

Meet a STEM Professional - Active reading and listening tasks





JESS BOLAND

LECTURER IN FUNCTIONAL
MATERIALS AND DEVICES

@DrJessBoland

KEYWORDS

functional
devices

ABOUT THE TASK

This is an active listening and reading task, that uses the SEEC model to develop understanding of key words. It is designed to inspire pupils to develop questions to ask Jess about her career journey to becoming a STEM professional.

ENGAGE



Ask the pupils to watch the video in full.

Then watch again stopping at 2 mins 50 seconds

Use the SEEC model to develop understanding of key words, and to encourage the pupils to develop questions to ask Jess about her career journey to becoming a STEM professional.

SEEC = select, explain, explore, consolidate



<https://youtu.be/pMHWdMxcztw>

ABOUT JESS - SUMMARY

- Jess' job involves research using terahertz spectroscopy and microscopy to explore new nanomaterials that could form the basis of energy efficient quantum devices! .
- Jess wanted to be a professional ballerina what she was younger, was part of the English Youth Ballet and hoped to join the Elmhurst school of Dance when she was old enough.
- Being 5ft tall put an end to the dream but Jess couldn't decide what to study at University between Classics, Maths or Physics.
- Jess had a Maths teachers who supported her to see that Physics would be a great route to study how Maths can apply to the real world
- Jess studied for her Physics degree at Exeter, a PhD in Oxford before a postdoc in Germany
- Jess is now a lecturer in functional materials and devices at the University of Manchester
- Jess would like work out how we can make devices smaller, faster and smarter and most importantly, more energy efficient.

MANCHESTER
1824
The University of Manchester



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WATCH
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ABOUT JESS

HER JOURNEY INTO STEM
Jess' journey into STEM was not the most conventional one. When she was at school, she really wanted to become a professional ballerina!

However, her mom convinced her to keep her options open (as she was 5ft). During this time, Jess discovered that she loved problem solving - whether it was thinking about real-world problems in physics, or working out translation for Latin poetry.

Jess' maths teacher encouraged her to explore a physics degree, as she was always asking how maths could be applied to the real world. That set her on her current STEM path, studying physics as an undergraduate at Exeter and a PhD at Oxford and finally becoming a lecturer in Electrical Engineering at University of Manchester. She hasn't looked back since!

HER JOB
Jess' job is split between teaching undergraduate students about electronic materials and her research. For her research, she spends time in the lab playing with lasers (some are bigger than she is) and aligning them onto samples to have a look at their properties.

HER HOBBIES
Jess really enjoys singing, playing the piano and always blasting out show tunes at home. She also likes going for long walks and cycling.

THE QUESTION JESS WANTS TO ANSWER IS...
I would love to work out how we can make devices smaller, faster, smarter but most importantly more energy-efficient!

JESS' QUESTION FOR YOU...
Think about the different type of materials they see around them and what you think they would be useful for. Which do you think would be useful in an electronic device such as a smartphone?

KEYWORDS

functional
devices

ACTIVE LISTENING

Access the Collins CoBuild dictionary to help with pronunciation, definitions and synonyms. Visit www.collinsdictionary.com/

1. SELECT

Jess describes her job as a lecturer in **Functional Materials and Devices**

The keywords words are likely to affect the pupil's understanding and engagement with Jess' profile. The terms may not be part of the prior knowledge.

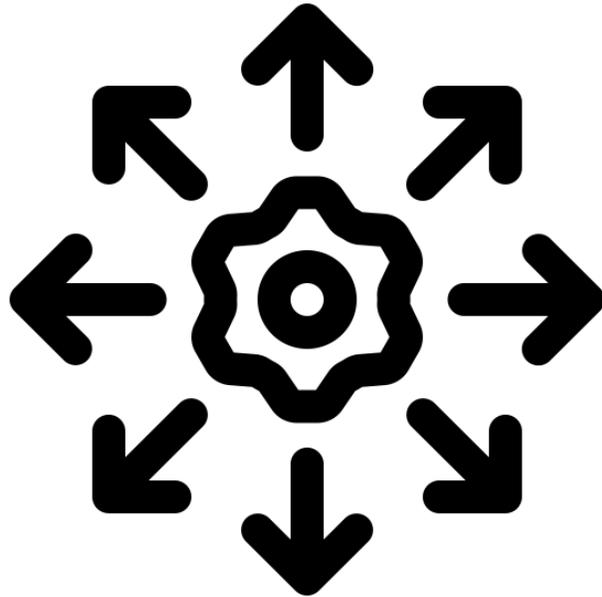
Focus on unpicking these words carefully.

