

Ingenious

by Katrina Porteous

This resource is based on the [Inventive podcast](#). The podcast mixes engineering fact with fiction. Each podcast features an interview with an engineer. That interview was used as inspiration by a variety of authors and poets to create a piece of fiction.



Image: Tony Griffiths

Katrina Porteous

Katrina Porteous is a poet based in Northumberland. Her poetry is often inspired by scientific topics including the Sun and the solar system.

Katrina has used ideas from Jack's interview and written poetry about collaboration and the future of engineering.

Your Name:

Class:

Teacher:

Katrina Porteous

Katrina Porteous is a poet based in Northumberland. She writes poetry about science and technology, although she doesn't have a qualification in science.

She is keen to explore the ways in which poetry and science are different ways of looking at the world, but how they both help us to know more about it.



Image: Tony Griffiths

To write the poem, Katrina listened to an interview with Jack Haworth, an electrical engineer. She takes the language he uses to describe his work and considers what that says about engineering and engineers. Katrina also did additional research into the technology and ideas that Jack mentions in his interview.

Katrina explains that this poem '**Ingenious**' describes the move from a master-slave relationships between humans and robots towards a relationship which is more about **collaboration**.

Through the poem she explores the concept of control, and what the future holds for engineering.

Towards the end of the poem Katrina reflects on the sinister potential of **artificial intelligence** but, unlike **dystopian** fiction, she balances this with the **optimism** of collaboration.

Vocabulary check	
<p>collaboration <i>noun:</i> working together, often to solve a problem</p>	<p>artificial intelligence <i>noun:</i> computer systems that can do tasks that usually requiring human intelligence to complete</p>
<p>dystopian <i>noun:</i> an imagined society where there is great suffering, often under control of a harsh government or where there has been a terrible disaster</p>	<p>optimism <i>noun:</i> having hope or confidence about the future</p>
<p>Ingenious <i>adjective:</i> <i>(of a person) inventive and original</i> <i>(of a machine or idea) well designed; solves a problem in an interesting and clever way.</i></p>	

Ingenious

When we read a text, we make inferences about it. Inference means to look at the evidence we have and make a prediction about what is going to happen next.

Look at the title of the poem.

We will make some predictions about the poem based on the title.

Think about:

- What does the name suggest?
- What do we know about Katrina? How does this affect your first impressions about the poem?
- Do you think it is the engineers or the machines that are ingenious?
- What questions do you have?
- What do you think the poem is going to be about?



nustem.uk/inventive/#jack

2. Meet the Engineer

Jack Howarth Electrical engineer

“Everything you look at involves engineering.”

Jack did not take a traditional route into engineering. He was studying A-levels in sixth form, but decided that this wasn't for him.

He chose an apprenticeship route into engineering. When he successfully completed his apprenticeship he went on to study for an HNC and HND in Electrical and Electronics engineering. Finally he studied for a degree in Plant engineering.



“My superpower would be hindsight”

Jack talks about the importance of all of the team on engineers, those with a degree and those without. He explains that experience is often more important than the qualifications that an engineer has.

Jack now works at Sellafield developing robots that can complete tasks in places that are too risky for humans to enter. He has developed robots that can work in extreme environments.

The aim is to develop robots that can work on their own independent of human instruction.

When asked what his superpower would be, Jack answered “hindsight”. Katrina takes this superpower and creates a section of her poem to explain why.

Now listen to the podcast which interweaves Jack's interview and Katrina's poetry. You can use the QR code or link to find the podcast.

nustem.uk/inventive/#jack



As you listen, write down some of the **attributes or skills** that Jack says are needed to become an engineer.

3. What makes an engineer?

In the podcast, Jack describes different attributes that are important to be a successful engineer.

Look at the list of attributes below. As a group write a definition for each work and suggest why they would be important for an engineer.

You could use examples from the podcast to support your answers.

Are these attributes just useful for engineering jobs? Explain your answer.

Attribute	Definition	Why needed
Collaborative		
a Communicator		
Creative		
Curious		
Observant		

4. Activity: Textual analysis

Listen to the podcast clip 'Hierarchy of education' and then read this section from Ingenious.

Il Robots at Sellafield

*A team is more than its players, dear,
A machine not mere components,
And the complex springs from the simple things
At unexpected moments.*

vi

Unpredictable, adaptable, fluent, creative, human –

The time has come. Let us speak of collaboration.

Not the model, not the data, not the graduate paper,

Not the Boss with his clean white shirt and his headful of theory

But the Sparkies with their screwdrivers –

They're the ones who know.

Experience. Getting the thing to work

On the site, on its own, in the extreme places

Where the problems are endless and the body cannot enter –

There's your challenge. That's the excitement.

You need to be inventive. We have to work together.

