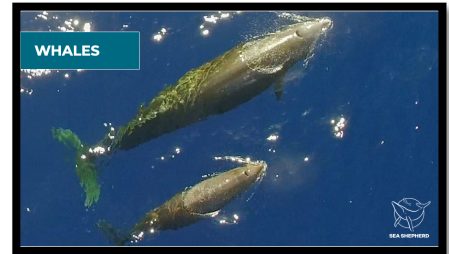


Lesson Summary

Whales are under threat from many different issues, hindering their recovery after the end of wide scale commercial whaling.

This lesson will take approx. 45 mins.



Subjects relevant to

English, Geography, History, Science and Social Science.

Learning objectives

From this lesson students will:

- Learn about the human threats to whales.
- Understand why whales are endangered.
- Discuss ways we can protect whales.

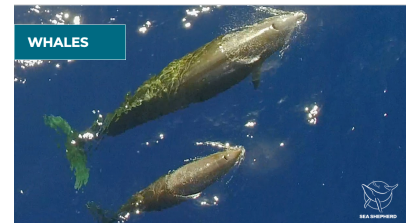
Preparation

- This lesson has been designed to provide a complete lesson, but can be stopped at any time and split over multiple lessons, should you wish to include your own discussion/questions or incorporate the lesson activities.
- Definitions of key terms have been provided at the end of the guide to assist with the learning process.
- Each lesson has case study options showing Sea Shepherd campaigns, including videos to provide students with a firsthand experience of ocean conservation in action.
- Depending on whether students are working in a classroom or remotely, you can choose to discuss questions in the class or use the online learning app.
- This digital lesson has an interactive option called student devices. If you choose this option ask the students to bring their mobile phones or tablets to the lesson.
- Should you choose the interactive option, it will run a quiz during the lesson. Recommendation: only use this interactive option in classes of up to 30 students.
- Students can sign up on their mobile device to the www.LessonUp.app. They will be asked for a PIN code (this will appear automatically on slide 3 and will also show at the bottom of the screen). Students who sign up under a false name may be removed by the teacher.
- Students who do not have a mobile device can join the quiz with another student.
- If student devices is turned ON, you can opt to turn the sound and the share screen ON or OFF. Further on you can choose if you want to 'show ranking after each quiz' question. Doing so will create a competitive element, but it can be distracting. Recommendation: turn the 'show ranking after each quiz' OFF.
- The abovementioned options will also show if you click on the PIN code at the bottom of the screen.

Lesson plan

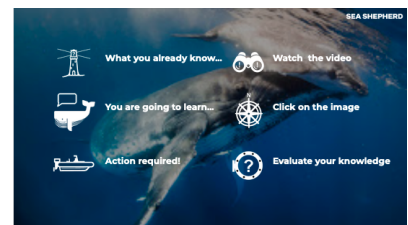
Slide 1 Introduction

This lesson is provided by Sea Shepherd. Sea Shepherd is a marine conservation organisation with a mission to protect the ocean and marine wildlife. Sea Shepherd works globally on a range of issues impacting the ocean, running numerous direct action campaigns each year. Whales are one species that Sea Shepherd is fighting to protect.



Slide 2 Lesson action icons

During the lesson we will use these icons to identify the learning actions.



Slide 3 Lesson summary

This lesson is about whale species, some of their characteristics, what is threatening whales and what we can do to help protect them.

INTERACTIVE JOIN – ask students to go to www.LessonUp.app

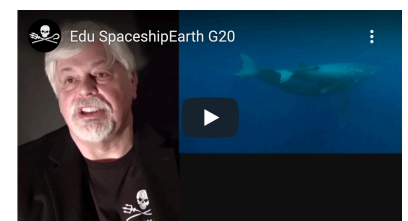


Slide 4 Empty ocean by 2050

Scientists estimate that by 2050 the ocean ecosystem will be on the verge of collapse, empty of fish and marine wildlife, unless urgent action is taken on the issues impacting the ocean and marine wildlife.

Show this video (2.53min), which explains how important all species are to our planet.

<https://www.youtube.com/watch?v=TLcA31VRIRU>



Discuss the video with the class and what it means.

Slide 5 Whales

Whales have been around on this planet for 50 million years. Once, the ocean was home to millions of them.

Today their numbers are significantly reduced.

Many whale species, such as blue whales, sperm whales and fin whales have been hunted to near extinction by whalers.



Slide 6 Why are whales important?

Ask students answer via www.LessonUp.app or discuss in classroom:

‘Who knows why whales are important to the future of our ocean?’