2. EXPLAIN

- **Say** – Tell the pupils to repeat the words carefully pronouncing all the syllables
- **Write** - Ask the pupils to write the words checking their spelling is correct
- **Definition** – Explain that functional devices are designed and built with a specific purpose in mind
- **Ask** – Invite the pupils to give examples of using these words which will support them to clarify meanings and allow you to identify any misconceptions or misunderstandings

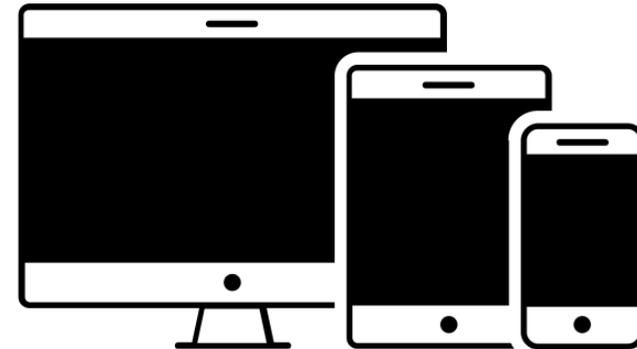
Functional devices

Functional



Created by Timofei Rostilov
from Noun Project

Devices



Created by Adrien Coquet
from Noun Project

3. EXPLORE

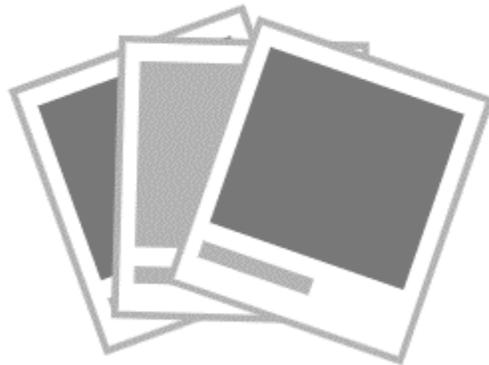
Etymology is finding out about where the word comes from. In this part of the task, pupils explore the etymology of the keywords.

Functional (*adjective*) meaning useful rather than decorative e.g. the furniture is functional and modern
Synonyms – practical, serviceable, utilitarian
Also (*adjective*) functional equipment operates in the way it is supposed to.

Device (*noun*) an object that has been invented for a particular purpose, for example recording or measuring something. E.g. an electronic device that protects your vehicle 24 hours a day.
Synonyms – gadget, machine, tool, instrument
Also (*noun*) a method of achieving something e.g. military spending is a device to build the capacity of our armed forces

Explore further examples and questions from the pupils relating to the keywords.

Images could be shown or drawn that link with the word.



4. CONSOLIDATE

- **Test and learn** – revisit the keywords at regular intervals until you are sure there is a depth of understanding. Use some of the ideas already tried in other sections of the SEEC model as a quick quiz or reminder.
- **Research and record** – find out more about these words – what else can you find out about or is connected to the words functional devices.



<https://youtu.be/pMHWdMxcztw>

- Ask the pupils to explain in their own words what Jess does. Ask them to explain what they understand about by the meaning of the keywords – **functional devices**?
- **Using the keyword in the world** – ask the pupils to use the words **functional devices** to produce questions for Jess.

Use the [Question Maker](#) to support this task.

Question Frame

What you need?

A pair of scissors, a pencil, an object that you're curious about, sticky labels (optional).

How does it work?

- 1 Make a frame out of an old cardboard box or use the printable. Be careful when cutting out the window in the centre.
- 2 Place the frame over an object or image, so that it appears in the window.
- 3 Observe what it looks like and describe what you can see.
- 4 Now, think about questions you have and jot them on a sticky note around the side of the frames.
- 5 Select the question(s) you wish to share.



5. COLLATE Questions for Jess

First name	Gender	Age	Question

Email at least 10 questions **together with** up to 10 photos of the pupil's work using the Question Maker to fascinate@manchester.ac.uk.

We will aim to get answers to as many as possible using a pre-recorded film with Jess or as a live Question & Answer session. You can also tweet Jess using @DrJessBoland