RESCUE

SCHOOL & VISITOR GUIDE

Image: DVIDSHUB

Image: Rescate Mineros

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Contents

Photo: expertinfantry

Introduction

Search and rescue operations take place every minute, every hour, every day, all around the world. From the air to the sea and on land, responsive operations are lifelines to many people in times of need. But what does a rescue scenario really involve? Who are the teams who put themselves in these dangerous situations? And do we really know what to do if we find ourselves in need of rescuing?

Rescue operations require a high level of training and are undertaken by specialist rescue squads. *Rescue* the exhibition, delves into this world, exploring topics related to rescue techniques, emergency supplies and equipment.

Visitors can engage with exciting hands-on and full-body experiences such as fire-fighting, surf rescue and sea life survival, while comprehensive graphic panels communicate the technology and techniques that rescuers use.

Audience appeal

The exhibition design is real, relevant and interactive, and offers visitors a unique experience for those who dare to enter the earthquake-damaged entrance. Captivating exhibits throw visitors straight into the thrall of emergency scenarios and engage all ages.

The primary target market is children aged between five and twelve years old and their parents. With full-body exhibits and interactive computer-based and tabletop exhibits, *Rescue* caters for whole-family interaction and teamwork.

This exhibition also provides unique teaching and learning opportunities. Primary-aged students will particularly benefit from interacting with exhibits such as the *Fire experience* and *Wave Rescue*, which involve learning about collaboration and assistance in physical rescue scenarios; while secondary-aged school students will be able to explore challenging rescue concepts and practices with the *Search patterns* and *Drone rescue exhibits.*

In addition, the exhibition will engage adults of all ages with science and technology as it is both credible and relevant to everyday life.

Photo: LAFRANCEVI

The exhibition

The exhibition consists of 17 interactive science. Full-body exhibits allow for plenty of group interaction and role-play, while a collection of computer-based and table-top exhibits encourage students to use problem-solving skills and explore rescue techniques to develop a deeper understanding of the science and technology involved in a rescue scenario.

Key messages

1. Technology expands our capacity to rescue

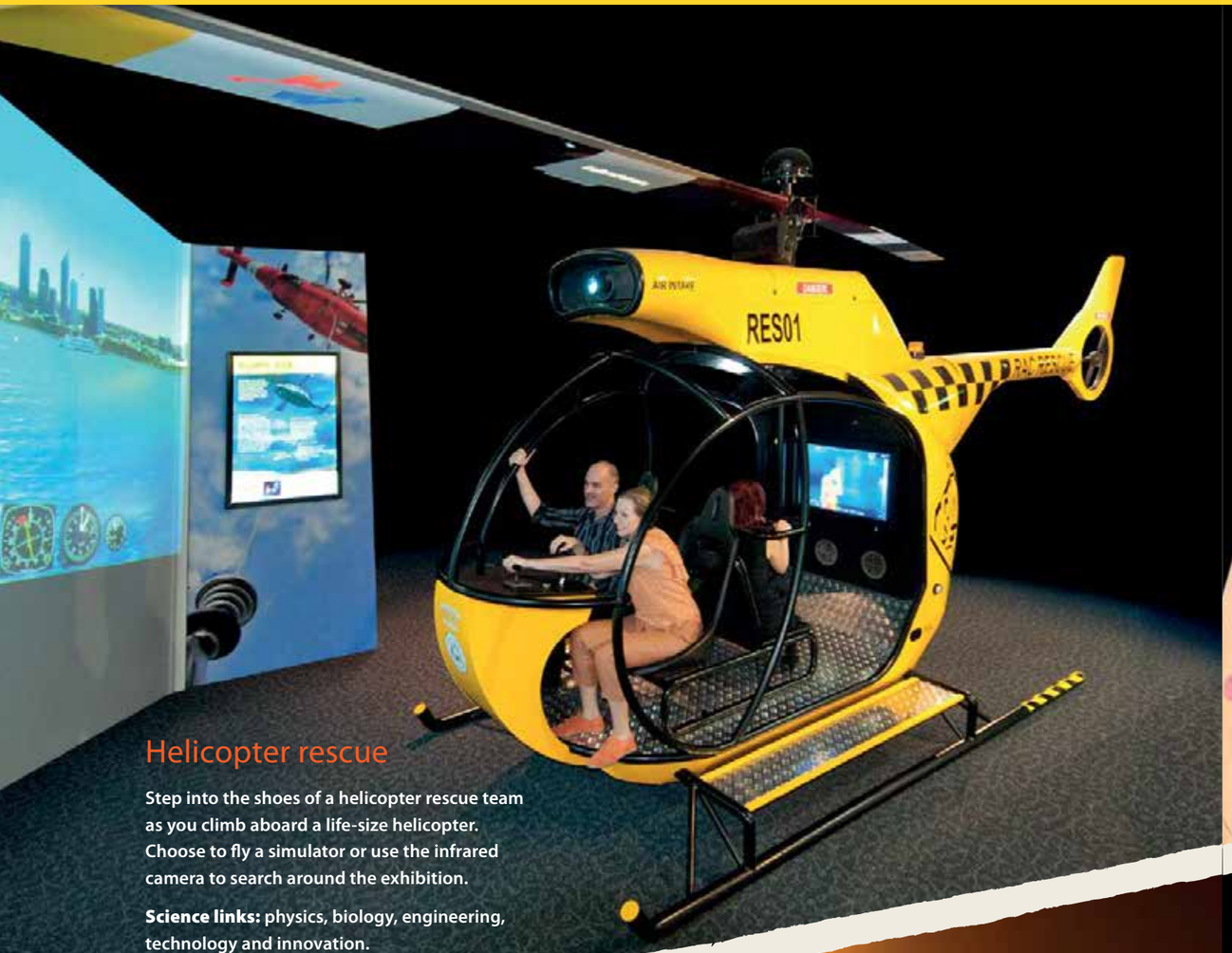
Advancements in technology means rescues are now faster and safer. Breathing apparatus has transformed the work of firefighters, radio beacons are fundamental in locating missing persons and infrared cameras allow rescuers to spot casualties even at night. Examples of rescue technology are integrated throughout the exhibition, helping to inform and educate visitors.

