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Tacú leis an bhFoghlaim Ghairmiúil i measc Ceannairí Scoile agus Múinteoirí

Supporting the Professional Learning of School Leaders and Teachers

Engineering

PLE Day 2024 - 2025

Meet the Team

Oide

Francis O'Farrell
Professional Learning Leader

Kevin Grant
Professional Learning Leader

Barry Nolan
Senior Leader

Ciarán Callaghan
Professional Learning Leader

Fergal Murphy
Professional Learning Leader

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Supporting the Professional
Learning of School Leaders
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Partners

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An Roinn Oideachais
Department of Education

www.gov.ie/education

NCCA

www.ncca.ie

Coimisiún na Scrúduithe Stáit
State Examinations Commission

www.examinations.ie

Oide

www.oide.ie

Key Websites / Online information

Oide

www.curriculumonline.ie

www.ncca.ie

www.oide.ie

@Oide_PP_Tech4

email: info@oide.ie

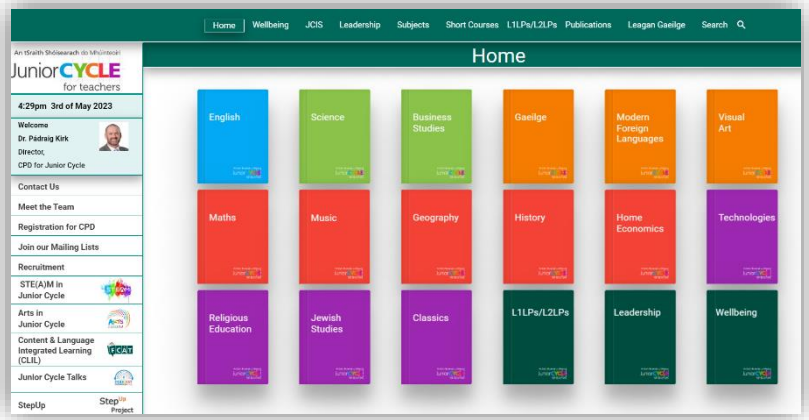
Oide Mailing List

Oide Mailing List

Junior Cycle Engineering Supports

Oide

Supports into the future



www.jct.ie

www.scoilnet.ie

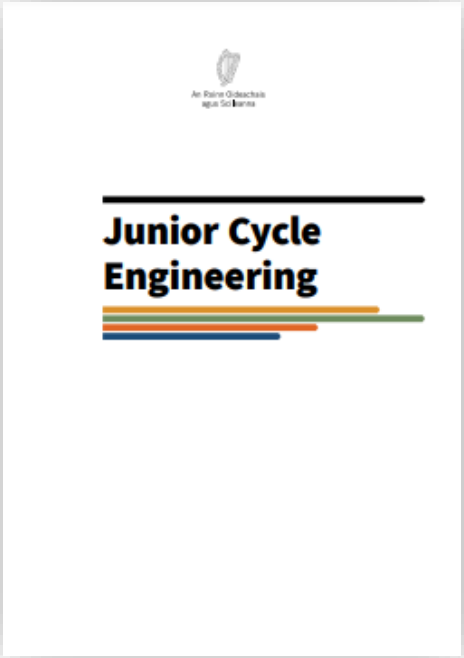
www.oide.ie

Updates

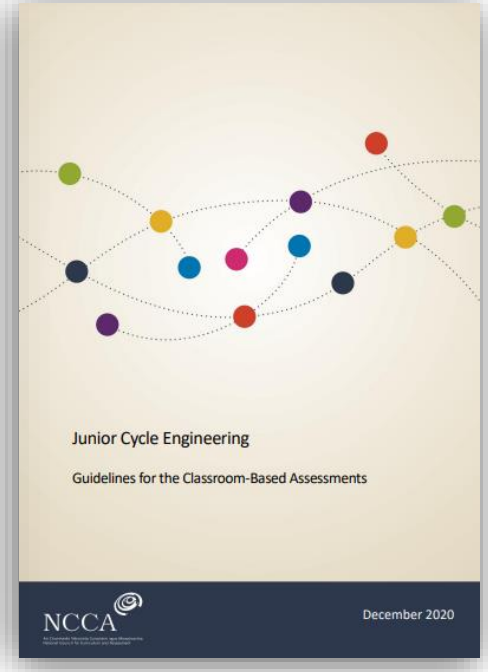
What is new in Engineering?

