

ABERTAY

25

YEARS

Abertay 25

**Education
in Industry**

**An Abertay 25
Research Project**

**With thanks to
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these packs.**



Introduction

We will:

- Use evidence to explore the unique relationship between Dundee College of Technology and Rautomead Ltd.
- Discover what Rautomead Ltd and Dundee College of Technology are and how they're connected to Abertay University.
- Answer questions using first-hand evidence and create our own questions for further research.
- Present our findings in a creative way to an audience of our choice.

Topics of interest:

Mechanical engineering; properties of metals used in engineering; vocational studies; benefits of hands on experience; mapping routes/geography; currency looking into the weight and value of gold and other metals; looking at value in people, expertise, partnerships and money.

Learning outcomes:

I know what Dundee College of Technology and Rautomead Ltd are and why they are significant to Dundee's history.

I have used evidence to discover a story around a topic of my and my group's interest.

I have understood a timeline and answered questions as well as created some of my own.

I have used primary and secondary resources to explore answers to my, and my group's, questions.

I have used my, and my group's, research to build a narrative and used the creativity and skills in the group to present this narrative to a chosen audience.



Teacher's notes — a longer overview of the Education in Industry story can be found [here](#)

Abertay University has a tremendous history of working with industry. For an educational institution which has always taken pride in its innovative teaching of practical technologies, relationships with industries have created a wealth of mutually beneficial projects.

In this pack, we will focus on the relationship between Rautomead Ltd. and Dundee College of Technology (later known as Dundee Institute of Technology and finally as Abertay University).

As you research this wonderful story, you will discover some fascinating events. From the development of training courses for overseas buyers of large machinery, to royal visits and a secret delivery of 92kg of solid gold ingots.

I expect this project to support me to:

reflect on my strengths and skills to help me make informed choices when planning my next steps

learn about where to find help and resources to inform choices

communicate, collaborate and build relationships

explore and evaluate different types of sources and evidence

develop my understanding of the history, heritage and culture of Scotland, and an appreciation of my local and national heritage within the world

broaden my understanding of the world by learning about human activities and achievements in the past and present

establish firm foundations for lifelong learning and for further specialised study and careers

recognise and nurture my creative and aesthetic talents



Feeding 400 oz fine gold ingots, Abertay University Archives

Teacher's Notes

- How to Use This Pack

To recap on the 3-stage project, [watch our video on Enquiry Learning](#) from the Welcome pack

This project aims to encourage the group to engage in discussions based around the evidence provided. The more they discuss, the more topics of interest they might come across. For example, they might become interested in how 92kg of gold was safely transported from the Royal Mint in Wales to Dundee College of Technology, or they might be interested in the properties of gold and why the demonstration held at the college was so innovative.

This pack provides ideas to help you take a group through a research project by questioning and discussing evidence in archive documents. We have highlighted some questions you might ask to get the discussion started. However, the aim is for the group to take the lead, and for you to be helping it achieve its goals. This can take time, so encourage them to make suggestions and ask questions, and see if they can discover their answers in the given resources. If they cannot, they can keep a note of those questions for further research. Over time they will use their research to find their own direction and build a story that they will tell in a presentation that they design and develop themselves.

Contact archives@abertay.ac.uk for more information, or for extra resources.


Preparing for Stage 1— teacher's notes

Each document in this stage has a suggested activity (or two!) to help your groups with their discussions. The purpose of this stage is for the groups to identify the story the documents tell, and find a topic, a person, place or a theme to focus on for their further research. In their discussions they will identify more questions to research, and take individual responsibility for tasks preparing for stage 2.

Stage 1 - Find your Focus

As the groups work their way through the documents, they'll come across the "main characters" of their research.

Before they start, ask each group to draw two large outlines of a building on a piece of paper. As the groups discover more about the people, places or events they're researching, they will add the information to the outline, constantly building on their research and discovering areas of interest.



Outside the line: write about the people you come across who are linked to either Dundee College of Technology or Rautomead Ltd. Circle the names of people you think might need further investigation.

Inside the line: write everything you discover about the sites. When were they built? What is their purpose? Do they still run? Have there been any changes in name or management? Where are they located?

