"Greig's Pointed Problem" and "Magic in the Wind"
by Bronwen Wall

Watching the Weather
LEVEL 3

Overview

These articles explore the processes involved in planning, designing, and producing a technological solution to a problem. "Greig's Pointed Problem" explains the processes in developing a new umbrella, and "Magic in the Wind" briefly describes some of the technological challenges faced by Len Lye in designing a successful wind wand. Together they provide the basis for a comparison between technology and art.

Curriculum context

TECHNOLOGY

NATURE OF TECHNOLOGY
Characteristics of technology
Achievement objective(s)

L 3: Students will understand how society and environments impact on and are influenced by technology in historical and contemporary contexts and that technological knowledge is validated by successful function.

Characteristics of technological outcomes
Achievement objective(s)

L 3: Students will understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.

TECHNOLOGICAL KNOWLEDGE
Technological modelling
Achievement objective(s)

L 3: Students will understand that different forms of functional modelling are used to inform decision making in the development of technological possibilities and that prototypes can be used to evaluate the fitness of technological outcomes for further development.

Key ideas

- Technology involves people designing and making technological outcomes to meet a need or opportunity.

- A technological outcome can be judged as good or bad by how closely its physical nature relates to its required function.

- Societal and/or environmental issues can influence what people decide to make and how they plan, select resources, and make and test a technological outcome.

- Technological modelling is when a technologist collects evidence that helps them make decisions.

- Technological modelling is an essential part of the process when developing a new technological outcome.

- There are two types of technological modelling:

  – functional modelling: the testing of design ideas

  – prototyping: the testing of an actual outcome in real conditions.

ENGLISH

READING
Ideas
Achievement objective(s)

L3: Students will show a developing understanding of ideas within, across, and beyond texts.

Indicators

- Uses their personal experience and world and literacy knowledge confidently to make meaning from texts.

- Makes meaning of increasingly complex texts by identifying main and subsidiary ideas in them.

- Starts to make connections by thinking about underlying ideas in and between texts.

- Makes and supports inferences from texts with increasing independence.

The Literacy Learning Progressions
The literacy knowledge, skills, and attitudes that students need to draw on by the end of year 6 are described in *The Literacy Learning Progressions*.

The following strategies will support students as they engage with the information and ideas in the text. Once they understand what the article is about ("the story"), they will be able to explore the key technology ideas outlined in the following pages.

The *Connected* series includes a range of texts that provide opportunities for students to locate, evaluate, integrate, and synthesise information and ideas.

It is expected that students will read across the range of texts in this *Connected* to develop their literacy skills and their understanding of the topic.

Text characteristics

- Short narrative texts
- Technical vocabulary
- A diagram that clarifies the text and requires interpretation.

1. FINDING THE INFORMATION IN THE TEXT

These texts give examples of how people were inspired by the weather to invent new products.

"Greig's Pointed Problem" is a more straightforward text to understand. Students are likely to make connections to other examples of people inventing new products or improving on old ones.

"Magic in the Wind" describes how Lye was inspired by the weather to create a work of art, so it's about a less common activity.

PROMPT the students to **MAKE CONNECTIONS** to the inspirations that motivated Greig Brebner and Len Lye.

Think of a product that improves on an earlier version of a similar product (examples might be mobile phones, four-slice compared with two-slice toasters). Why is one better than the other?

Think of a sculpture you've made. What materials did you use? Did you have to "go back to the drawing board" at any stage in its design? Did it turn out the way you'd planned?

Why do you think the writer called this article "Magic in the Wind"?

2. DEALING WITH TECHNICAL VOCABULARY

Both articles contain technical vocabulary, the meanings of which are not directly explained in the text.

After reading the texts, **IDENTIFY** and **LIST** the technical vocabulary. In "Greig's Pointed Problem", this includes "rib", "visualising", "lacquer", "canopy", "tension", "struts", "functional models", "mouldings", "prototype", "concept", and "trialled".

