

Video

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Each day of the field trip, the LEARNZ Team shoot, edit and upload curriculum-rich videos which help students to feel right up close to the action.

For help and more information about LEARNZ videos, go to [Help with Videos](#) [1] in the [LEARNZ Support](#) [2] section.

Monday 16 June

1. **Boarding the RV Tangaroa** - [Play or download](#) [3] 29Mb mp4 file or [Watch on Vimeo](#) [4].

You have been through the security gate and have arrived at the busy Center Port, Aotea Quay in Wellington ready for the departure of the RV Tangaroa.

1. What is the reason for this voyage of the Tangaroa?
2. What other ship is tied up to the Center Port at Aotea Quay in Wellington? What export products can you see being loaded aboard this ship? What city is the ship from?
3. What is the name of the organisation which owns the Tangaroa?

Next step learning: Find out more about the two research organisations that are supporting this field trip: NIWA and NOAA.

Tuesday 17 June

1. **On the bridge of the RV Tangaroa** - [Play or download](#) [5] 60Mb mp4 file or [Watch on Vimeo](#) [6].

The bridge is high up on the Tangaroa with a spectacular view of the decks and the surrounding sea. This is where the ship is controlled.

1. When was the Tangaroa built and what was it built to do?
2. Where are you at this time?
3. How many nautical miles have you got to go and what speed is the boat doing at the moment?

Next step learning: Find out about nautical miles and knots and why sailors use these measuring units.

2. **A quick tour of the RV Tangaroa** - [Play or download](#) [7] 56Mb mp4 file or [Watch on Vimeo](#) [8].

Your ship takes a bit of getting used to! It has many corridors, stairways and decks.

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Visit the galley, the TV room, your cabin and the bridge.

1. What is the muster station, and what are the three important pieces of survival equipment found near the muster station?
2. A ship can be a dangerous place if you are not careful and don't pay attention to rules and advice from the crew. What hazards can you spot on this tour, and what advice would you give to visitors about those hazards?
3. Look carefully at the bridge windows. What do you notice about them and why do you think they are different than windows in your house?

Next step learning: Most ships have a monkey island. Yes, a monkey island! Find out what this means and see if you can find another interesting word or phrase used in the shipping industry.

Wednesday 18 June

1. **Regular and Deep Argo Floats** - [Play or download](#) [9] 46Mb mp4 file or [Watch on Vimeo](#) [10].

You are in a small storage room off the main working deck on the RV Tangaroa. Your expert today is [Nathalie Zilberman](#) [11] from the Scripps Institute of Oceanography.

1. Why is Nathalie on this voyage?
2. What do Argo Floats measure?
3. Why can't we open the box and see an Argo Float?
4. Why were the Argo Floats shifted out on to the deck?

Next step learning: Write down three questions about ocean currents. Now try and find some answers to them.

2. **The CTD** - [Play or download](#) [12] 79Mb mp4 file or [Watch on Vimeo](#) [13].

Today there was a test of an important piece of equipment called a CTD. It took most of the day to prepare and was finally lifted off the deck and lowered by cable 2,000m into the ocean. You are with oceanographer [Esmee van Wijk](#) [14] in a lab just off the Tangaroa's main deck.

1. Who does Esmee work for and where?
2. What does CTD stand for and what does it measure?
3. What two things can we learn from these measurements?
4. Whereabouts in the ocean is the salinity very stable (doesn't change much)?
5. What went wrong today?

Next step learning: Find out where the very deep oceans are. Where are the

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deepest parts near New Zealand?

Thursday 19 June

1. **Researching the Undersea World** - [Play or download](#) [15] 52Mb mp4 file or [Watch on Vimeo](#) [16].

The library is a nice quiet space on the RV Tangaroa with a coloured map of New Zealand. But this is no ordinary map. Oceanographer [Phil Sutton](#) [17] uses the map to show where you are and to explain why we are here (and not somewhere else!).

1. Name New Zealand's three large underwater land masses.
2. What sort of water did Phil want to test the new Deep Argo Floats?
3. How do you know (by looking at the map) that the area here has the same depth over a large area?
4. What is the latitude and longitude of this special place?
5. Phil explained that the heat arriving on the planet from the sun ends up warming the atmosphere, the land and the oceans. Scientists can calculate where most of the heat goes but there is some that is unaccounted for. A question for scientists: where is the missing heat? Question for you: What might the Deep Argo Floats tell us that might be useful?

Next step learning: Find out about how greenhouse gases warm the planet.

2. **Preparing a Regular Argo Float for Deployment** - [Play or download](#) [18] 29Mb mp4 file or [Watch on Vimeo](#) [19].