Whales play an important part in the ecosystem; one of those roles is in supporting our air supply:

Phytoplankton, are tiny little beings that live in the ocean, they are so small you can’t see them with the naked eye, but they are very important to our air supply. They draw carbon from the air. All the air we breathe out, or the fossil fuels we burn, like coal to make electricity, or petrol in our cars, all creates carbon. Without something to take that out of the air it would become toxic and the air would poison us.

Phytoplankton are dependent on nutrients and nitrogen in the ocean which they receive from things like whale poo. Whales need phytoplankton as food, as do other creatures like krill, which are another food source for whales. So we need whales in order to have the phytoplankton populations grow and helping to reduce the carbon in the air. It has been proven that the reduction in the number of whales in Antarctica has had a negative impact on phytoplankton and the level of carbon in the atmosphere.

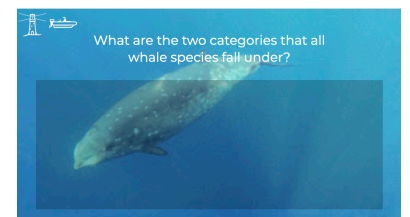


Slide 7 Categories of whales

Ask students answer via www.LessonUp.app or discuss in classroom:

‘What are the two categories that all whale species fall under?’

- Toothed and Baleen Whales.



Slide 8 Baleen whales

Ask students answer via www.LessonUp.app or discuss in classroom:

“What is the key characteristic of a baleen whale?”

Baleen means they feed by sifting plankton, krill or fish, through a baleen plate, which is a fibrous brush like plate used to separate their food from the water. It's like having a big sieve to catch food in.

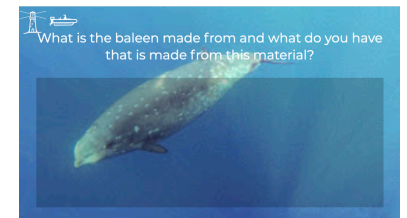


Slide 9 What is the baleen made from?

Ask students answer via www.LessonUp.app or discuss in classroom:

“What is the baleen made from and what do you have that is made from this material?”

The baleen plate is made out of keratin. Keratin is the same material your fingernails or hair are made out of.

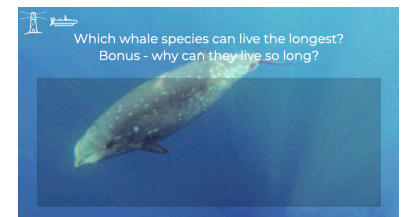


Slide 10 Longest living whale

Ask students answer via www.LessonUp.app or discuss in classroom:

“Which whale species can live the longest?”

Bowhead whale – known to live up to 200 years. They live in the Artic and subarctic waters. To survive in this environment they have thicker blubber layers and slower metabolism, which helps them cope with the colder waters. It is believed this is what helps them live longer.



Slide 11 Largest whale

Ask students answer via www.LessonUp.app or discuss in classroom:

“Which is the largest whale species?”

The largest blue whale was over 33m (108 feet).

Ask students if they think there is any mammal that is larger than the Blue whale?



Slide 12 Whale species

Show the image that shows comparative size of some whale species.

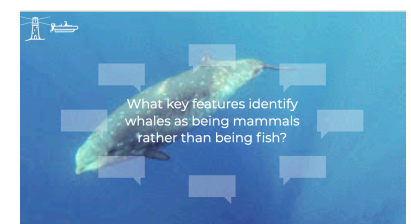


Slide 13 Key features

Ask students answer via www.LessonUp.app or discuss in classroom:

“What key features identify whales as being mammals rather than fish?”

- Breathe air through blow holes (fish through gills).
- Tail moves up and down (fish side to side).
- Warm blooded (fish are cold blooded).
- Young drink milk.
- Give birth to young (fish lay eggs).
- Smooth skin (fish have scales).
- Heart has 4 chambers (fish have 2).



Slide 14 How do whales navigate?

Ask students answer via www.LessonUp.app or discuss in classroom:

“How do whales communicate and navigate their way?”

Toothed whales use echolocation. This means they emit sounds out into the environment and listen to the echoes of those sounds that return from the objects around them. They use these echoes for hunting and finding their way.

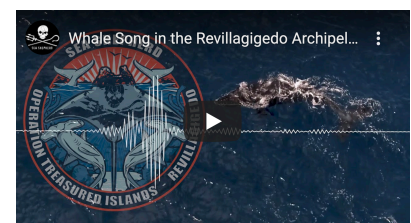


Slide 15 Whale song

Whales also have their own songs, used to communicate with other whales,

Show this video (1.14min), which shows a humpback whale singing:

<https://www.youtube.com/watch?v=am5fOjC4Ac0>



Slide 16 What could impact whale navigation?