In "Magic in the Wind", this vocabulary includes "tangible", "motion", "sphere", "aluminium", "mounting", "tubing", "adjusted" and "flexible".

Have the students **SORT** this vocabulary according to how they worked out the words' meanings. Categories could include:

- I know this word from another context.
- I can see the meaning from the illustration.
- I predicted this meaning from reading the text.
- I found a clue to this meaning in the text.
- We use this word in technology.
- I found the word in the dictionary.

EXPLORE the meanings of the expressions "back to the basics", "on to something", and "back to the drawing board".

EXPLAIN the non-fiction convention of inserting birth and death dates after the names of famous people.

ASK : *How old was Len Lye when he died? How do you know?*

3. USING DIAGRAMS TO CLARIFY THE TEXT

EXPLAIN that diagrams help to clarify the meaning of the text.

ASK QUESTIONS to support the students to use the diagram and integrate information as they are reading.

Why do you think Greig included double struts in his design? What do the arrows show us about the umbrella's design?

The following activities and suggestions are designed as a guide for supporting students to develop understandings about the importance of design and technological modelling when developing a technological outcome.

Key ideas

- Technology involves people designing and making technological outcomes to meet a need or opportunity.

- A technological outcome can be judged as good or bad by how closely its physical nature relates to its required function.

- Societal and/or environmental issues can influence what people decide to make and how they plan, select resources, and make and test a technological outcome.

- Technological modelling is when a technologist collects evidence that helps them make decisions.

- Technological modelling is an essential part of the process when developing a new technological outcome.

- There are two types of technological modelling:
    - functional modelling: the testing of design ideas
    - prototyping: the testing of an actual outcome in real conditions.

We are reading this article to find out about the kinds of knowledge people need when they design and create technological outcomes that make our lives easier. Write down any questions you think of while reading this article.

Activity 1: *Exploring how societal and environmental issues can influence what people decide to make*

Discuss controversial or unique technological outcomes from history and/or the future (for example, wind farms, car airbags, YikeBike, robots, swallowable camera pills).

Brainstorm the societal issues that might have influenced the development of these outcomes (for example, car airbags: more cars on the roads have led to more accidents) and how these issues needed to be considered throughout the entire development of that technological outcome (for example, design, selection of resources, creation, and technological modelling).

Brainstorm the environmental issues that might have influenced the development of these outcomes (for example, YikeBike: too much transport uses non-renewable fuels) and how these issues needed to be considered throughout the entire development of that technological outcome (for example, design, selection of resources, creation, and technological modelling).

After reading "Greig's Pointed Problem", have a class discussion about the societal and environmental issues that might have influenced Greig's technological outcome (for example, environmental issue: broken umbrellas are non-recyclable rubbish).

How did these societal and environmental issues influence:

- *what Greig wanted to create?*

- *how Greig planned his technological outcome?*

- *how Greig selected his resources and materials?*

- *how Greig built his technological outcome?*

- *how Greig tested his technological outcome?*

Technological outcomes	What are the issues that might have led to the development of this technological outcome?	When does the technologist need to think abut this issue?
Car airbags	More cars on the roads are leading to more accidents.	First design ideas
		Choosing materials
		Testing the airbags (technological modelling)
YikeBike	Most vehicles use non-renewable fuels (e.g. oil = petrol).	First design ideas
		Testing the YikeBike
		Charging the battery
Blunt umbrella		

Activity 2: *Understanding the difference between functional modelling and prototyping*

Identify the technological modelling mentioned in the article, for example:

- visualising designs in his head

- making a model out of kite material

- researching the history of umbrellas

- using CAD (computer-aided/assisted design)

- making functional models

- testing the prototype on One Tree Hill

- testing in a wind tunnel.

Brainstorm what other kind of technological modelling Greig might have done that is not mentioned, for example:

- design drawings

- mock-ups

- patterns

- fabric testing

- consumer surveys.

What were the physical and functional attributes of the Blunt umbrella? Choose two different chairs, hairbrushes, or wallets. Using their physical and functional attributes, explain why you think they are a good or bad design.