Meet your main characters

- Main Character #1

COLLEGE - INDUSTRY LIAISON PROJECT
(sponsored by the Scottish Education Department)

'MORE PARTNERSHIP - MORE PROFIT'

CASE STUDY - "PARTNERSHIP BETWEEN DUNDEE COLLEGE OF TECHNOLOGY
AND RAUTOMEAD COMPANY LIMITED"

by Dr R W Johnson, Head of Department of Mechanical Engineering,
Dundee College of Technology

on 11 November 1987 at 2.00 pm at Paisley College of Technology

Close up
of paper by Dr R W
Johnson: Partnership
between Dundee
College of Technology
and Rautomead
Company Limited.
Abertay University
Archives

Discover your main character

What is their name?

What is their occupation?

Where do they work?

How is this placed linked to Abertay University?

What do you think they are doing?

Why do you think they need to wear protective equipment?

What is written on the machine?

What do you think the machine does?

What do you think is coming out of the machine?



Dr R W Johnson checking cooling system, Abertay University Archives

Golden Document -

Scottish Training Conference on 'Training for Scotland's Future', 17th June 1987, Abertay University Archives


This presentation is concerned with a partnership, which continues to develop, between Rautomead Company Limited, a Dundee-based small engineering company, and Dundee College of Technology, a Scottish Central Institution. It will discuss the formal and informal links which now exist between the two partners, and, very briefly, describe some of the engineering activities undertaken by the partners. Finally, some consideration will be given to the benefits of the partnership to the staff and students of Dundee College of Technology and to the company.

1. INTRODUCTION

1.1 Rautomead Company Limited

Endeavouring to innovate in any sector of industry - particularly one with long-established techniques - can often prove a risky business. This proved to be the case for Rautomead Ltd, after the firm was first established in 1978 by joint managing directors Sir Michael Nairn and Mr Sandy Cochrane. The company was formed to develop technology in the area of one of the oldest industrial processes in the world, non-ferrous metal casting. The technology in which Rautomead were to specialise was continuous casting, in itself not a new technique, but one which Rautomead have developed substantially. But as the company set out to "break the casting mould", so to speak, the engineering industry in Britain, particularly the non-ferrous sector, began to feel the chill of recession. Rautomead caught the chill as well and the company lost money in each of its first three years. Rather than quit, however, Sir Michael, Sandy Cochrane and their team at Rautomead decided to look outwith the UK for customers, and to the establishment of closer links with staff in the department of mechanical engineering at Dundee College of Technology.

This was to prove the turning point in the company's fortunes.



Read this golden document, then use the activities on the next page to explore further

Activities - 10 minutes

- Find 5 facts—You have 2 minutes to find 5 facts in the document! Write them on a piece of paper, or project jotter.
- What is a recession and how does it effect businesses?
- What do you think were the benefits for Rautomead Ltd working with Dundee College of Technology?
- What kind of engineering is Rautomead involved in?

Tip! When using documents that are very text heavy, break them down into smaller sections and split the work between members of the group, each looking at a much smaller part of a larger paper. This will give them practise in independent learning before providing an opportunity for group discussion and feedback.

You might not find all the answers to your questions from this snippet of a larger document. Contact archives@abertay.ac.uk for more information and access to the full paper!

Golden Document -

Breaking the Casting Mould, Report on the Innovation Centre, June 1988. Abertay University Archives

Below: 92kg of 22 carat gold strip created during a demonstration of the Royal Mint of Wales at Dundee College of Technology, c. 1983. Abertay University Archives

BREAKING THE CASTING MOULD

Mutual co-operation between academic institutions and industry is proving a realistic means of putting innovation into the market place with benefits to both parties.

An example is a unique relationship which has developed between a metallurgical engineering company, Rautomead Ltd of Dundee and the Department of Mechanical and Industrial Engineering at Dundee College of Technology.

Rautomead specialises in the design and construction of continuous casting machines and has supplied such a machine to the College. Here it is used for research and teaching purposes and for co-operative technical work. The company offers customers a training course in the maintenance and operation of its machines and uses the College's facilities as a supplement to the course.

The siting of a small continuous casting machine at the College provided Rautomead with additional opportunities to demonstrate the equipment to potential customers.