Ask students answer via www.LessonUp.app or discuss in classroom:

“What do you think could impact on whales being able to communicate and navigate?”



Slide 17 Ships sonar

Because whales use echolocation, which is like the sonar that we use on ships, it means that the sonar on some ships can interfere with a whale's sonar. This can result in whales being unable to hunt or find their way. It is also believed to be the reason whales sometimes beach themselves.

Noise pollution from shipping.

Another issue is noise pollution – sound travels 4 times faster under water and it travels further, so imagine the noise coming from a port or shipping lane. Imagine living in a constantly noisy environment and how stressful it might be when you are exposed to unfamiliar sounds or noises.

All this noise disturbs the ability of whales to communicate with each other over distances.



Slide 18 Human impacts on whales

Ask students answer via www.LessonUp.app or discuss in classroom:

“What other human activities do you think are having a negative impact on whales?”



Slide 19 Whaling

The obvious issue impacting on whales is whaling.

While commercial whaling has been banned since 1986 and most countries stopped whaling prior to the ban, their numbers have yet to recover.

Despite the ban there are 3 countries that continue to whale commercially – Japan, Norway and Iceland.

Refer to the Lesson – Whaling for more detail on this topic.



Slide 20 Why are whale numbers slow to recover?

Ask students answer via www.LessonUp.app or discuss in classroom:

"Why do you think whales have not fully recovered from whaling?"

Whales are slow to recover from whaling for a number of reasons:

- Slow to reproduce - whales only have new calves once every 3-6 years.
- The numerous other issues having an impact on whales. Which we will discuss next.



Slide 21 By-catch

By-catch in commercial fishing nets. By-catch is anything that gets caught in the nets that the fishermen don't want or cannot sell.

Due to the size of commercial fishing nets, like purse seine nets, which can be several kilometres long, it is easy to trap whales in the net.

Each year over 300,000 whales and dolphins die as a result of being caught as by-catch in commercial fishing nets.



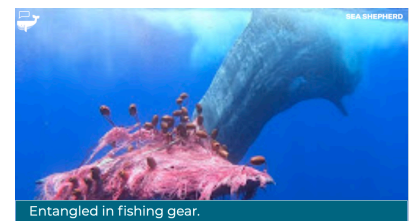
Slide 22 Entanglement in fishing gear

Migrating whales also get entangled in illegal gillnets used by poachers or in lost or discarded fishing nets.

Dumped nets become ghost nets, floating in the ocean still catching all animals they encounter. Thousands of whales die each year trapped in nets.

Whales also get caught in cray pots and fishing traps, with the lines becoming entangled around the whale's body or tail (fluke).

For more information on this topic see the Lesson: Abandoned, Lost and Discarded fishing gear.



Slide 23 Marine debris

Over 12 million tonnes of plastic pollution finds its way into the ocean each year.

That is one full garbage truck every 40 seconds emptying its contents into the ocean.

This includes small items like plastic bags, balloons, bottles and all kinds of rubbish left behind at beaches, dumped at sea or lost from container ships during rough weather.



Slide 24 Why do whales ingest plastic?

Ask students answer via www.LessonUp.app or discuss in classroom:

“Why do you think whales end up dying from this plastic pollution?”

Whales ingest the plastic while feeding. Because they can't regurgitate the accidentally eaten plastic, their stomach gets blocked and they are no longer able to eat and digest properly.

Whales can't distinguish the difference between food and rubbish. Baleen whales can easily scoop up rubbish as they feed.

Whales don't expect anything but food to be in the ocean, they're not familiar with 'manmade' rubbish.

Ocean pollution kills hundreds of thousands of marine animals each year.

The “Polluting the Ocean” lesson provides additional information on this topic.



Slide 25 What other pollutions is in the ocean?

Ask students answer via www.LessonUp.app or discuss in classroom:

“What other types of pollution could be in the ocean?”

Other pollution types:

- Household chemicals.
- Industrial chemicals.
- Agriculture run off with nitrogen and pesticides.
- Prescription and illegal drugs from human waste.

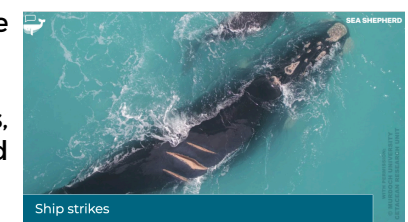


Slide 26 Ship strikes

Shipping is the main way that goods are transported around the world, with up to 90% of cargo sent by ship.

Increases in shipping over the last 50 years has led to two issues, the first we have already talked about, noise pollution. The second is ships hitting whales and other marine wildlife.

