

The background of the entire page is a deep blue. In the lower-left quadrant, there is a bright, glowing point from which hundreds of thin, white and light-blue lines radiate outwards, resembling a starburst or a bundle of fiber optic cables. These lines extend across the lower half of the page, creating a sense of dynamic energy and light.

Playing with **LIGHT**

EXHIBITION GUIDE

scitech

Perth • Australia



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Introduction

LIGHT is fundamental to our every day lives. With so many applications from the apparent simplicity of vision, the beauty of rainbows or paintings, to the high tech world of fibre optic communication, holographic security and laser surgery, light provides the basis for much of our technology and our view of the world.

PLAY is a means to ignite the imagination for people of all ages. Open ended and without instruction, it offers the opportunity for exploration and creativity, but most importantly, it enables learning through experimentation, a key tenant of the scientific process.

In drawing together PLAY and LIGHT, Scitech has created an exhibition experience like no other. Using basic physics principles, innovative interactive experiences and a sense of fun, *Playing With Light* offers the opportunity to explore our world and how it is illuminated through 21 exhibits with a multitude of outcomes.

Audience appeal

The exhibition has been designed around a number of key, immersive experiences for people of all ages. The incorporation of play in both the exhibition title and the exhibits themselves provides the feeling that the exhibition is not a typical museum installation, but providing something quite unusual for visitors.

The key target market is children aged between five and twelve years old and their families. The capacity for interaction between family members at many of the exhibits is high; resulting in wonderful opportunities for parents and carers to participate in their children's learning and play experiences while in the exhibition.

Physics, and in particular optics, is a subject that is difficult to demonstrate in the classroom without specialist equipment. This exhibition provides the opportunity to engage both primary and secondary school students. The subject material has very close links to the science curriculum, providing high quality teaching and learning opportunities outside the classroom for visiting groups.

In addition, the attractiveness and highly creative nature of the exhibition provide an opportunity to engage adults of all ages with science and technology.

Given the intriguing nature and all pervasiveness of the subject material, significant opportunities exist to engage with the media and potential sponsors to assist promotion of the exhibition.





The exhibition

The exhibition consists of 21 interactive science exhibits and includes the entry tunnel and supporting walls, lighting and other equipment plus three information kiosks. The exhibition is modular and has been built to fit into a space between 400 and 500 square metres, depending upon available floor area.

All exhibits have been constructed with accompanying in-built backlit graphic interpretive panels. These panels provide suggestions on how to interact with the exhibit, explorations of the scientific principles underlying the exhibit and applications of the exhibit phenomena in the real world that visitors may be familiar with to highlight the role light plays in their life, not just in an exhibition situation.

Key messages

1. Light plays a vital role in our daily lives

Our vision relies on light and the optics of the eye. Rainbows and sunsets are beautiful examples of light phenomena in nature, while practical applications include mirrors, lenses, cameras, telescopes and microscopes. Combined with engineering and other scientific fields, optics has led to the development of lasers, holography, fibre optics and more. Through its use in a range of applications, such as medicine, communications and security, light provides great benefits to society.

2. Science helps us to describe and explain the behaviour of light and to discover even more about the world around us

Science helps us to describe and explain natural light phenomena, such as reflection, refraction and absorption, to make sense of the world around us. Ongoing scientific research has led to the progressively deeper understanding of the nature of light and driven the development of ever more sophisticated technology in optics and other scientific fields.

3. Play and experimentation are important for learning

Albert Einstein said that "Play is the highest form of research". Play leads to the development of skills in observation, experimentation and the testing of ideas. The range of open ended, interactive exhibits provides opportunities for visitors to ask questions, investigate and draw conclusions from their own experiments, encouraging and enabling them to improve their own scientific literacy.

Exhibit descriptions



◀ Entry

Visitors enter the exhibition through an interactive tunnel containing over 20,000 LEDs that switch on and off in response to a visitor's movements.

