Children's lecture Activity booklet

Royal Geographical Society with IBG

Advancing geography and geographical learning

5 December 2020

www.rgs.org/childrenslecture

Welcome!

Our speakers today:

Isla Hodgson from the University of Stirling, who is going to tell us about our extraordinary oceans and some of the creatures we may find in them.

Catherine Gemmell from the Marine Conservation Society who is going to take us on a virtual beach clean in Scotland and tell us about what we may find.

Kate Winter from Northumbria University, who will be telling us about how we can conduct research in Antarctica and what the impact of climate change may be.

Joanna Grochowicz, all the way from New Zealand, who is a polar historian and author and will tell us the story of Robert Falcon Scott's Terra Nova expedition.

To link all of these talks together, we have created some activities for you to complete and learn more about the Weddell Sea Expedition. You'll also find some wild flower seeds to plant and a decoration to design with your favourite sea creature!

About the 2019 Weddell Sea Expedition

Bringing together world-leading experts in polar and marine exploration in a mission to solve unanswered questions about one of the most remote and least-studied wilderness areas on our planet.
The expedition:

Investigated the ice shelves around the Weddell Sea and, in particular, the Larsen C Ice Shelf from which a giant iceberg broke off in July 2017.

Documented the rich and little-studied marine life of the western Weddell Sea ecosystem.

Attmpted to locate and survey the wreck of Sir Ernest Shackleton's ship Endurance, which was trapped and crushed by the ice and sank in the Weddell Sea in 1915. Conditions in the Weddell Sea sadly prevented the team from reaching Endurance in 2019.

The Society worked with the 2019 expedition to provide educational resources to inspire young people about science, engineering and technology, as well as the protection of Antarctica.

Odd one out - how do you get to the Weddell Sea?

Which of these transport modes will not get you to the Weddell Sea?

1

2

3

4

5

6

https://weddellseaexpedition.org/ https://www.facebook.com/weddellseaexpedition/
The answer is number 1. This is a commercial airline which is actually pictured in the Arctic. Look closely for the name of the airline "Icelandic".

Football on ice - spot the difference

What do you think is happening and why?

Think about the difference between the clothing, the people and the ship.

Why might these images play such an important role in communicating what it is like to be on an expedition in the Antarctic?

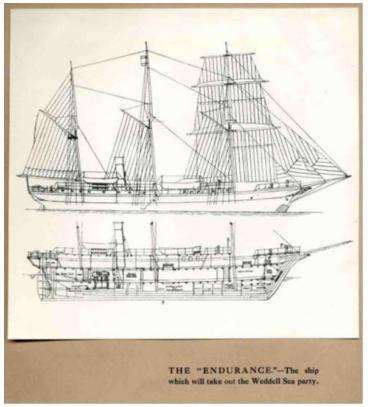
The *Endurance* team playing football on the ice, New Year's Day 1915

The Weddell Sea Expedition team playing football on the ice, New Year's Day 2019

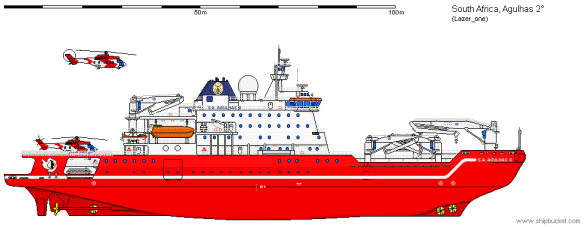
A tale of two ships
Endurance and SA Agulhas II

Compare and contrast the ships Endurance from 1914 and SA Agulhas II 2019.

Below are some images, one a drawing of the *Endurance* taken from The Imperial Trans-Antarctic Prospectus, along with an extract from the 1914 Imperial Trans-Antarctic Expedition Prospectus; and an information sheet about the *SA Agulhas II*.