Ships often use the same water routes as migrating whales, and also cross whales feeding grounds and nursery areas. Thousands of marine animals are hit and seriously injured or killed by ships each year. In particular by the big cargo ships, oil tankers, coal ships and cruise liners.



Slide 27 Tourists boats

Ask students to answer via www.LessonUp.app or discuss in classroom.

“Another risk is whale watching tourist boats getting too close and harassing or injuring whales. What measures might be in place to protect the whales?”

Generally there are laws in place that restrict how close vessels can get to whales. This also applies to aircraft and drones. Exemptions might apply for researchers collecting data.

There may also be laws in place that restrict vessel speed to protect whales and dolphins in areas close to shore.



Slide 28 Oil spills

Other issues that have a huge impact on the health of our ocean is oil disasters and toxic waste. These have a devastating impact on marine ecosystems and it takes decades for the area to start to recover.

Some 40% of oil produced is shipped around the world in tankers. Over the years there have been a number of disasters with oil tankers.

In the Gulf of Mexico in 2010 an oilrig doing exploratory drilling had a blowout, resulting in oil leaking into the surrounding ocean for 3 months. The amount of oil that leaked was some 780,000 cubic metres (7.8m litres). This equates to 180,000km² of ocean covered.

The chemicals used to disperse the oil from the ocean surface are also toxic to fish with some causing cancers, decimating marine species. Making the oil disappear from the surface does not mean the problem is solved. It just means the oil is now covering the ocean floor, killing everything on the seabed.



Slide 29 Overfishing of food sources

Overfishing of the ocean impacts on other marine species, as their food sources are taken away. Whales and other species may be competing for food.

Krill fisheries are expanding in the Southern Ocean around Antarctica, increasing the catch taken. This is the same region where most whales migrate to in the southern summer to feed on krill and plankton.



Slide 30 Climate change

Climate change; is having an impact on the ocean, as it absorbs increasing levels of manmade carbon pollution, increasing the acidity levels in the ocean, as well as the temperature of the ocean water.

Warming temperatures have an impact on which species can live in each area. This may have a long term impact on feeding and migration patterns of whales.



Slide 31 Question

Ask students to answer via www.LessonUp.app or discuss in classroom.

“Name six of the issues impacting on whale species?”



Slide 32 Question

Ask students to answer via www.LessonUp.app or discuss in classroom.

“What do you think you could do to help protect whales?”



Slide 33 Ways to protect whales?

Ways to help protect whales?

- Don't invade a whales space, stay at a safe distance. Disturbing a whale with a calf can cause distress.
- Think about noise pollution if out on the water on a boat.
- Help fight climate change to reduce ocean acidification and a rising ocean temperature.
- Reduce demand for fish and related products, like fish oil or krill oil.
- Help fight plastic pollution – reduce your use of single use plastics or join in clean ups.



These areas can be expanded as classroom discussions or research projects on ways students can help in each area.

Slide 34 What did you learn?

Ask students to answer the following question using www.LessonUp.app or discuss in the classroom.

“Write down three things you have learned?”



Slide 35 What don't you understand?

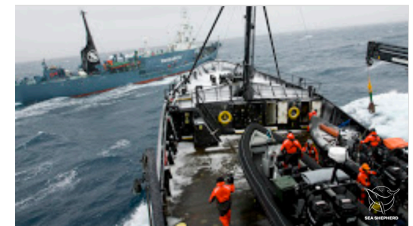
Ask students to answer the following question using www.LessonUp.app or discuss in the classroom.

“Write down one thing you didn't understand?”



Slide 36 Case Studies

Sea Shepherd Case Studies cover a number of Sea Shepherd campaigns and show video of some of our work to protect whales. These can be used to enhance the learning experience from these lessons



Slide 37 Close



Case Study Options

Case Study – Antarctic Whale Defense

Case Study – Operation Albacore

Case Study – Operation Milagro

Case Study – Plastic Pollution

Case Study – Operation Jeedara

Key Definitions

Baleen – a filter-feeding system inside the mouth of a whale.

By-catch - is basically anything that is caught in fishing nets or on lines that the fishermen don't want or are not allowed to legally sell.

Ecosystem - a biological community of interacting organisms and their physical environment.

Echolocation - the location of objects by reflected sound, in particular that used by animals such as dolphins and bats.

Endangered – the survival of the species is threatened, seriously at risk of extinction

Ghostnets – abandoned, lost and discarded nets that float in the ocean trapping marine wildlife.

Sonar - a system for the detection of objects under water by emitting sound pulses and detecting or measuring their return after being reflected.

YOUR FEEDBACK

We value your feedback and would be pleased to hear your thoughts about this lesson and activities. Any comments, suggestions or requests for further information can be sent to education@seashepherdglobal.org.