The Rautomead continuous casting machine is a reliable, economic and efficient means of production of semi-finished rods, sections, flats and hollow bars in a wide range of non-ferrous alloys. The machine can be fed with scrap, ingot, virgin metals or a combination of these either in solid form or as molten metal from a separate pre-melting furnace. The metal containment sys-

Applications of the process are diverse. Smaller machines are used in the precious metals industry for production of gold and silver strip used in the manufacture of jewellery, bullion coins and electronics components. Here, the requirement may be for only

Rautomead and its customers are not the only people to benefit from the training school. Staff and students at Dundee College of Technology have found that the use of Rautomead's prototype industrial plant has led to improved integration in the teaching of courses, particularly for the subject of materials, manufacturing processes, design and economics. They have found that consider-

By establishing a link between Rautomead Ltd and the Dundee College of Technology by the siting of the continuous casting machine and training school at the College both parties have been able to enjoy an extended range of facilities. The company has been able to offer its customers a course on its machines, as well as using the training school as a show place for its technology to potential customers. The College has been able to give its students invaluable experience solving real engineering problems and has enjoyed joint research and development programmes with Rautomead.



1. Why did Rautomead Ltd develop a relationship with Dundee College of Technology?
2. What is continuous casting and what was so innovative about Rautomead Ltd's machines with Dundee College of Technology researchers?
3. How do you think working with the College helped Rautomead Ltd overcome the recession?
4. What do you think was the purpose of the demonstrations offered at the college?
5. What do you think the Royal Mint used the gold strip for?
6. What do you think are the benefits of making a machine that uses up scrap bits of metals?

More images
can be
requested
from [archives@
abertay.ac.uk](mailto:archives@abertay.ac.uk)



Left: Metal Casting on a small scale, Royal Mint demonstration, Dundee College of Technology, c. 1983 Abertay University Archives

Right: Perth Mint, Australia. Gold Strip scrap. Abertay University Archives.



Discuss! 5 minutes

1. What do you think was so remarkable about the Royal Mint demonstration?
2. How do you think staff and students reacted to the armed guarded delivery?
3. How secret do you think this delivery was? Who do you think knew about it?
4. How do you think the gold strip would be used to create coins?

STAGE 2

FURTHER RESEARCH

Teacher's Notes

Where the group's further research takes them depends entirely on them. At this point, the group has curiosity. Some of the questions raised at the end of Stage 1 will not be answered by the documents in the pack, so where does the group need to look to find the answers? First of all, they need to decide which questions they want to answer—they need to discuss and decide on the direction they want their further research to go in. What is it they want to discover and why?

Contact archives@abertay.ac.uk when you know the topic your groups want to explore further. We can send larger copies of the documents from this pack as well as help you discover more sources of information! The last page in this pack lists further sources of information.

EXAMPLES OF FURTHER RESEARCH TOPICS

The group might be interested in looking at a road map from the early 1980s and mapping out the safest/quickest route from Royal Mint, Wales to Dundee College of Technology. They might want to imagine the security issues and need for armed guards for this. They will cover subjects such as geography and maths by looking at distances etc on a map but may also look into the properties of gold and why it is a precious metal. An output for this could be a Stop Motion Animation, a computer game design, or even a children's activity where the van needs to follow the correct line to get to its destination.

Another topic of interest may be the uses of continuous casting and exploring how it is used as a starting point for almost every production of metal items from jewellery to cars and trainlines. They could look into how students were given research projects to create new objects using continuous casting, and how this helped to develop and upgrade the machines sold all over the world. This research might take them into discovering more about business, mechanical engineering as well as production costs and processes.

[Click here for an example of what a further research topic could look like.](#)

Factory extension for Dundee firm

DUNDEE-based Rautomead, who manufacture continuous casting machinery, have extended their factory to include an in-house foundry operation which will enable them to demonstrate their equipment to potential customers.

It will also be used as an aid to technical development, working in tandem with existing research projects at Dundee College of Technology where a Rautomead machine was installed last year.

The company currently design, manufacture and market continuous casting systems to process a wide range of copper-based alloys for the non-ferrous metal industry.

The new production plant will concentrate on more

exotic and unusual materials such as aluminium bronzes which are regarded as relatively difficult to manufacture but have excellent properties in terms of tensile strength and corrosion resistance.

These alloys are used for high-duty fasteners, pump impellers, valve spindles, pump rodding and in marine applications.

Other metals will include free machining coppers for welding nozzles and gas fittings, silicon bronzes for welding, copper and silver based alloys and special bronzes.

Three extra machine operators have been recruited bringing total employment at the Dundee factory to 12 and further jobs are expected to result from an extensive UK and overseas selling programme which is about to get underway.