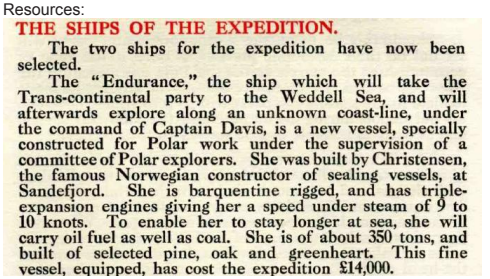


A drawing of the *Endurance* ship taken from the Imperial Trans-Antarctic Prospectus 1914
© RGS-IBG



A drawing of the SA Agulhas II
© www.shipbucket.com
Further information
http://www.histarmar.com.ar/Antartida/BuquesAntarticos-

Resources:



THE SHIPS OF THE EXPEDITION.

The two ships for the expedition have now been selected.

The "Endurance," the ship which will take the Trans-continental party to the Weddell Sea, and will afterwards explore along an unknown coast-line, under the command of Captain Davis, is a new vessel, specially constructed for Polar work under the supervision of a committee of Polar explorers. She was built by Christensen, the famous Norwegian constructor of sealing vessels, at Sandefjord. She is barquentine rigged, and has triple-expansion engines giving her a speed under steam of 9 to 10 knots. To enable her to stay longer at sea, she will carry oil fuel as well as coal. She is of about 350 tons, and built of selected pine, oak and greenheart. This fine vessel, equipped, has cost the expedition £14,000.

An extract from the Imperial Trans-Antarctic Prospectus.
© RGS-IBG

The SA Agulhus II:

- Cargo capacity of 4,000 m^3 the equivalent of 40 school buses
- Space for 500 m^3 fuel
- Capable of carrying piston bullies (ice tractors) that weight 35 tonnes
- The piston bullies can be stored below deck
- The main crane can lift 35 tonnes up to 45 meters into the air
- The two smaller cranes can lift 10 tonnes each
- The helicopters on board can lift up to 1 tonne of cargo

What are the similarities and differences between the two ships? Think about their size, the materials that they are constructed from and what they are able to carry.

Similarities **Differences**

Why you think the Endurance was crushed by sea ice but the SA Agulhas II is able to sail through it?

Design your own Weddell Sea equipment to search below or above the ice

What would you like to discover more about? Using the key features below, design a piece of equipment that will enable them to carry out the task e.g. ROV's take images of the deep sea.

Area of study	Equipment	Key functions	Video clip for inspiration	Images for inspiration	Further information
Deep sea creatures	Remotely Operated Vehicle (ROV)	• Take photographs • Track locations • Collect samples of animals (different types/sizes etc)	https://youtu.be/WZsGx-7-huM		http://www.eclipse.us.com/specifications.html
Deep sea creatures Shipwrecks	Autonomous Underwater Vehicle (ROV)	• Move easily • Transmit data • Observe marine life • Study sea floor • Search for shipwrecks	https://youtu.be/5F-w34oqqCY		https://oceaninfinity.com/wp-content/uploads/AUV_Factsheet.pdf
Sea ice	Aerial Drones	• Camera • GPS • Laser	https://youtu.be/SxSLg9kYyOc		https://www.canterbury.ac.nz/science/science-news/2018/uc-duo-prepare-to-join-search-for-shackletons-lost-ship.html
Geology of the sea bed	Sediment corer	• Drill down into the sea floor and collect sediment samples	N/A		http://seatechnology.co.za/

S.A. Agulhas II
The Weddell Sea Expedition 2019 research ship

Technical overview

- Built in 2012 by STX in Finland
- Gross tonnage: 12,897
- Length: 134m
- Power: 4 x 3000kW engines
- Polar Class 5: Can break ice 1m thick at 5 knots

Research facilities on board

Imagine having your science classrooms on board an ice breaker in the middle of the Weddell Sea. The S.A. Agulhas II has fully functioning biology, chemistry and geology laboratories.

