



Smithsonian

SCIENCE

for Computational Thinking



WHALES AND SHIPS

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WHALES AND SHIPS: SHARING THE OCEAN

Ship Speed

Some ships are very large.

They are made to carry cargo from one place to another.

Some ships carry containers.

The containers can hold food or other things.

A container could be filled with washing machines or televisions.

The cargo is made in one place and is needed in another place.

Container ships can be 400 meters (1,312 feet) long.

That is the length of four football fields!



This ship is carrying many containers filled with goods.





Ships moving slower are less likely to injure or kill whales.

Most cargo ships travel at 12 to 30 knots (14 to 35 miles per hour).

Scientists have studied ship speeds and whales strikes.

Ships going faster are more likely to hit whales.

Ships going slower are less likely to hit whales.

Scientists studied ships striking whales in one area.

Ships were required to go 10 knots or less in that area.

When the ships had to go slower, fewer ships struck whales.

It is hard to know exactly how many fewer ships struck whales.

Some whales that are hit by ships are never found.

Scientists think there were a lot fewer whales strikes when ships moved slower.

How Do Whales Breathe?

Can you breathe underwater?

No!

When you go underwater, you hold your breath.

People get oxygen by breathing in air.

Many animals that live in the water can get oxygen from water.

Fish breathe underwater through their gills.

Frogs get oxygen from water through their skin.

Frogs can also breathe air through their mouth.

What about whales?



This girl is having fun underwater!





This humpback whale is exhaling air.



Here is a whale blowhole up close.

Whales are like people.

They cannot breathe underwater.

They need to get oxygen from the air.

This is why whales come to the surface of the water.

Whales have a blowhole on the top of their body.

They can exhale and inhale through the blowhole.

The blowhole closes when they are underwater to keep water out.

Whales do not need to breathe as often as people.

Humpback whales can stay underwater for up to 45 minutes.

Shipping Traffic and Whales

Ships carry cargo all over the world.

Ships often start their trip in large cities.

Ships often end their trip in large cities.

Large cities have a lot of shipping traffic.

Some whales also swim near large cities.

Because of this, there is a greater chance that a ship will hit a whale near a large city.



The city of Singapore is a busy shipping harbor.



Scientists study where whales swim the most.

People can create a protected area for whales.

That is an area where ships should not go.

There is a protected area for whales near Los Angeles, California.

There are small islands near there called the Channel Islands.

Many whales swim near these islands.

The area around the islands is protected.

Large ships are not supposed to go there.

- ▼ Large ships are not supposed to go in the gray area. Some people would like to make that area bigger. The red line is the possible bigger area.



How Can We “See” Whales?

How can ships know if there is a whale nearby?

Can people on the ships see the whales?

Whales spend most of their time underwater.

But they come to the surface to breathe.

A person on a ship can look for whales coming to the surface.

They use a tool called binoculars. This helps them see things that are far away.

People can see some whales this way.

But some whales will not come to the surface at the right time to be seen.



This woman is using binoculars. She is in the US Navy.





This ocean water is cloudy.

Are there ways to see whales underwater?

Maybe ships could use underwater cameras.

The problem is that there are tiny particles in ocean water.

This can make the water look cloudy.

A camera might be able to record a whale 10 meters (33 feet) away.

A ship traveling at 12 knots (14 miles per hour) moves that distance in less than 2 seconds.

Two seconds is not enough time for a large ship to stop or change direction.

If the water is cloudy, a camera could see only a few meters away.

There would be even less time to stop or change direction.

There are other ways people can see whales.

Some types of whales sing songs.

Their songs are loud, deep, and have a melody.

A recorder can record underwater noise.

A computer can analyze the recording to see if there are any whale songs.

The computer knows the time and location of the whale song.

This can be shared on the Internet.

People who see whales at the surface can share information too.

They can share on the Internet the time and location they see a whale.

People on other ships can see where whales were seen and heard.

Ships can avoid those areas.

▼ On this day, three whales were seen by people on ships and one whale was heard by a recorder.