2. Rescue is a human endeavor

Rescues would be impossible without the brave people who perform them – many of whom push themselves to extremes both physically and mentally. Rescuers are highly trained members of teams who work together to produce amazing results. In this exhibition, visitors are encouraged to put themselves in the shoes of a rescuer and examine their own feelings and reactions.

3. Rescue situations promote innovation and improvements in technology

Rescuers often have to improvise techniques and equipment in unique scenarios. These skills and technologies can then be refined and incorporated into innovative equipment.



Helicopter rescue

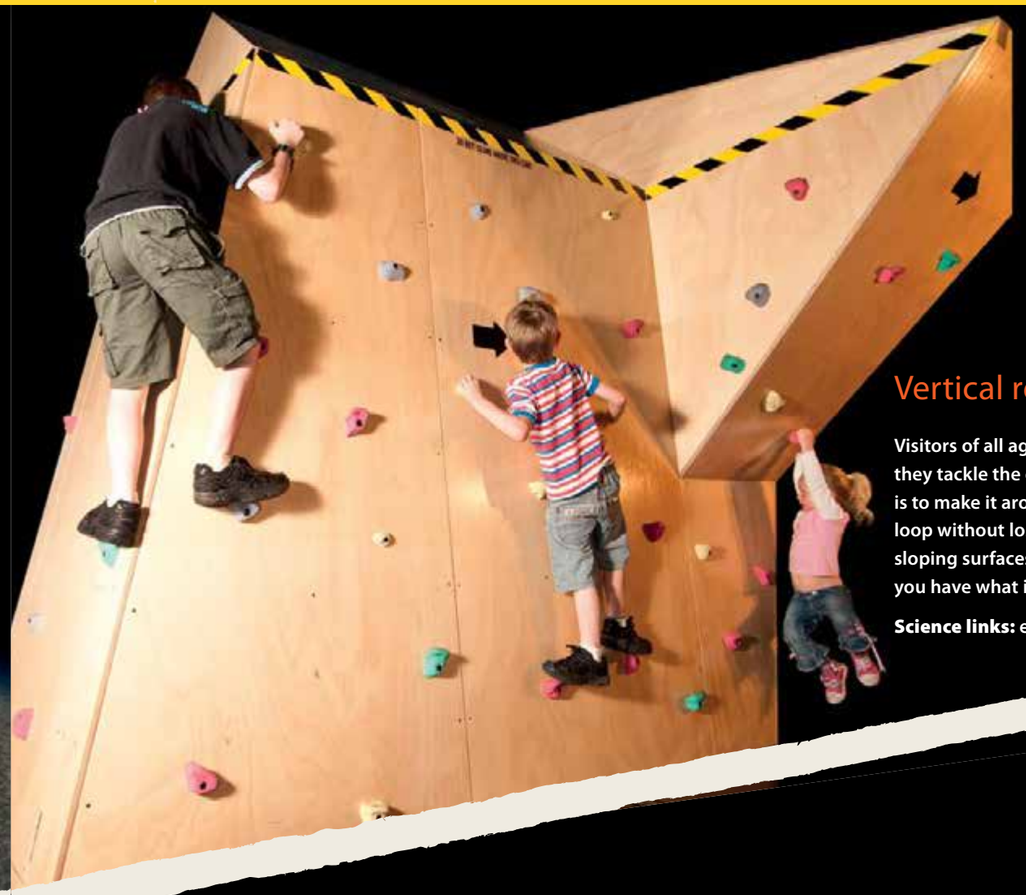
Step into the shoes of a helicopter rescue team as you climb aboard a life-size helicopter. Choose to fly a simulator or use the infrared camera to search around the exhibition.