There is a special brown box on the deck of the Tangaroa. It is tied up with yellow tape and is being prepared for a big adventure! Inside, the Regular Argo Float is all set for a lifetime's work out in the oceans.

1. How is the yellow tape released so the box will float away?
2. How does the box open up so the Argo Float can be free?
3. How is the Argo Float started?

Next step learning: Think about all the costs of deploying an Argo Float. Write down as many as you can.

3. **Deploying a Deep Argo Float** - [Play or download](#) [20] 39Mb mp4 file or [Watch on Vimeo](#) [21].

The Deep Argo Floats are very new. The prototypes on this voyage are called 'Deep Solo II' Argoes. They are being released to see if they can successfully travel down to 5,500m and still return to the surface to send their information to satellites. Scientist [Nathalie Zilberman](#) [11] tells the story.

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1. What was done to enable the Deep Argo Float to communicate with satellites before deployment?
2. How was the Float put into the water?
3. How deep is its first test dive?
4. How deep is the second test dive?
5. If both test dives are successful how deep will the regular dives be?
6. What will happen after one year?

Next step learning: Find out about the word prototype. Describe a prototype (eg a vehicle or machine).

Friday 20 June

1. Building a Deep Argo - an Example of Technological Practice - [Play or download](#) [22] 101Mb mp4 file or [Watch on Vimeo](#) [23].

The Deep Argo is a clever robot designed to do a very special job. On this voyage you are part of the process of evaluating a prototype Deep Argo. This is part of a technology process to produce a fully tested and working Deep Argo robot.

1. What was the need for a Deep Argo?
2. What functional outcomes were required from the Deep Argo?
3. What four decisions had to be made in the first stages of planning?
4. During the planning, each stage was broken down into steps. Norge's company used a process to help with this planning. What was the name of that process?
5. What sort of people and skills are required for the Deep Argo project?
6. On this voyage you are seeing part of the evaluation stage. List some of the things the prototype will need to withstand to perform successfully?

Next step learning: Find out about other planning tools, systems and processes (such as Gaant charts) that help with technological practice.

2. Prototype Deep Argoes - [Play or download](#) [24] 65Mb mp4 file or [Watch on Vimeo](#) [25].

On this voyage you will see two prototype Deep Argoes being deployed. The first deployment went very well. How will this one go? Oceanographer [Nathalie Zilberman](#) [11] talks you through the deployment, and explains the purpose of having two Deep Argoes at this one location.

1. Which part of the deep argo has to be protected during deployment?

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2. Where was the engineer who was checking the signals from this Deep Argo Float, and what was he checking for?
3. Once Nathalie knew that the Argo was working perfectly what was the command that was sent to it?
4. How long should this test dive take?
5. What were the goals for having two deep argo floats?

Next step learning: Once the first test dives are completed these prototype Deep Argoes will move down to the ocean floor sending data to a satellite and on to Scripps Institute of Technology in California, when they surface. Make a list of all the smart technologies you can think of that allow deep argoes to do this.

Monday 23 June

1. **The Life of a Young Scientist** - [Play or download](#) [26] 61Mb mp4 file or [Watch on Vimeo](#) [27].

There are nine scientists on this voyage including [Denise Fernandez](#) [28]. Denise is a PhD student, starting out on her career as a scientist.

1. Where is Denise from?
2. What courses did Denise study at first at university?
3. What is Denise doing on this voyage?
4. Besides working with cold water and getting sea sick what are some other challenges of being a scientist on board the Tangaroa?

Next step learning: Find out about other science careers that involve water (other than oceanography).

2. **How does a CTD work?** - [Play or download](#) [29] 105Mb mp4 file or [Watch on Vimeo](#) [30].

The CTD is a very important piece of equipment, and science technician [Matt Walkington](#) [31] is the man to talk to about it.

1. What are the two jobs that the CTD does?
2. What is one measurement that is made using sensors?
3. How does the electronic signal from the sensor get back to the computer onboard the Tangaroa?
4. When the CTD is lowered into the water all the Niskin bottles are open and water can flow through them. How are they closed?
5. How many Niskin bottles are there on a CTD?
6. Why are there two different ways of measuring temperature, salinity and dissolved oxygen on the CTD?

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7. What is the major objective of this voyage?

Next step learning: Find out about electronic sensors that measure things about the environment. What are they used for?

Tuesday 24 June

1. **What is it like 2,000m below sea level?** [Play or download](#) [32] 36Mb mp4 file or [Watch on Vimeo](#) [33].

You've been on this voyage for seven days and during that time the CTD and two prototype Deep Argoes have made many trips down to 2,000m below sea level and some down to over 5,000m! The CTD is made of steel and hard plastic and comes back to the ship looking just the same. Would all materials survive unchanged by a dive to 2,000m? Here is an experiment to see.