Key Documents

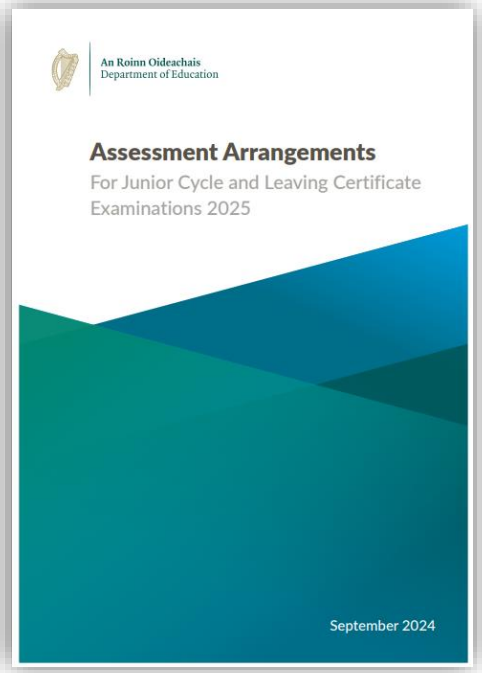
Oide



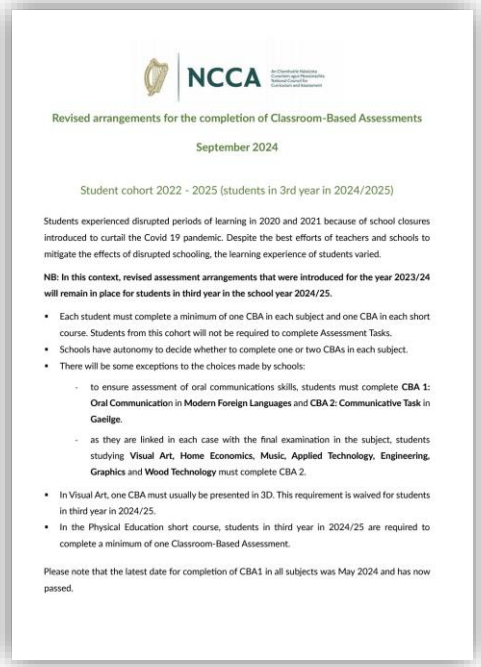
Subject Specification, NCCA



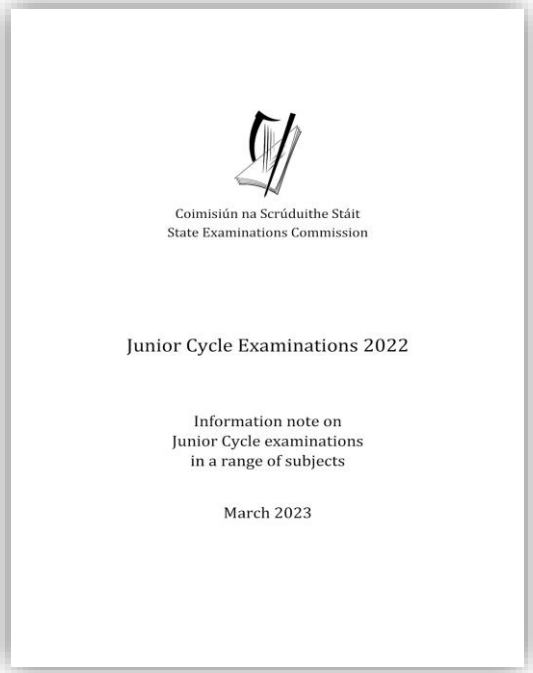
Assessment Guidelines, NCCA



Assessment Arrangements 2024/2025, Dept. of Education



CBA Key Dates 2024/2025, NCCA



Junior Cycle information note 2023, SEC

Over today's three sessions - we will…

Oide

Explore the development of the engineering mindset and student communication skills, through active engagement in problem solving