Biology Lab

Chemistry Lab

Wet Geology Lab

Dry Geology Lab

What are the challenges that you think the scientists might encounter on board, when trying to carrying out their research?

Credit: Patrick Woodhead

Life on board the S.A. Agulhas II

The expedition team will live on board the ship for 45 days.

- The vessel has 10 Decks
- Passenger cabins are located on deck 4, 5, 6
- Deck 3 and 8 accommodation is for the Ship's Officer's and Crew
- Deck 9 is where the Wheelhouse/Bridge is located
- Deck 10 is an open upper deck with a partially enclosed viewing cubicle
- Outer decks are accessible to Passenger's, however, it is controlled
- The Business Centre, Auditorium, Laundry, Gym and Sauna is on Deck 4
- The Passenger Dining Room and Canteen is on Deck 4 forward
- The Library, Helicopter briefing room and Hospital are on the port side of deck 5
- Scientific Laboratories, moon pool, side door and aft deck is on deck 3







Imagine that you are on board the ship. Write a postcard to someone at home.
Describe where you are, what you are feeling and whether are you missing anything?
Remember that you have been away for a long time.

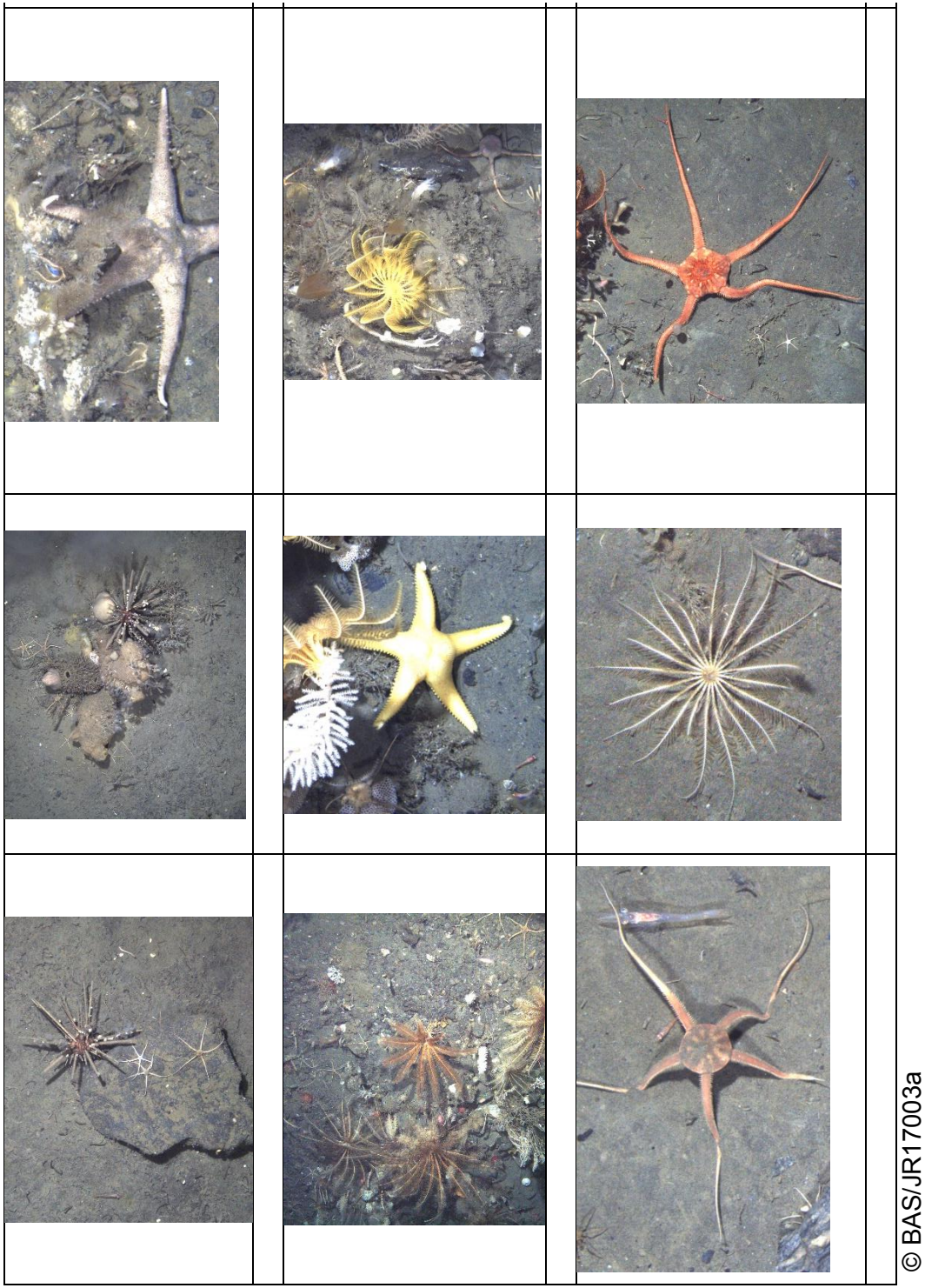
Life below the ice in the Weddell Sea

Due to its depth and inaccessibility, there is currently little known about life beneath the ice in the Weddell Sea. One of the aims of the Weddell Sea Expedition 2019, is to discover more. Using state of the art Remotely Operated Vehicles (ROV's) and Autonomous Underwater Vehicles (AUV's) the team are hoping to photograph and classify species that have never been seen before. These might be very small organisms, alongside larger animals such as star fish.

Using photographs from the British Antarctic Survey/ JR17003a expedition, classify (group) the fauna (animals) that you can see in the images. You could classify (group) them according to size, colour or how many arms they have.