▼ Laser dodge

Visitors are challenged to reach their next destination without activating an alarm by successfully dodging a series of laser beams that are blocking their path. This whole-body, multi-user exhibit demonstrates the properties of laser light and highlights its use in security applications.

Science Links: Lasers, security engineering.



➤ Sticky light

Multiple users can observe and creatively interact with a beam of light as it traces the edge of surfaces placed on the table, such as shapes or even the hands of the user. This exhibit showcases the use of lasers for applications such as industrial welding.

Science Links: Lasers, computer technology, industry.

▼ Kaleidoscope

The kaleidoscope exhibit takes visitors into a world of many reflections. A triangle arrangement of three large mirrors produces multiple images of the one or more visitors standing inside. This exhibit gives insight into the workings of a toy kaleidoscope.

Science Links: Optics, materials science (reflectivity).



Exhibit descriptions



◀ Bendy mirror

Visitors can make themselves shorter, taller, thinner, wider, and more with our adjustable bendy mirror. This multi-user exhibit allows people to explore how the shape of the mirror affects the size and orientation of the image they see. The exhibit highlights the use of adaptive optics technology in astronomy and other applications.

Science Links: Optics, materials science, engineering.

✔ Computer vision

Visitors observing their own shadow on a screen will see their shadow come to life! This multi-user exhibit showcases impressive computer vision technology, providing visitors with a full body, creative interactive experience. Graphics highlight the use of computer vision in surveillance and medical applications.

Science Links: Computer technology, experimentation.



➤ Make a telescope

Visitors build a simple telescope and use it to see tiny pictures and messages on the other side of the exhibition. By varying the lenses used and the distance between them they can alter the magnifying power of the telescope and learn more about how telescopes work.

Science Links: Optics, astronomy.



◀ Light lab

This multi-user exhibit allows visitors to experiment freely with a range of optical components such as lenses, mirrors and prisms using a central array of white and coloured light beams. This exhibit reinforces concepts explored by other exhibits and encourages deeper experimentation. Graphics highlight the importance of scientific research in light and other fields.

Science Links: Optics, colour, experimentation.

Exhibit descriptions



◀ Change your view

The lens and filter effects wheel demonstrates how optical components can change the way we see our world. Visitors can rotate one of two large wheels to select a lens, filter or combination to peer through and explore its effect on light.

Science Links: Optics, experimentation.

➤ Colour shadows

Multiple users can stand, wave, jump or dance in front of a large screen and observe their 'coloured shadows'. This exhibit demonstrates that three primary colours can be combined to give white light and reveals what happens when one or more of these colours are blocked.

Science Links: Light spectrum, experimentation.



➤ Colour mixing

Visitors can manipulate a red, green and blue light source to produce colourful overlapping patterns and explore primary colour mixing. Graphics explain the difference between different types of colour mixing and highlight applications of each.

Science Links: Light spectrum, technology, experimentation.



✓ Paint with infrared

This high-tech exhibit allows visitors to draw on a screen using a virtual paint brush and paint bucket. This multi-user exhibit offers a creative, colourful experience and demonstrates infrared detection technology in action. Graphics explain infrared light and highlight a range of applications.

Science Links: Light spectrum, technology, experimentation.



Exhibit descriptions



◀ See with a spectroscope

Visitors can use a spectroscope to examine a number of different light sources and discover the differences in their spectra. Graphics highlight different types of spectra and applications of spectroscopy.

Science Links: Light spectrum, technology.

➤ Colour changes

This exhibit demonstrates that the way objects look depends on the light that is shining on them. Visitors peer through a viewing window and rotate the container to select objects to view. They can then select various colours of illumination, including UV light, to use to examine the objects. The exhibit explores colour absorption and reflection.

Science Links: Light spectrum, colour perception, materials science.



➤ Guiding light

Visitors can make light bounce down a stream of water, demonstrating total internal reflection. Depending on the curvature of the stream of water, which the user can vary, light will either partially escape or be completely trapped.

Science Links: Optics, Lasers, experimentation.