Left: Aberdeen Press and Journal, 21 March 1984. Copyright DC Thomson & Co. Ltd.



Above: Gifts created by students at DIT c. 1990s. Abertay University Archives.

You are always welcome to contact archives@abertay.ac.uk for further information or to ask for help with your project from a member of the archive team. We can help further focus and develop your group's research.

STAGE 3

PRESENTATIONS

Teacher's Notes

The group will need to decide on a few things before getting started on their presentations. We want them to be as creative as possible, using the skills of those found within the group. Is there a confident speaker? A musician? Someone who enjoys arts and crafts? Encourage the group to discuss the different ways they could present their research to an audience.

On page 16, there are some questions the group could discuss together to help guide them towards a presentation.

What is your topic?

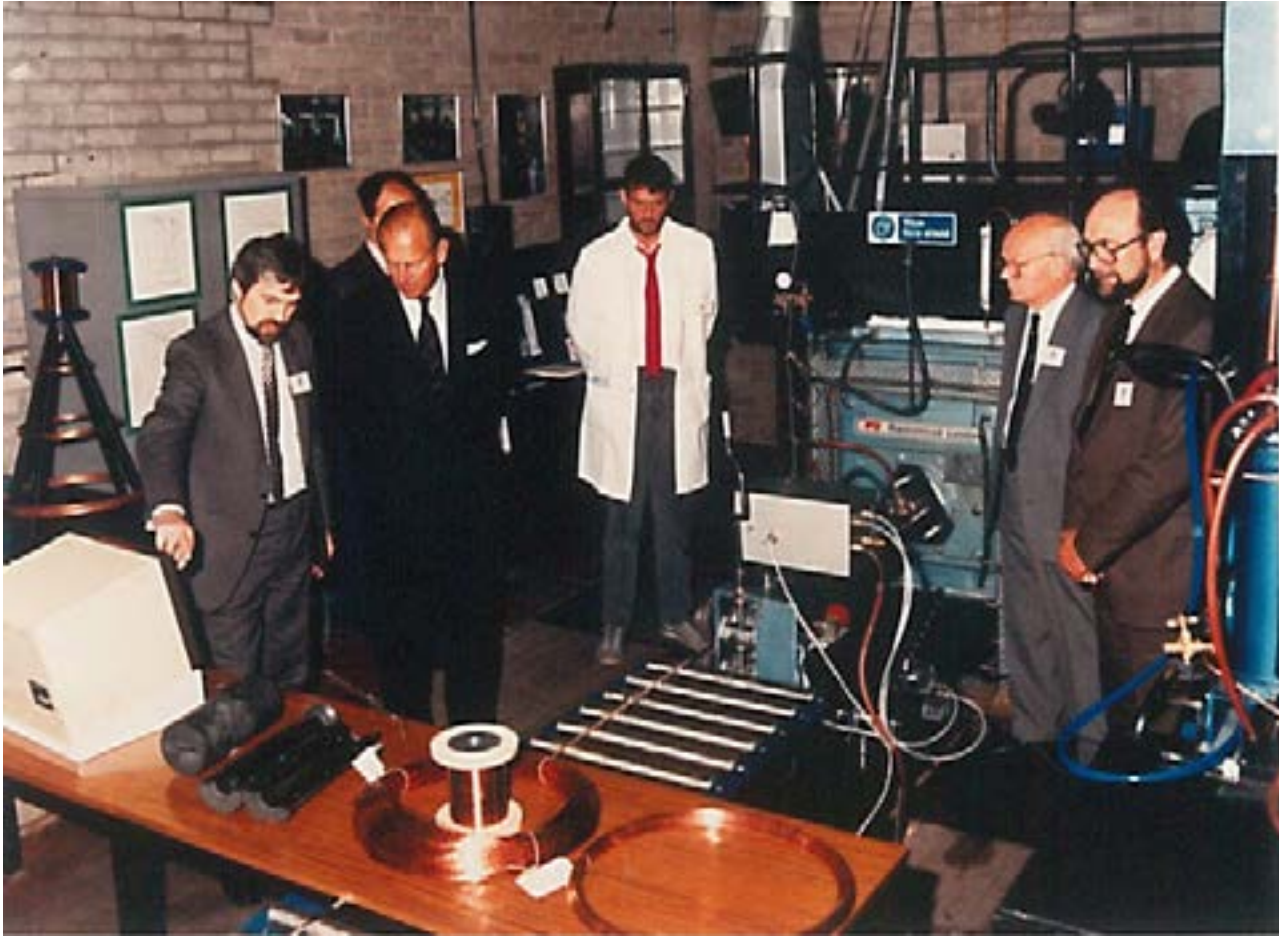
- The group should agree on the topic of the presentation, the story they want to tell, and the message they want to send.
- Their message should be clear, strong and something that they are confident talking about.

