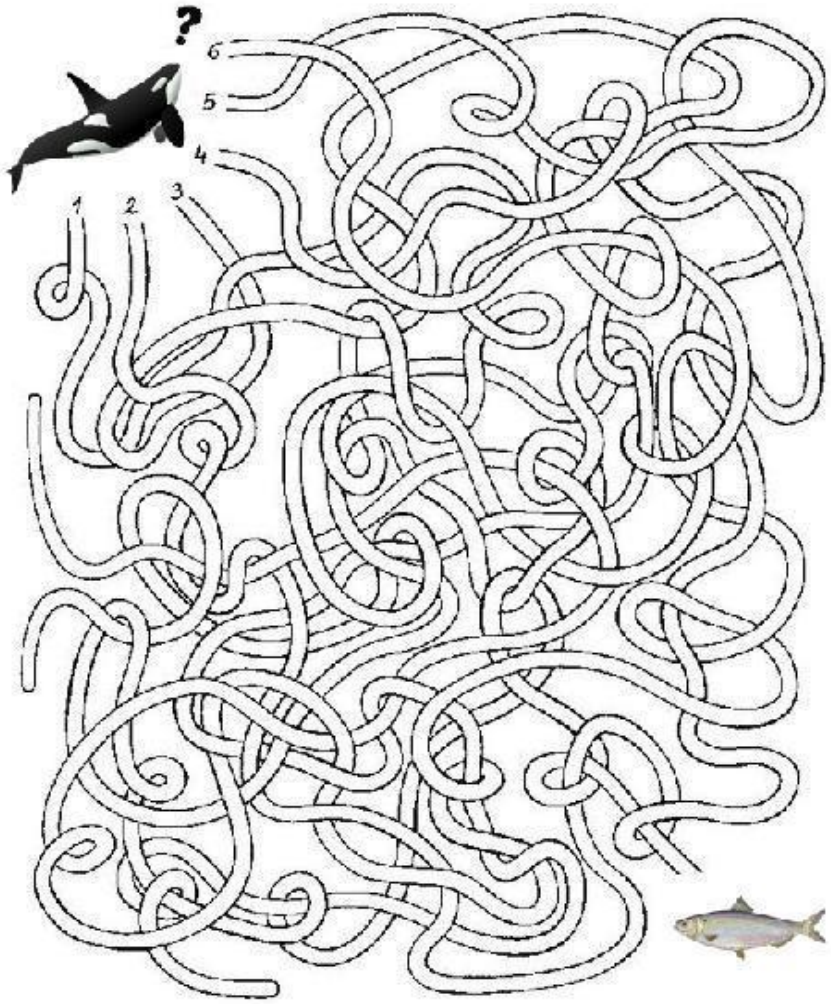
SQUID, FISH, BIG, WEIGHT, JELLY, PARENTS, ICE, ORCA, HERRING, SMALL.

Hello, my name is Adán and I am the youngest _____ in Orca Ocean. I was born in 2010 and my _____ are Keto and Kohana.

We each eat according to our_____ and activity. For example, Keto, my father, is very _____ so he eats a lot. He can eat up to 50kg of _____ a day! I, however, as I am still very _____, eat much less.

Every day, our caregivers prepare our meals with great care. Our favourite fish are _____, capelin and sprat, although we also eat _____. But we also love _____ and _____!

Which path will Adam have to take to get to the herring?



PRIMARY SCHOOL ACTIVITIES

Read the text about Morgan the orca and answer the following questions:

Echolocation is a technique used by both dolphins and orcas to communicate with each other, to know where they are and to find food. This technique consists of emitting sounds (clicks, whistles, and squeaks) and detecting the echo that is produced when the sound hits a fish, a rock, a boat.... just like we do when we scream in a cave!

When a killer whale or dolphin is not able to hear these sounds, it gets disoriented and cannot hunt or communicate with its family, so it ends up lost at sea, as Morgan probably did.

Morgan was found off the coast of the Netherlands in June 2010 alone and very hungry. She was rescued, fed, and her vocalisations analysed to find her family. As it was not at all clear which family she belonged to, she could not be returned to the sea because it was uncertain whether she would survive.

Scientists came to believe that Morgan was deaf and therefore couldn't find her family or eat, because she couldn't use echolocation! So, the authorities decided that the best place for her was Loro Parque, and so she became part of our orca family.

Once here, scientists ran many tests and proved that Morgan is indeed deaf. The trainers have worked very hard and have managed to make her understand them with light signals, as she can't hear whistles, and the rest of the family has learnt this too!

1.) What is echolocation?

2.) Why did Morgan get lost?

3.) How have the Loro Parque trainers managed to communicate with Morgan?

4.) Think of another form of communication you could use to make Morgan understand you.

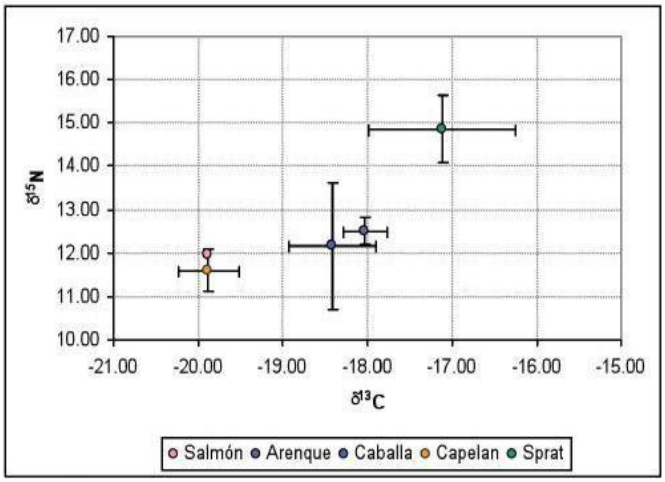
SECONDARY SCHOOL ACTIVITIES

Find out whether the following statements are true or false by doing some research on orcas. If they are false, correct them.