Explore how effective communication supports and enhances the student experience in Engineering

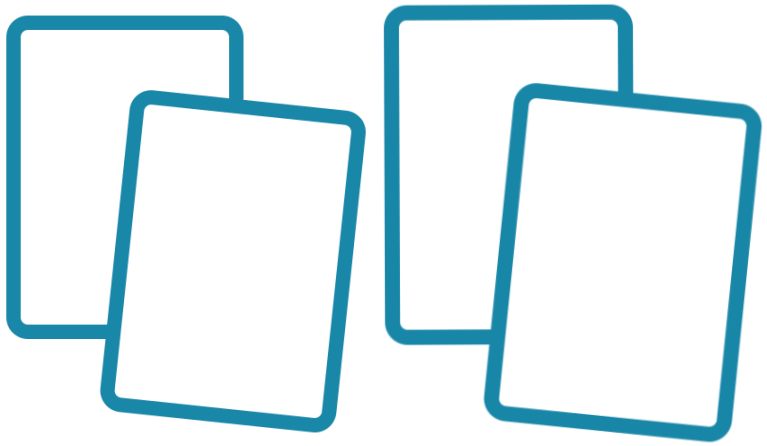
- Explore student approaches and teacher observations for CBA2
- Engage in planning to enhance teaching and learning

In this session, we will…

Explore the development of the engineering mindset and student communication skills, through active engagement in problem solving

Icebreaker

Engineering Pictionary



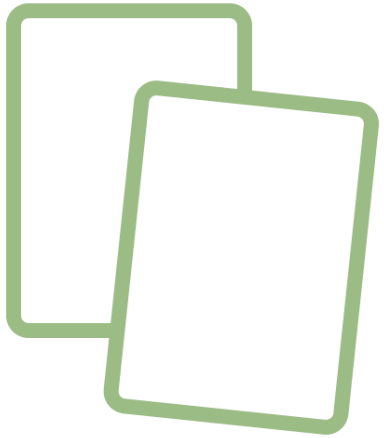
10 minutes

- Using the given cards, graphically represent (sketch) the object, process, or design on the card without the use of words or letters
- After sketching your response, see if you can guess what your colleagues are trying to represent

Round One

Oide

Pick a **Green** Card each (random)



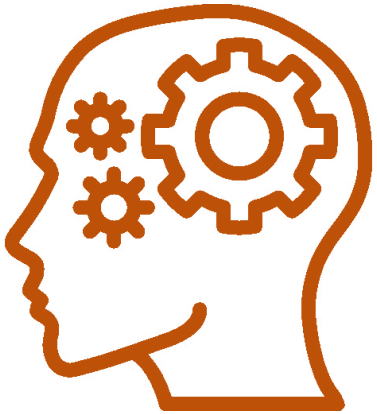
30 seconds

- Each person picks one card from the green deck
- Do not let your colleagues see your card
- You have 30 seconds to communicate what is on your card without the use of words
- At the end of the 30 seconds, your colleagues at the table must then guess what you were trying to communicate

Round Two

Oide

Pick an **Orange** Card each
(Technical Knowledge)



1 minute

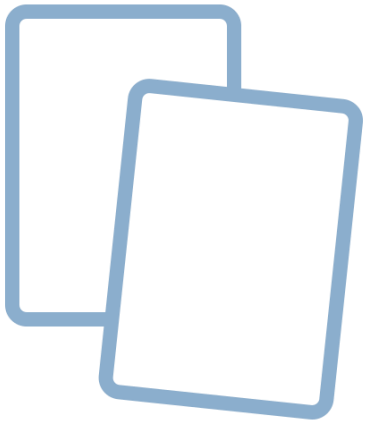
- Each person picks one card from the orange deck
- You have 1 minute to communicate what is on your card without the use of words