Science links: physics, biology, engineering, technology and innovation.

Fire experience

Enter this room and be hit by the elements. With heat topping nearly 104˚F and smoke obscuring your vision, visitors are encouraged to drop low and feel their way through this replica burning building.

Science links: physics, biology.



Vertical rescue

Visitors of all ages will have fun as they tackle the climbing wall. The aim is to make it around the wall in a 360˚ loop without losing your grip. With sloping surfaces, this is no easy feat. Do you have what it takes to hang on?

Science links: exercise science, physics.

Wave rescue

A radio-call has come in alerting you to a swimmer who has been washed out to sea. You and your friend must navigate jet skis around the obstacles to rescue the swimmer. You have just three minutes. Who will reach the swimmer first?

Science links: technology and innovation, mathematics (mapping), earth science.

Fight the fire

Would you know what to do if confronted with a 'fat fire'? What about an 'electrical fire'? Would you know what extinguishing device to use in each scenario and which ones to avoid? In this interactive exhibit, visitors are faced with four different fire extinguishers and must choose the correct one to put out the simulated fire.

Science links: physics, chemistry, problem solving.

Read the news

When a disaster strikes, the media play a crucial role in informing the public. In this exhibit, one visitor takes to the news desk as the anchor, breaking the news story and informing the public, while the other visitor is the reporter live on the scene of a fire. Chromakey technology relays the vision onto a monitor so friends and family can watch the news program come together.

Science links: technology and innovation.

Pulleys share the load

Learn how pulley systems give a mechanical advantage when pulling casualties to safety. Visitors operate one of three stations to compare the effort needed to pull the casualty to safety. This exhibit educates visitors about the advantages of using multiple pulleys and their use – not only for rescue, but in everyday life.

Science links: physics, technology and innovation.

Ropes and knots

Would you trust yourself to tie a knot to save a life? Knots, although simple, are used for specialist purposes. Learn where and when to use particular knots and how to tie them.

Science links: mathematics (topology).

Cliff walk

Your eyes will deceive you as you make your way across a balance beam perched above a 'raging ravine.' Clever graphics give the illusion of depth as you conquer your fear and make it to the other side. Supporting graphics detail how rescuers must often overcome their own fear to save others.

Science links: biology (neuroscience and psychology), physics.

Real life rescues

Large screens mounted in a collapsed building display real-life rescue videos. This makes an audio-visual impact on the visitor as they enter the exhibition. On the other side of the entrance, a visually captivating wall of newspaper articles highlights amazing rescue stories from around the world.

Science links: chnology and innovation, biology, physics, problem solving.