1. What material was used in this experiment?
2. What did the blocks look like after their 2,000m dive?
3. How could we calculate the amount of shrinkage?
4. The large cube was 4cm across before the dive and 2.5cm after the dive. What was its volume before the dive and after the dive? How much smaller was its volume after the dive?

Next step learning: Find out about vehicles that can travel to great depths in the oceans and the pressures they can withstand.

2. **Deploying Regular Argo Floats** - [Play or download](#) [34] 41Mb mp4 file or [Watch on Vimeo](#) [35].

The main purpose of this voyage was to test prototype Deep Argo floats. But regular Argo Floats were also deployed on the way to, and back from the test site. Phil Sutton describes the two different ways that regular Argo Floats are put into the sea.

1. What are the two different ways to deploy regular floats?
2. Why are Argo Floats deployed in boxes?
3. Why do the straps come off the box when it enters the water?
4. What are the white straps around the box made from and why?

Next step learning: Record the number of the first Argo Float deployed on this video. Search on google earth for Argo Floats in this area (about 177°W 36°S) and look out for this Argo Float number to appear (it may take many weeks).

Wednesday 25 June

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1. **Field Trip Summary** - [Play or download](#) [36] 32Mb mp4 file or [Watch on Vimeo](#) [37].

Take time at the end of the field trip to reflect on what you have learnt.

1. What has been the most interesting thing that you have learnt during the field trip?
2. Choose one aspect of the field trip to base a further inquiry on.
3. Help your teacher to complete the online evaluation for this field trip.

One more thing: To keep informed, how about putting a recurring item on your online calendar to check the Argo Floats using the [Google Earth Argo App](#) [38]?

2. **Voyage Summary** - [Play or download](#) [39] 17Mb mp4 file or [Watch on Vimeo](#) [40].

Oceanographer [Phil Sutton](#) [17], the Deep Argo Development Cruise Coordinator, summarises the aims and outcomes of this voyage.

Source URL: <http://www.learnz.org.nz/argofloats142/videos>

Links

[1] <http://www.learnz.org.nz/support/videos>

[2] <http://www.learnz.org.nz/support>

[3]

<http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d00-01.mp4>

[4] <https://vimeo.com/98493428>

[5]

<http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d01-01.mp4>

[6] <https://vimeo.com/98493896>

[7]

<http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d01-02.mp4>

[8] <https://vimeo.com/98494017>

[9] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d02-00-regular-vs-deep-argo-floats.mp4>

[10] <https://vimeo.com/98596837>

[11] <http://www.learnz.org.nz/argofloats142/meet-nathalie-zilberman>

[12] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d02-02-the-ctd.mp4>

[13] <https://vimeo.com/98597057>

[14] <http://www.learnz.org.nz/argofloats142/meet-esmee-van-wijk>

[15] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d03-01-researching-the-undersea-world.mp4>

[16] <https://vimeo.com/98690619>

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- [17] <http://www.learnz.org.nz/argofloats142/meet-phil-sutton>
- [18] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d03-02-preparing-a-regular-argo-float-for-deployment.mp4>
- [19] <https://vimeo.com/98690779>
- [20] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d03-04-deploying-a%20deep-argo.mp4>
- [21] <https://vimeo.com/98691022>
- [22] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d04-01-building-a-deep-argo-float-an-example-of-technological-practice.mp4>
- [23] <https://vimeo.com/98883427>
- [24] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d04-02-prototype-deep-argoes-v2.mp4>
- [25] <https://vimeo.com/98883530>
- [26] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d05-01-the-life-of-a-young-scientist.mp4>
- [27] <https://vimeo.com/98979254>
- [28] <http://www.learnz.org.nz/argofloats142/meet-denise-fernandez>
- [29] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d05-02-how-does-a-ctd-work.mp4>
- [30] <https://vimeo.com/98979379>
- [31] <http://www.learnz.org.nz/argofloats142/meet-matt-walkington>
- [32] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d06-01-w-hats-it-like-2000m-below-sea-level.mp4>
- [33] <https://vimeo.com/98998347>
- [34] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-d06-02-deploying-regular-argo-floats.mp4>
- [35] <https://vimeo.com/99085133>
- [36] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-field-trip-summary.mp4>
- [37] <https://vimeo.com/99193494>
- [38] <http://argo.jcommops.org/argo.kml>
- [39] <http://www.learnz.org.nz/sites/learnz.org.nz/files/Field%20trips/af142-voyage-science-summary.mp4>
- [40] <https://vimeo.com/99196530>