Who is your audience?

- How will the group get their message across?
- How will the group's chosen audience benefit from their research?

How will you present your discoveries?

- Now they know what their message is and who their audience is, they can focus on the best way to get that message across—what will make the biggest impact.
- A short story, drama, piece of music, animation, artwork, interactive exhibit – the possibilities are endless!



Royal visit, Dundee Institute of technology
1991. Abertay University Archives.

Create!

Once the groups have decided on their message, audience and presentation style, it's time to create! Each member of the group needs a role either in the design or delivery of the presentation (or both!) Before they start, they should make a plan. How long do they have to create their presentations, what equipment and skills to they have—laptops, art supplies, cameras etc.

Remember to contact archives@Abertay.ac.uk – we might just be able to help!

Most importantly, the group needs to create realistic goals. They should think about time, resources and skills and what they can actually achieve with the resources available to them.

Record!

Whatever the presentation is, we'd love to see it. If you're able to take photographs, video or audio recordings—or even send a file over—please do. It might just end up in our archives! Contact archives@abertay.ac.uk to find out more.

Stage 3

- Presentations Group Worksheet

Work through this sheet to help prepare your group presentation. Discuss each of the questions with your group before making a decision. Think about the skills of each person in the group, for example do you have an artist in your group? Or someone who is a confident speaker? Do you have a musician or someone who is interested in video editing? Use what skills and equipment you have available, but make sure everyone has a role in either the design or delivery of the presentation.

What is your topic or message?

Discuss the main topic of your presentation. Write your topic in 10 words or less. This will help you decide the title of your presentation. Try to summarise the story you want to tell in a paragraph. This can help you plan how it could be divided up into sections / scenes in your presentation.

Who is your audience?

Discuss who you are creating this presentation for. Your school, a nursery, a future employer or customer? It can be a completely made up audience—someone from the future, the past or even an alien!

Why do you think they should listen to your message? How will they benefit?

Your presentation needs a “why”. Think about why your audience needs to hear your research. It might help them change their perspective, or inspire them to make a change.

How will you present your work?

This will depend on the topic/message and audience you have chosen. A younger audience might benefit from storytelling or rhyme, whereas an alien might need a lot of visual cues. Use the skills in your group to decide on the best way to present.

Discuss realistic goals. What can you achieve with the time and resources available to you. Play to each other's strengths – maybe one person is an amazing writer, another a great illustrator and someone else is a fantastic speaker – work together to create something you can all feel confident presenting!

Further Research

There are different sources for your research, including the ones below.

Abertay University Archives archives@abertay.ac.uk

British Newspaper Archive www.britishnewspaperarchive.co.uk/

Dundee City Archives archives@dundeecity.gov.uk

Local History Centre www.leisureandculturedundee.com/library/localhistory

Rautomead Ltd www.rautomead.com

Acknowledgements

Abertay University would like to thank the following organisations for support in the development of these resources. They can also be contacted for further help with research.

Dundee City Archives archives@dundeecity.gov.uk

Local History Centre www.leisureandculturedundee.com/library/localhistory

University of Dundee Archive Services www.dundee.ac.uk/archives

DC Thomson Archives – www.dcthomson.co.uk

While their collections are not normally publicly accessible, an enquiry service is offered but responses may take a few weeks. Historic newspapers can be searched through the British Newspaper Archive, and the Dundee Central Library collections hold modern editions so please use these sources first.

Verdant Works Museum www.verdantworks.co.uk/

Rautomead Ltd www.rautomead.com

Colourful Heritage www.colourfulheritage.com/

We would also like to thank the following people and organisations for direct help in creating this pack

Professor Bob Johnson

Sir Michael Nairn

Congratulations!

Congratulations! You've completed Abertay 25's Education in Industry Pack! Don't forget to fill in your post-project evaluation forms!



We'd love to see your creations, so take photos and recordings and send them to archives@dundee.ac.uk

If you have any feedback from your experience (either as the group taking part or the group leader) please do get in touch.