Put the different forms of technological modelling in the order of when they might have been done (for example, design drawings would normally be expected before the model out of kite material, but in fact Greig worked on a practical level first). All the modelling done before Greig created his final umbrella (called the prototype) is functional modelling. Functional modelling tests design ideas.

Each form of technological modelling provided Greig with evidence that helped him make decisions while developing his umbrella. Choose a form of technological modelling from above (for example, pattern):
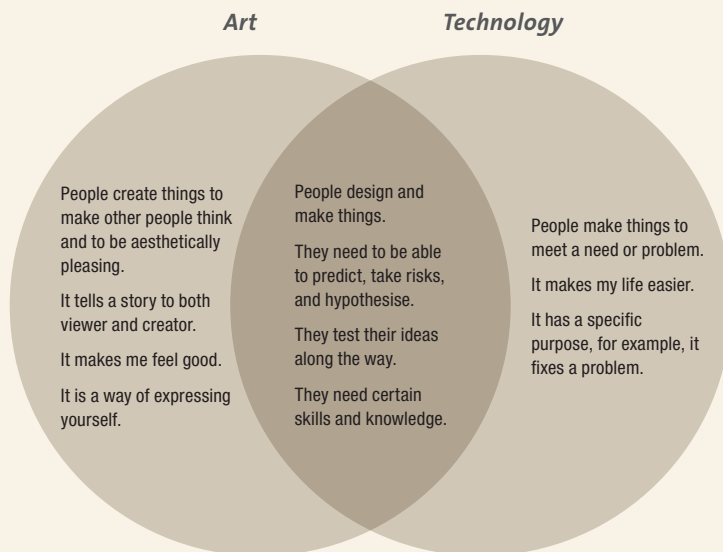
- *What evidence does this technological model provide (for example, size, shape)?*

- *What evidence doesn't this technological model provide (for example, strength, waterproofness)?*

Activity 3: *Technology or art?*

"Magic in the Wind" describes the development of the Len Lye wind wand. Is the wind wand sculpture a technological outcome or a piece of art? As a class, discuss these questions:

- *What is technology? (Technology involves people designing and making technological outcomes for an identified purpose.)*

- *What is art? (Art involves people designing and making artistic outcomes to express their creativity or imagination.)*

- *What is the difference? (They have different purposes.)*

- *What are the similarities? (Both create the "made" world and are human endeavours that require specific skills and imagination.)*

- *When does art become technology (and vice versa)?*

Explore the similarities and differences between art and technology through a Venn diagram.

Art   *Technology*

People create things to make other people think and to be aesthetically pleasing.

It tells a story to both viewer and creator.

It makes me feel good.

It is a way of expressing yourself.

People design and make things.

They need to be able to predict, take risks, and hypothesise.

They test their ideas along the way.

They need certain skills and knowledge.

People make things to meet a need or problem.

It makes my life easier.

It has a specific purpose, for example, it fixes a problem.

- *How did Len use technological modelling to develop his wind wand?*

- *Do you think Len Lye's wind wand is technology or art?*

(Technology and art have many overlapping aspects, including the technological modelling aspects highlighted in this article. Len Lye produced several pieces of commissioned artwork, which were made for a specific environment and represented something significant for that locality. As these were fulfilling a specific purpose, they can be described as technological outcomes.)

MINISTRY OF EDUCATION RESOURCES

- www.techlink.org.nz/curriculum-support/indicators/nature/level3.htm
- www.techlink.org.nz/curriculum-support/indicators/knowledge/level3.htm
- www.techlink.org.nz/curriculum-support/Progression-Diagrams/index.htm
- www.techlink.org.nz/teaching-snapshot/Y07-10-Middle/Curriculum-activities-Selina-Paul.htm

FURTHER RESOURCES

- www.bluntumbrellas.com, especially Blunt-technology/Revolution not evolution and Blunt story/Why we hate umbrellas