You can be a rescuer

Rescue uniforms are designed to resist extreme conditions. From chemical explosions to fat fires, these outfits can mean the difference between life and death for firefighters. Visitors can try on various real rescue uniforms including firefighter, surf lifesaver and paramedic.

Science links: materials science.

Drone rescue

Drones are being used in more rescue operations around the world. From lifesaving support to search and rescue in difficult terrain, drone operators can reach people in need faster. Visitors fly a surf lifesaving drone and deliver a flotation aid to a swimmer in distress.

Science links: technology and innovation

Mayday, mayday

A distress call comes through on the radio – it is panicked, rushed and hard to hear. With no time to lose, you must pick out the most important details and piece together what is needed to perform the sea rescue.

Science links: problem solving.

Escape the rip

You are caught in an ocean rip at the beach and have to try to escape and return to shore without losing too much energy. In this exhibit, visitors learn about the properties of rips and what a swimmer should do if caught in one.

Science links: earth science, biology, exercise science.

Search patterns

Using this interactive touch-screen exhibit, visitors take command of a search team to map out a search route to find a missing hiker. What search tactic would you use to locate a missing person in a vast area?

Science links: problem solving, mathematics.

Cut the car

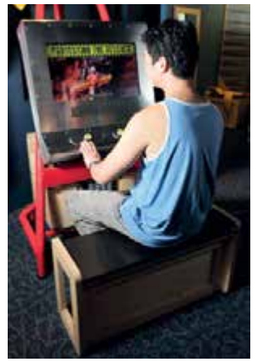
Would you know where to cut a car to avoid hazards and rescue a trapped person? This interactive multimedia exhibit educates about the hazards in a car and the technology and techniques used by specialist rescue teams. This exhibit is complemented by 'jaws of life' cutters that were once used in active duty.

Science links: engineering, problem solving.

What to pack

You have been called out to the scene of a rescue. Before you go, you must decide what to pack in your supplies bag. Make sure you only take the essential emergency items suitable to the surroundings because your backpack will fill up fast.

Science links: biology, health science, materials science.



Information kiosks

Interactive multimedia kiosks are positioned around the exhibition and feature information, images and video to educate visitors about:

- Finding people faster,
- Protecting the rescuer,
- Treating the casualty.

Science links: problem solving, physics, biology, innovation and technology.

Primary worksheet questions, ages 4 - 8

Welcome to *Rescue!* Rescuers use lots of science and technology in their jobs, as well as needing great problem solving and mapping skills to find and help people in trouble. To complete this worksheet, find each exhibit pictured and test it out. Then try to answer the questions about that exhibit. To get the answers you may need to read the graphic panels or use your problem-solving skills.

Helicopter rescue:

Question 1: What does the infrared camera measure and how does that help in rescues? _____

_____

Fire experience:

Question 2: Why do you need to crawl under the smoke? _____

_____

Fight the fire:

Question 3: What type of fire extinguisher should you use to put out an electrical fire? _____

Question 4: Why should you never use water or foam to put out an electrical fire? _____

_____

You can be a rescuer:

Question 5: Why are rescuer outfits usually bright colors like red and yellow?

_____

Drone rescue:

Question 6: Describe how you used the drone to help rescue the person caught out at sea._____

_____

Question 7: What useful things could a drone deliver to a person caught out at sea? _____

_____

Question 8: How else could drones be used to help people in our community? _____

Escape the rip:

Question 9: Which way should you swim to escape a rip? _____

_____

What to pack:

Question 10: Why would a blanket be a good thing to take on a rescue mission? _____

Did you know:
Silver-colored Mylar rescue blankets are made of material that was originally used as a trendy wall covering in the 1950s?

Primary worksheet answers, ages 4 - 8

Helicopter rescue:

Question 1: What does the infrared camera measure and why does that help rescuers?
They measure heat, so rescuers can spot people from their body heat.