Write which group they belong to into the box below the images.

Most of these species are not officially named, so you could also come up with some names for them!



Life above the ice in the Weddell Sea

The Weddell seal lives farther south than any other mammal. They are impressive divers, and can reach 600m depth and spend as long as 82 minutes underwater.

We want to count how many Weddell seals there are in the Ross Sea area of Antarctica. Only then can we tell if they are being adversely affected by human fishing for toothfish, or by the ice melting away beneath them due to climate change. But it is really hard to count seals – they live in very remote hard-to-reach locations where weather conditions are extreme, and they spend a lot of their time in the water. But during the summer they haul out onto the ice for some time each day. If we can count them then, and also understand the typical pattern of numbers out on the ice, then perhaps we can make reasonable estimates of the population.

Are Antarctic Weddell seals threatened by fishing? By climate change? Help us find out.

Using the website: https://www.zooniverse.org/projects/slg0808/weddell-seal-count

In the photograph there are mothers and pups, seals and pups.

Your task is to classify the seals.

Before you begin, read through the tutorial. The project aims to measure the variation in the number of seals on the ice throughout the daily cycle. So we need good counts.

Place a green spot over a mother with her pup beside her, a blue spot over a pup on its own, and a red spot on all the other seals. When in doubt if it's a pup, use the red spot. Include seals at the edge of the image. Do not count dead seals.