➤ Light investigation

Visitors manipulate laser beams to explore the behaviour of light as it travels from one material to another. The exhibit allows users to investigate various properties of light, such as reflection, refraction and total internal reflection of light.

Science Links: Optics, Lasers, experimentation.

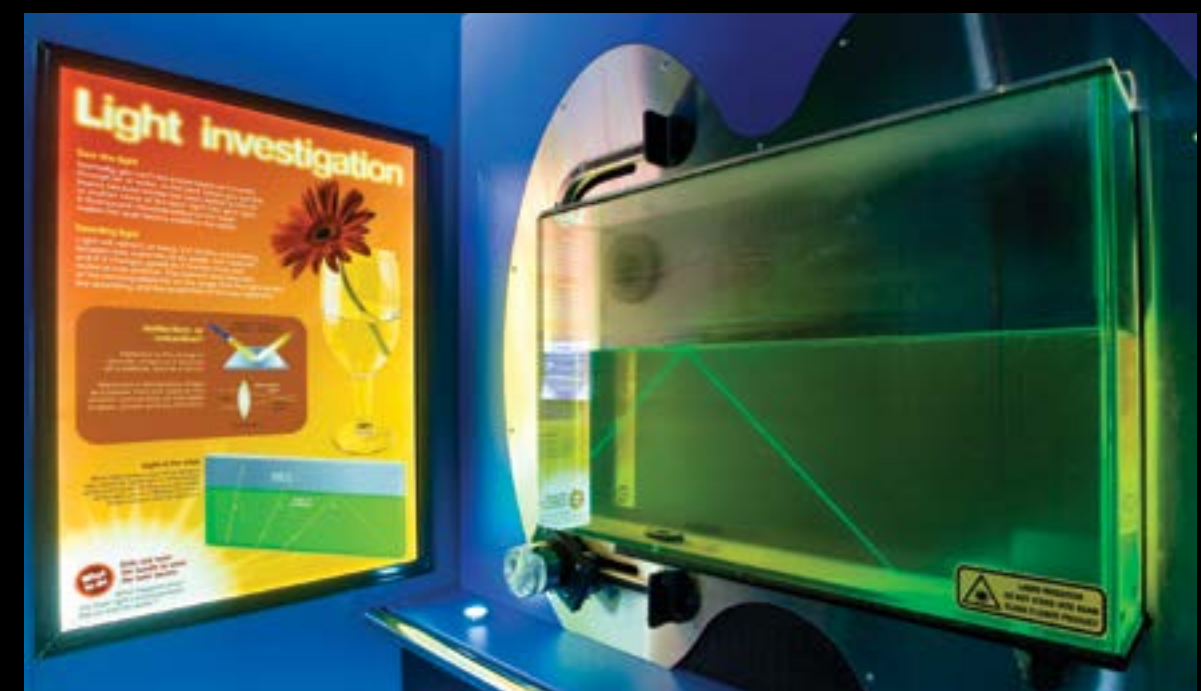


Exhibit descriptions



◀ Fibre optic transmission

This exhibit allows visitors to look through an optical fibre cable and see an image, such as the room around them or their own hand. The optical fibres inside the cable are spread out and displayed for the visitors to see as they experiment. This demonstrates fibre optic transmission of data.

Science Links: Technology, optics.

▼ Freeze your shadow

Visitors stand, wave, jump, dance in front of a screen and experience a flash of light. Their shadows appear frozen on the screen behind them before slowly fading away. This multi-user, full body exhibit allows people to explore phosphorescence. Visitors can also draw on the screen using a UV wand.

Science Links: Phosphorescence, light spectrum, experimentation.



◀ See in slow motion

Visitors use a strobe light to examine a piece of machinery with components moving at high speed. By varying the frequency of the flashes of light from the strobe they can make some of the components appear to slow, stop or even move backwards. The exhibit highlights the use of strobe lights in industrial applications.

Science Links: Optics, industry, technology.

▼ Hologram

Holograms are photographic images that appear to be 3-dimensional when viewed under illumination. Visitors can investigate the appearance of two holograms as they view them from different positions and even peer through them. Graphics highlight a range of holographic applications.