Fire experience:

Question 2: Why do you need to crawl under the smoke? *Crawling low to the ground reduces your risk of inhaling the smoke which can make you sick or unconscious.*

Fight the fire:

Question 3: What type of fire extinguisher should you use to put out an electrical fire? *Dry chemical or CO_2*

Question 4: Why should you never use water or foam to put out an electrical fire? *Because the electricity could travel through the water or foam and electrocute you.*

You can be a rescuer:

Question 5: Why are rescuer outfits usually bright colors like red and yellow? *Because they are easy to see. Bonus: This makes it easier for the victim to see them coming, it makes it easier for a helicopter to spot them if an airlift is needed, and it makes them easier to see if they need to be rescued themselves.*

Drone rescue:

Question 6: Describe how you used the drone to help rescue the person caught out at sea. *Possible answers: pushing and pulling on the joysticks to fly the drone and move it up and down. Pressed the button to drop the supplies.*

Question 7: What useful things could a drone deliver to a person caught out at sea?
Possible answers: life jacket, floatation device, water, lights for attracting attention.

Question 8: How else could drones be used to help people in our community?
Possible answers: searching for missing people, investigating bush fires, delivering supplies .

Escape the rip:

Question 9: Which way should you swim to escape a rip? *You should swim sideways across the rip, parallel to the shore.*

What to pack:

Question 10: Why would a blanket be a good thing to take on a rescue mission? *The victim may be very cold, and keeping warm will help their chances of survival.*

Secondary worksheet questions, ages 8 - 12

Welcome to Rescue! Rescuers use lots of science and technology in their jobs, as well as needing great problem solving and mapping skills to find and help people in trouble. To complete this worksheet, find each exhibit pictured and test it out. Then try to answer the questions about that exhibit. To get the answers you may need to read the graphic panels or use your problem-solving skills.

Helicopter rescue:

Question 1: What does the infrared camera measure and how does that help rescuers?_____

_____

Fire experience:

Question 2: Why do you need to crawl in a fire? _____

_____

Question 3: Why is it important to avoid smoke? _____

_____

Fight the fire:

Question 4: Why does carbon dioxide put out fires? _____

_____

Question 5: Why should you never use water or foam to put out an electrical fire?

_____

Pulleys share the load:

Question 6: Which rope makes the load feel lighter? _____

_____

Question 7: Why do more pulleys make the load feel lighter? _____

_____

You can be a rescuer:

Question 8: What would need to be special about a firefighter's outfit? _____

_____

Question 9: What would need to be special about an underwater rescuer's outfit? _____

_____

Secondary worksheet questions, ages 8 - 12

Drone rescue:

Question 10: Name two advantages and a disadvantage of using drones in a rescue at sea. _____

_____

Question 11: What other rescue operations could be made easier by using a drone? _____

_____

Question 12: What are three dangers to a person adrift in the water that may lead to death or drowning?

_____

_____

Search patterns:

Question 13: Name two technologies that could be used by the victim and/or the rescuers to help the person be rescued faster? _____

_____

Cut the car:

Question 14: Why would cutting through the air bags in a car be hazardous? _____

_____

Whole exhibition:

Question 15: List five types of technology that you found in this exhibition. For each one, say what they are used for and how they help rescuers.

_____

_____

_____

_____

_____

Did you know:

The record for the longest time adrift at sea alone is held by a man named Poon Lim. He survived 133 days (over four months) on a wooden life raft in the Atlantic Ocean before being rescued in 1943.

Secondary worksheet answers, ages 8 - 12

Helicopter rescue:

Question 1: What does the infrared camera measure and how does that help rescuers? *It measures heat, which helps rescuers find victims by their body heat, especially at night.*

Fire experience:

Question 2: Why do you need to crawl in a fire? *To avoid the smoke, which is more concentrated higher up.*

Question 3: Why is it important to avoid smoke? *Because inhaling smoke can lead to illness, unconsciousness or death.*

Fight the fire:

Question 4: Why does carbon dioxide put out fires? *It starves the fire of oxygen.*

Question 5: Why should you never use water or foam to put out an electrical fire? *Because these are conductive materials and put you at risk of electrocution.*

Pulleys share the load:

Question 6: Which rope makes the load feel lighter? *The one with more pulleys.*

Question 7: Why do more pulleys make the load feel lighter? *The pulley spreads out the weight over a larger distance. You have to pull less weight over a longer distance, which results in the same amount of effort overall.*

You can be a rescuer:

Question 8: What would need to be special about a firefighters outfit? *It would need to be fire retardant.*