PAPER GLOBE

/ OrigamiTree

For more crafty fun,
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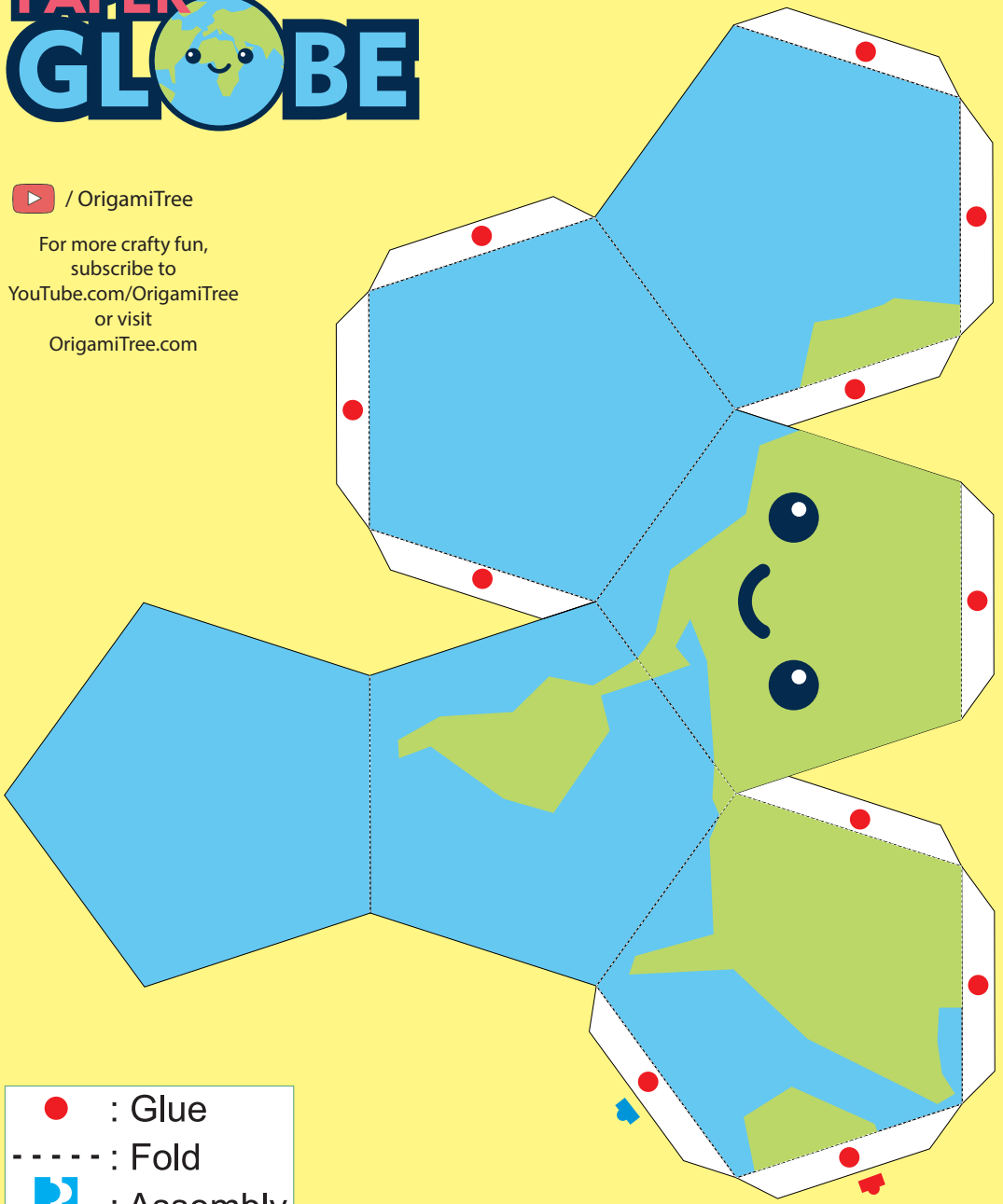
OrigamiTree.com