Science Links: Optics, technology.



Exhibit descriptions



◀ Concave reflections

Visitors will be amazed with this exhibit that uses reflection to allow them to 'shake their own hand'. As they reach into a large black dome, a 'spooky' inverted image of their hand appears to reach right out back at them. Visitors can investigate the different images formed at different positions within the dome. The exhibit allows people to explore the range of images that can be produced by a concave mirror.

Science Links: Optics, technology, experimentation.



➤ Polarised light

Visitors can explore what happens when polarised light passes through a variety of objects followed by a polarising filter. They can rotate the polarising filter and objects and investigate the effect on the colours and patterns seen. Graphics highlight applications of polarised materials.

Science Links: Optics, technology, experimentation.

➤ Information kiosks

Three touch screen kiosks provide additional information and in depth exploration of three key areas of the science of optics:

LIGHT: What is light? How does visible light enable us to see things? Explore the properties of light we can see and the types of light we can't see, such as infrared and UV.

COLOUR: How do we perceive colour? Explore the difference between colour mixing with light and colour mixing with paint, highlighting applications of both in our daily lives.

LASERS: What is a laser? How do they work? And where are they used around me in everyday life?

✓ Time-lapse

Visitors will 'play with light' on their own photo, as they wave a bright white LED wand to draw light patterns on their image. The image can then be emailed home and shared on social media to share the exhibition experience with friends.





Educational resources

Playing with Light is accompanied by a School and Visitor guide to assist teachers and family groups visiting the exhibition.

The exhibition covers the following areas of science:

- Physics
- Optics
- Technology

Scitech will provide each venue with a sample program to run with visiting schools. Venues are free to use and modify this material to suit the curriculum in their area or the target audience, providing due acknowledgement is made to Scitech.

Marketing

Playing with Light has been designed specifically for children aged between 5 and 12 years old although the subject material and exhibit content will have broad appeal for both younger and older audiences.

Scitech will provide the following marketing materials to help each venue promote the exhibition:

- Exhibition photos and videos (where available)
- Exhibition logos
- Examples of advertising and promotional artwork

Playing with Light will tour to other venues free of any specific sponsorship agreements, enabling host venues to link with a wide range of sponsors for the local market.

Touring arrangements

The host venue will need to supply the following:

- 400-500 square metres unencumbered floor space, preferably with no natural light
- Given the subject material, the exhibition will be most effective in a space with no or minimal natural light
- Minimum ceiling height of 2.7metres, optimal height 4metres
- Entry and exit points measuring at least 2.7metres x 2.7metres for movement of exhibits into and out of the building
- A licensed electrician to assist with the exhibition installation
- Replacement of exhibit consumables as required
- 24 hour physical and or electronic security of the exhibition
- Appropriate storage for parts and crating
- Any special requirements (scaffolding, forklifts, trolleys, etc.) as specified in the contract as necessary to install and remove the exhibition.

Power and air

- All exhibits are powered by standard 240v electricity supply and are designed to accept power from the ceiling or the floor
- Some exhibits require 24 hour power to prevent damage to the projectors
- A licensed electrician will need to be supplied by the host venue to assist with the exhibition installation
- The exhibition is completely self-contained, but if auxiliary compressed air can be made available, exhibit operation will be optimized

Negotiations with individual venues will be held to determine the appropriate fee structure.

Exhibition and visitor service staff will be given a full briefing on exhibit operation and maintenance by Scitech staff as the exhibition is being installed in your venue. The exhibition does require some simple maintenance, that needs to be carried out on a daily basis. A full list will be provided in the exhibition manual.

Scitech will provide:

- 21 exhibits, 3 information kiosks
- Freight of the exhibition to the host venue
- Transit insurance
- An exhibition supervisor to coordinate the installation and dismantling of the exhibition
- An exhibition installation team to install and remove the exhibits
- Replacement parts through normal wear and tear



Contact details

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Information contained in this guide was correct at the time of printing.

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