Question 9: What would need to be special about an underwater rescuer's outfit? *It would need to keep heat in and be waterproof. They would also need a source of air.*

Drone rescue:

Question 10: Name two advantages and a disadvantage of using drones in a rescue at sea. *Advantages: fast, easy to find people from the air, does not endanger rescuers. Disadvantages: cannot pull the person to safety, hard to steer if windy.*

Question 11: What other rescue operations could be made easier by using a drone? *Possible answers: searching for missing people in bushland, mountains or caves, investigating and putting out bush fires, bomb detection.*

Question 12: What are three dangers to a person adrift in the water that may lead to death or drowning? *Possible answers: predators, getting too cold, falling asleep, getting physically tired, getting a cramp, panicking.*

Search patterns:

Question 13: Name two technologies that could be used by the victim and/or the rescuers to help the person be rescued faster? *Answers may include: Infrared camera, helicopter, personal locator beacon (EPIRB), satellite phone. Answers may be imagined technologies as long as they make sense and would solve the problem.*

Cut the car:

Question 14: Why would cutting through the air bags in a car be hazardous? *Air bags inflate so quickly that they could injure the rescuer or the person trapped in the car.*

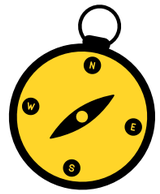
Whole exhibition:

Question 15: List five types of technology that you found in this exhibition. For each one, say what they are used for and how they help rescuers.

For example: *Jaws of life are used to rescue people trapped in vehicles. Rescuers use them to cut through the car so the victim can be safely removed.*

Post-visit classroom activities

Orienteering



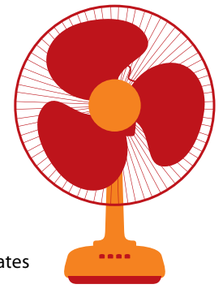
Discuss the search aspect of rescue operations and discuss the importance of navigational systems for rescuers as well as for those leaving road systems. You may want to have students investigate different methods of navigation that have been used on land and at sea throughout history.

Put some of this into practice by having students learn to use compasses and maps and complete an orienteering course in the school grounds or a local park.

Floatation device Investigation

Investigate buoyant materials and the role of shape in increasing an objects buoyancy. Then have students design a prototype floatation device out of a selection of materials (e.g. plastic bag, popsicle sticks, string, sticky tape, paper, modeling clay etc.). The device can be tested for buoyancy (how much weight it can take before it sinks) and stability (how big a wave you can create before it capsizes). As an extension, modify the prototype to make it small enough to be carried by a drone but still buoyant enough to stay afloat with the maximum weight from previous testing.

Body heat



Tie your visit to the Rescue exhibition with health or human biology lessons. Discuss the optimal temperature of the human body and link this into infrared cameras and their role in search and rescue operations. Show students that their bodies can stabilize their temperature. Some activities which show this could be:

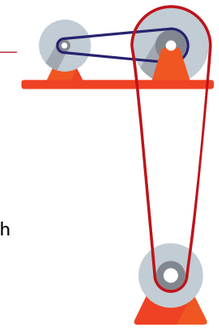
- Blow a fan on their hands when they are dry and then again when they are wet. This shows how our sweat cools us down.
- Discuss how shivering helps keep us warm and how when we are very cold our body concentrates warmth in our vital organs (which is why our fingers, nose and toes become very cold).

Have students investigate what happens when the body becomes too cold or hot. Students may also investigate technologies which help regulate temperature, such as space blankets or ice vests.

Knots

Learn to tie various knots and how and why they are used. Use this activity to teach children about the physics of knots – for example, why some knots slip when they are pulled and others tighten when pulled. You can also use this for a starting point to teach some topology.

Pulley investigation



Make pulleys in class using empty thread spools and long objects such as skewers or knitting needles. Thread the skewers through the spools and then balance them between two high objects (e.g. chairs) so they are off the ground.

Children can attach various objects to string and compare pulling them without a pulley and with one. Having one pulley changes the pulling direction so that you are pulling down with gravity, which makes pulling easier. Try rigging up a system with more than one pulley. It should be even easier. Have students take note of how much farther they have to pull to lift it now.

Image: Rescate Mineros

Image: Flickr mikebaird