: Glue
- - - - - : Fold
: Assembly

PAPER GLOBE

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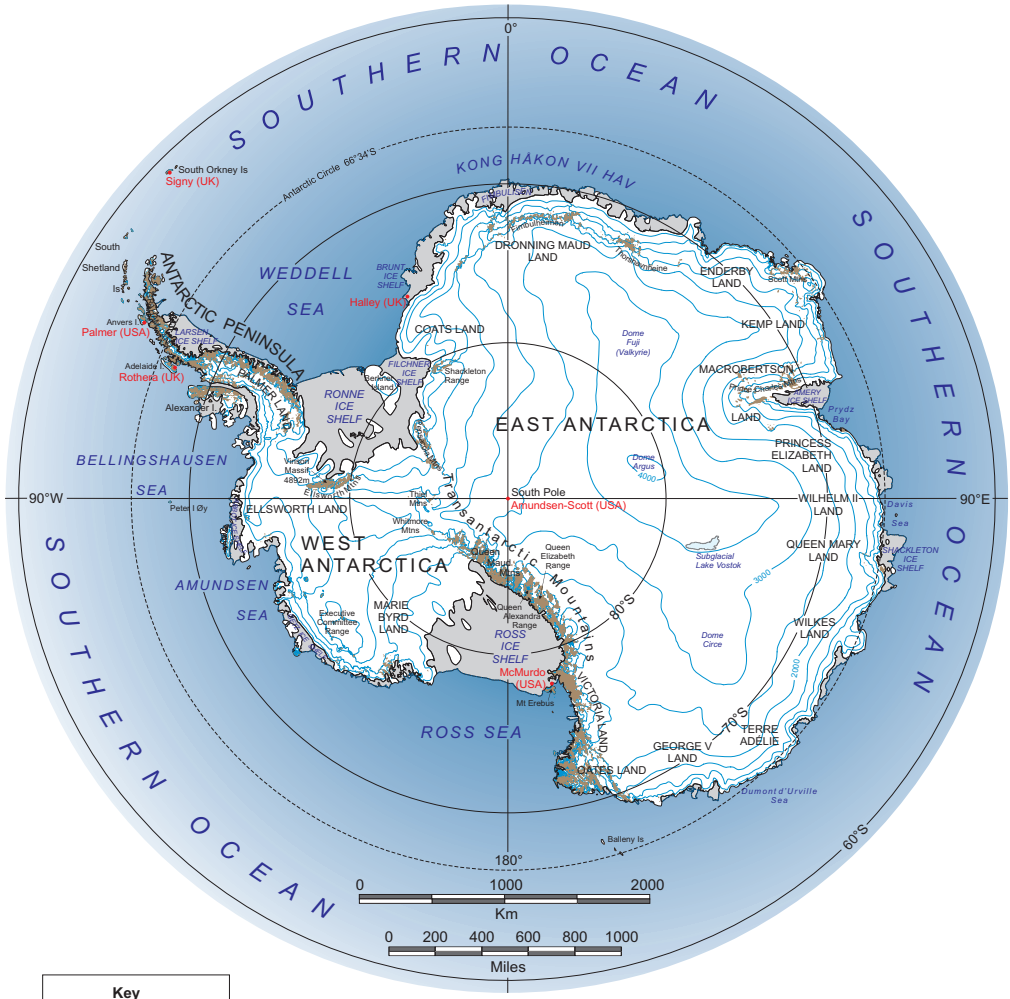
ANTARCTICA OVERVIEW MAP

This map shows the major geographical features on the Antarctic continent and the USA and UK research stations, to accompany the Landsat Image Mosaic of Antarctica (LIMA). For information about LIMA and to access the imagery, go to **http://lima.usgs.gov**



Key

- Ice-free rock
- Ice sheet
- Ice shelf
- Contours at 500m intervals

To find more detailed maps of Antarctica:
Order maps and posters from the LIMA website: http://lima.usgs.gov/order.php
British Antarctic Survey Map Catalogue: http://www.antarctica.ac.uk/magic/newmapcat/mapcat.html
SCAR (Scientific Committee for Antarctic Research) map catalogue: http://aadc-maps.aad.gov.au/
For a composite gazetteer of placenames in Antarctica visit: http://www3.pnra.it/SCAR_GAZE/
For a map showing all research stations operating in Antarctica visit: http://www.comnap.aq/

To find out interesting facts about Antarctica see:
'Antarctica in Context' on http://lima.usgs.gov/download.php

To find out more about Antarctica and British Antarctic Survey research, visit:
www.antarctica.ac.uk

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