Sparkies: electricians

In this section of the poem Katrina reflects upon Jack's route into engineering and the discussion of what Trevor describes as the 'hierarchy of education'.

Write a short paragraph which answers this question.

What does this section of the poem say about the value of the 'hierarchy of education' within engineering.

Use examples from the text and podcast to support your answer.

5. Activity: Metaphor

Ingenious makes use of metaphor to link the interview with Jack to a much broader understanding of the world.

Ingenious

i

Imagine you have a third eye.

Where will you place it?

Imagine a sense that allows you to suddenly

See in the dark.

Imagine your eyes could unscramble the spectrum

Beyond the peep-hole of their own prison.

Think of your fingers making a fist,

Locking around your phone, its screen;

A stone-age axe at the end of your wrist.

The metaphor of the eye

The third eye is a phrase which often refers to the ability to look beyond ordinary sight. It is often thought to represent a spiritual perception and can refer to looking into the future.

Highlight the sections of the poem that relate to the metaphor of the eye.

What do you think the poet is trying to tell us?

How does this relate to Jack's work with robots at Sellafield?

The stone-age axe

What do you think the poet means by a stone-age axe?

How does this fit with the theme of looking to the past and future

6. Interpret and identify themes

In this activity you will explore how the evolution of robotics is portrayed in in the poem. Read the section of the poem and then answer the questions that follow it.

Ingenious

*There must be some way out of here
With our schemes and dreams and human
Hands-on skills and our teamwork, dear,
And our brave imagination.*

ii

Control Architecture, programmer, tele-operator of the obedient
Semi-autonomous Master-Slave Assembly – what are you
Human? Unpredictable. Fluent,

Adaptable, emotional, creative – often mistaken.

Your charged language sizzles, electric;

The root of your word 'Robotics' stings like a whip –

The time has come to speak of collaboration.

The origin of the word robotics is from the Slavic word for servitude or forced labour; slave.

How does your understanding of the word robotics help your understanding of the poem?

Why is the word “collaboration” surprising but important to end the stanza? How does this help the reader to link to the reference to the ‘third eye’ in the opening line of the poem?

6. Interpret and Identify themes continued

Evolution

The poet uses the continued theme of evolution to describe the journey humans and machines have taken. This is a clever use of language as it suggests that machines will continue to adapt to meet the needs of their environments just as humans have.

Look at the extracts from the poem. Use them to explain the evolution of robots that the poet refers to.

1.

**Think of your fingers making a fist
Locking around your phone, its screen;
A stone-age axe at the end of your wrist.**

2.

**Slowly evolving.
Imagine it moving, independent
Of the soft, warm animal of your body.**

Evolution

noun

1. *the biological process by which species of living organisms change over long time scales.*

2. *the gradual development of something*

3.

**Your charged language sizzles, electric;
The root of your word 'Robotics' stings like a whip**

4.

The time has come to speak of collaboration

5.

**How long has it taken
Nature to craft that complex contraption
To grip and lift a cup to your lips. But you**

**Are engineering your own future. You
And the clever machines.
Can you imagine it? Now,**

Make it come true.

This section of the poem links to artificial intelligence (AI).

IV) AI-IA

iv

You can see it from space –

An ancient planet. Across its scarred surface
Homes, schools, businesses, offices, cities
Flicker, a brain scan – adaptive, emergent,

Highly-distributed networks,
Connecting together a myriad ways,
Generating synergies.

Do they augment us?
Will they replace us?
What will be lost to us in their implacable reasoning?

*For it's Hey, hey, the logic gates
And the streams of information,
And it's three cheers for your bright ideas
And your flashes of inspiration.*

v

The machine in your pocket buzzes.
Already it can recognise your face
But it does not know the answer.

It does not know what it knows,
Or what is at stake –
Your privacy. Your job. Your life. Your species.

AI refers to human-like behaviour that is displayed by a machine. AI is often a theme in science fiction novels. Sometimes the writing is utopian and sometimes dystopian.

Look at stanza v of the poem.

1. Do you think the poet wanted the reader to reflect on the positive or negative possibilities of AI?
2. Which words give the reader this impression?

7. Dystopia / Utopia continued

Read the final stanza of the poem

IV) AI-IA

vi

Have you sent your third eye ahead of you yet
Into Tomorrow?

It's waiting – for your fingers to make a fist,
Locking around your tools, your phone –
The stone-age axe at the end of your wrist.

How long it has taken
Nature to craft that complex contraption
To grip and lift a cup to your lips. But you

Are engineering your own future. You
And the clever machines.
Can you imagine it? Now,

Make it come true.

Extended writing task

Answer the following question

Do you think that the poem “Ingenious” is utopian or dystopian?

Give your reasons and support your answer with evidence.