

Endurance22— Robotics

Welcome to the Endurance22 Expedition to Antarctica. Reach the World has designed a journey outline with linked articles and sample activities to guide you. This itinerary is designed to be followed at your own pace. Use this suggested itinerary and take your students on a virtual exchange expedition that they'll never forget!

Reach the World's Partner, the MATE ROV Competition, has many resources and activities, from free lessons to fee-based robotics supplies. Find out more [here](#). You can also find great lessons on underwater robots from NOAA [here](#).

Want more related learning resources? [Feel free to use any of Reach the World's activities!](#)
Questions? Please contact educators@reachtheworld.org.

Week #1: Endurance22: A Historic Expedition

1. Journal: [An Expedition 100+ Years in the Making](#)
 - o Recommended Activity:
 - i. [Design Your Own Expedition Flag](#)

Week #2: Introduction to Endurance

1. Livestream: [Pack Your Bags](#) (41 mins)— The Endurance22 Expedition is just days away from departure for the Weddell Sea. What is RTW explorer Tim Jacob packing for a multi-week Antarctic expedition? Let's ask him!
 - o Recommended Activities:
 - i. [Pack Your Bags](#) (Elementary)
 - ii. [Pack Your Bags](#) (Middle School/High School)

Week #3: Introduction to Sub-Sea Robotics

1. Journal: [Deep Dive on High-Tech Marine Robots](#)
2. Slide deck from MATE: [Intro to ROVs](#)
3. Field Note: [Water, Water Everywhere](#)
 - o Recommended Activity:
 - i. [Water Pressure Worksheet](#) (Middle School)

Week #4: Preparing the AUVs for the Expedition

1. Journal: [Deep-Water Trials in France](#)
2. Recorded Livestream: [AUV Supervisor Chad Bonin](#) (47 mins)— AUV expert Chad Bonin is back from deep-sea trials in Toulon, France, and he's ready to share how the Endurance22 sub-sea team used creative problem-solving to tackle unique challenges!

- Recommended Activities:
 - i. From MATE ROV: [Build a Coat-Hanger ROV](#)
 - ii. [Design-Based Thinking: Prototyping](#)

Week #5: Other Robots Aboard Endurance22

1. Recorded Livestream: [Livestream with Members of the Ice-Monitoring Team](#) (50 mins)— Watch to learn about the work scientists are doing to navigate the S.A. Agulhas II through icy conditions!
2. Journal: [Putting \(Very\) Smart Buoys to Work](#)
 - Recommended Activities:
 - i. [Time, Distance and Speed: A Math Worksheet](#) (Elementary/Middle School)
 - ii. [Breaking the Ice with Torque Math Worksheet](#) (High School)

Week #6: The Search Begins

1. Journal: [Underwater Archaeology and the Search for Endurance](#)
2. Journal: [Antarctic Wildlife: Creatures of the Deep](#) and [Antarctic Wildlife: Penguins](#)
3. Album: [Accessing the Underwater World](#)
 - Recommended Activities:
 - i. [Diorama Project](#)
 - ii. [Design Your Own Adventure](#)

Week #7: Finding Endurance

1. Recorded Livestream: [Discovering Sir Ernest Shackleton's Endurance](#) (58 mins)— Over a century after Sir Ernest Shackleton's ship sank, the Endurance22 crew found Endurance at a depth of 9,869 feet in the Weddell Sea. Watch Tim speaking with Endurance22 Director of Exploration Mensun Bound and AUV Supervisor Chad Bonin about sub-sea robotics and their search for Sir Ernest Shackleton's sunken Endurance.
 - Recommended Activities:
 - i. [Why Was Endurance So Difficult to Find?](#) (Elementary/Middle School Social Studies)
 - ii. [Discover Endurance, Using Math](#) (High School) with [Educator Resource](#)
 - iii. [Share your reaction to the discovery!](#)

Week #8: Reflections on a Historic Expedition

1. Journal: [Farewell to the S.A. Agulhas II](#)
 - Recommended Activities:
 - i. [Environments Around Us](#)
 - i. Share your feedback with us: [E22 Survey](#)

- ii. Watch crew and expedition member reactions and have students share their own [here](#)

OPTIONAL: Live Video Conference with Reach the World Explorer Tim Jacob

Would you like to schedule a live video conference between your students and Tim? Video conferences are optional and subject to classroom and explorer availability. Reach the World strongly recommends that classrooms review most expedition articles prior to scheduling a video conference.

Interested? Please e-mail educators@reachtheworld.org and Reach the World staff will get in touch with further information.