

Ingenious! Edutainment via Interactive Multimedia

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“No one knows exactly who ‘HQ’ is. Some say he’s an astronaut who changed his life after seeing the Earth from space. Others say he invented a time machine, and saw how bad the future would be if we didn’t take better care of the Earth. That’s why he set up the *Ingenious!* organisation, with teams in every part of the world. Most I-teams consist of three members, but in Australia the team is one short. That’s why you’ve been invited to join.”

This is the opening scene of a CD-ROM produced by Questacon, Australia’s National Science and Technology Centre, the Australian Broadcasting Corporation and Radiant Productions. *Ingenious!* features a roving mobile science team, consisting of the player and two other members of the Australian I-Team.

The CD-ROM contains five interactive detective missions, each with an emphasis on applied science – using systematic thinking to tackle the following Australian science challenges:

- ◆ In the Northern Territory, we are trying to save one of our most endangered species, a small wallaby called the Mala. Can we do it?
- ◆ Millions of small dead pilchards are being washed up on the beaches of southern Australia. What is the cause? Will it threaten one of our most important fishing industries?
- ◆ It is time to develop Australia’s entry in the World Solar Car Challenge! Can you design and race a car, powered only by the sun, from Darwin to Adelaide?
- ◆ The town of Dwellingup in Western Australia is being threatened by bushfires. Can the *Ingenious!* Team use science to overcome this danger?
- ◆ The Parkes Radio Telescope in New South Wales is your base as you search the universe for signs of extra terrestrial intelligence. Will your mission succeed?

Each mission is set within the context of a real world problem. The mysterious 'HQ' sets the brief, but how you get there is up to you and your team. Using audio, and a device called a 'mindmap', your fellow I-Team members argue the merits of particular courses of action. The final decision is yours. You can explore their arguments in more detail by clicking on icons that appear on the mindmap as they make their cases. Whichever action you choose, there will be consequences (sometimes decisions made for good reasons don't work out). Sometimes you will have to retrace your steps. Many of the missions include actual false steps made by the real-life researchers. During each mission, players can collect infocards to help inform the decisions they need to take. As each mission is completed, players can print out certificates to acknowledge their efforts; find out about the real story and the scientists behind the real story; look up a file of useful contacts for following up each mission; and file a report recommending future action.

Ingenious! is optimised for players aged eight to 14, but both older and younger audiences will also find it engaging. The title has been designed to work at several levels. Its extensive use of audio and video makes it accessible to players without developed reading skills, yet its underlying sophistication and deep vein of richer content rewards even adult players.

Creating greater awareness of science

The aim of the project was to create a greater awareness of the process of science and its limits. How do scientists come to know what they say they



The cover of the CD-ROM *Ingenious!*

know? The results of science frequently call for changes in the way society should do things. Often the called-for changes have economic or personal consequences for large numbers people. It should be no surprise that scientific findings often trigger political debate, but too often in such debates each side claims its case is backed by 'science'. But what is science? In a healthy modern democracy the public need to have an understanding of what science is, and what it is not.

Ingenious! was designed to give its users greater insight into the strengths and weaknesses of the scientific method. It allows players to participate in the process by which scientists go about their problem solving. How do scientists find ways to test competing explanations? The missions featured in *Ingenious!*

are based upon real and contemporary Australian science problems. Few of the stories end with a clear-cut result. More often, players will have accumulated a body of evidence upon which they are asked to make recommendations for future action.

Promoting science and technology learning outcomes

As an example, the 'Racing on the Sun' challenge involves the player in building a solar car from the wheels up, selecting from a range of different shapes, materials, solar cells, motor system, storage batteries and even paint finish! This has to be accomplished within a budget – it is not possible to select the most expensive option from each range – therefore the player needs to balance price and performance in selecting options.

Once the car has been assembled, the player can race it from Darwin in the north of Australia to Adelaide in the south – a distance of 3000 km – using power from the sun. As a full simulation, this challenge can be played again and again as the player experiments with different shapes, materials, solar cells, motor system and storage batteries. In this way, the performance of different designs can be compared in coping with variables such as clouds and hills along the way.



The interactive workshop screen that enables the user to "build" a solar car.

The 'Racing on the Sun' challenge was developed to assist schools in achieving particular outcomes in science and technology curricula.

Optimising educational impact

The project involved a large team of scientists, educators and media specialists. Questacon provided the oversight of the educational content development, working with key organisations such as the Australian Science Teachers Association (ASTA) and the Australian National University's Centre for Public Awareness of Science (CPAS).

As each component of the title was developed, Questacon conducted focus group testing with school children in the target age group as well as with younger children and adults in family settings. This helped to ensure that both the content and functionality of each experience was well suited to its intended audience.

Included with *Ingenious!* is a set of educational resources, enabling teachers to gain direct access to all of the information within each mission, plus comprehensive and classroom-ready notes prepared by the Australian Science Teachers Association. The collaboration with ASTA ensured that this multimedia title would meet the needs of primary and secondary classroom teachers in formal learning environments. Similar collaboration with the Australian National University's Centre for Public Awareness of Science ensured that the *Ingenious!* experience would work well in informal learning environments.

Two copies of *Ingenious!* were distributed free to every school and public library in Australia, as part of the Commonwealth Government's 'Australia on CD' Program. *Ingenious!* was recognised as the winner of the Australian Teachers of Media Award for 'Best Educational Title' as well as the winner of the AIMIA Award for 'Best Entertainment Title' – demonstrating a successful blending of learning and entertainment to create edutainment!

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