1. To hunt seals on ice, orcas make waves with their flippers so that the seals fall into the sea, and they can catch them. T F
2. Orcas come ashore and move a few metres on their bellies to hunt penguins. T F
3. Orcas are more closely related to river dolphins in Southeast Asia than to pilot whales. T F
4. There are two types of orcas: resident and transient. T F
5. Orcas are distinguished from each other by the individual features of their fins. T F
6. Both the genitals and mammary glands of orcas are concealed in abdominal slits. T F
7. Orcas live in pods in which females are the dominant ones. To defend themselves, the calves stay in the centre, then the males protect them, and the females defend everyone from any attack. T F
8. The female's dorsal fin is bent because it has no bones. T F
9. Thanks to echolocation, they can find food and communicate with each other, although they speak different 'languages' depending on the area. T F
10. Females are typically 5 metres long and weigh around 4 tonnes. T F
11. The ancestors of orcas and dolphins are related to those of the hippopotamuses. T F

SECONDARY SCHOOL ACTIVITIES

Loro Parque Fundación participates in a project to study the diet of orcas in the Strait of Gibraltar by measuring nitrogen and carbon isotopes in skin biopsies. These results are compared with those obtained from our own orcas, whose diet we know. This comparison allows us to determine what the orcas in the Strait of Gibraltar feed on.



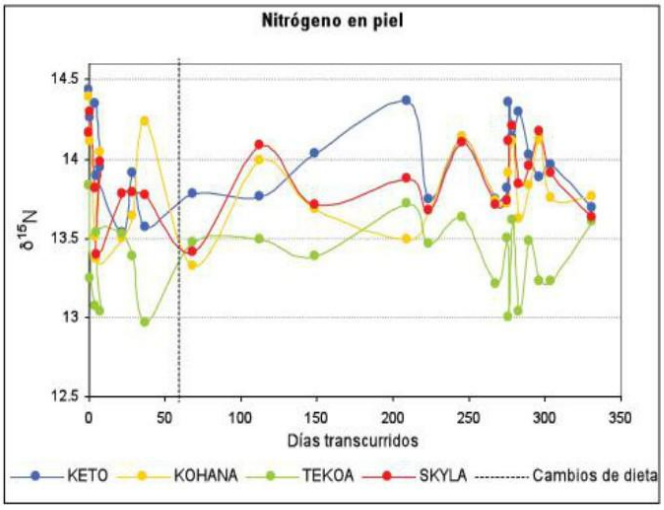
During the experiment, our orcas ate only capelin or only herring. The Carbon and Nitrogen isotope ranges for both species are shown in this table, and are as follows:

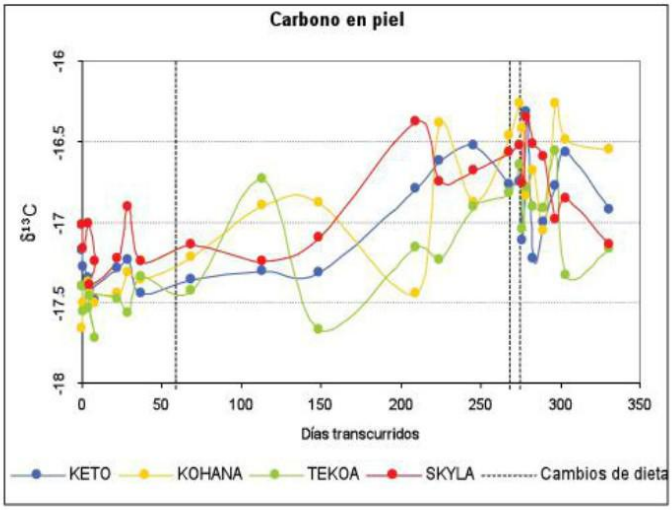
- **Herring:**
  - **·Isotope 13 C: -18.3 to -17.8**
  - **·Isotope 15 N: 12.2 to 12.8**

- **Capelin:**
  - **·Isotope 13 C: -21.3 to -19.5**
  - **·Isotope 15 N: 11.1 to 12.1**

Point out in the graphs below which fish the orcas at Loro Parque ate between days 60 and 250.

Keep in mind that the values obtained from orca biopsies will not be exactly the same as these fish but will be close to them!





TRADUCCIÓN DE LA TABLA ANTERIOR	
Carbono en piel:	Carbon in the skin:
Nitrógeno en piel:	Nitrogen in the skin:
Días transcurridos:	Days elapsed:
Cambios de dieta:	Changes in diet:

Thanks to this project, it was found that orcas do not feed exclusively on tuna (which is endangered), although they were highly dependent on it.

SECONDARY SCHOOL ACTIVITIES

How do you think orcas could be affected by the extinction of tuna, and what could we do about it? Write down your answer.