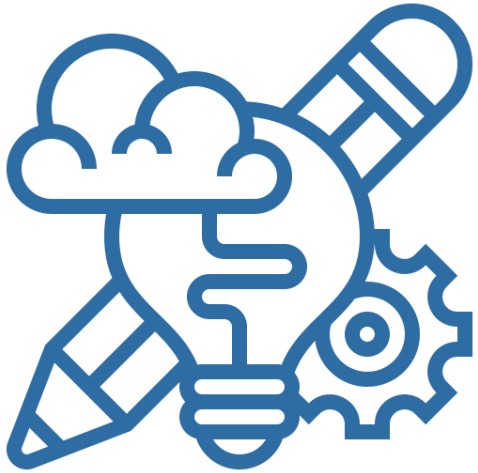
Round Three

Oide

Pick a **Blue** Card each

(Environmental impact of Engineering)





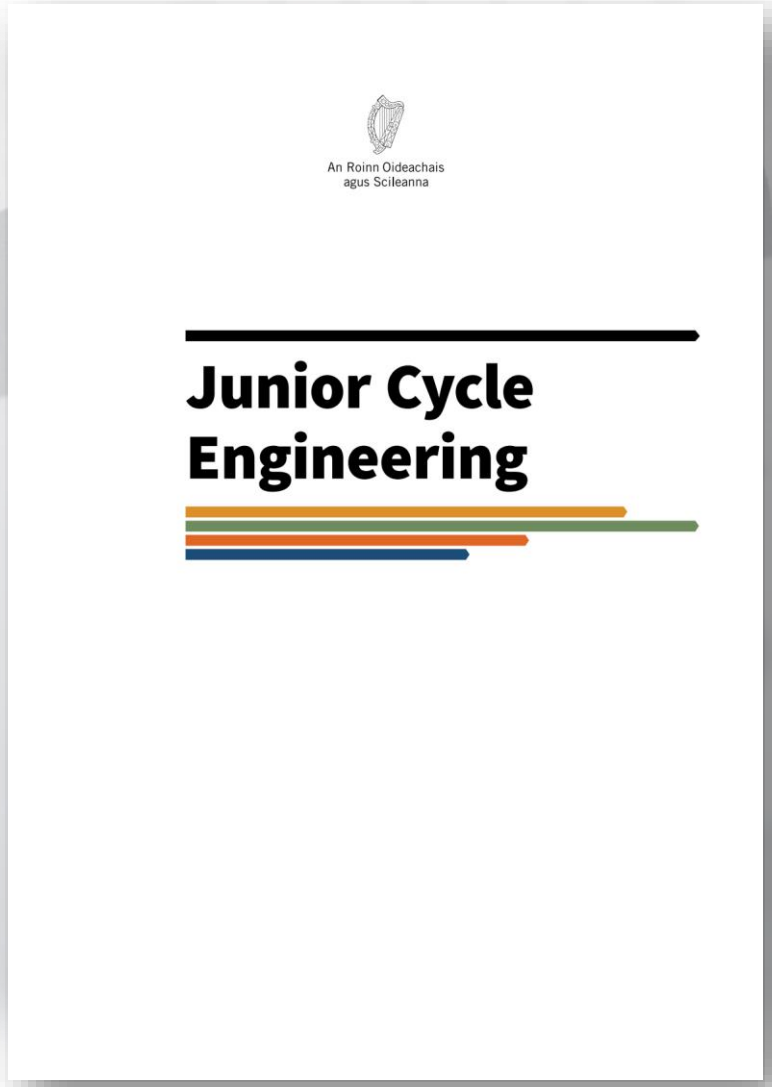
1 minute

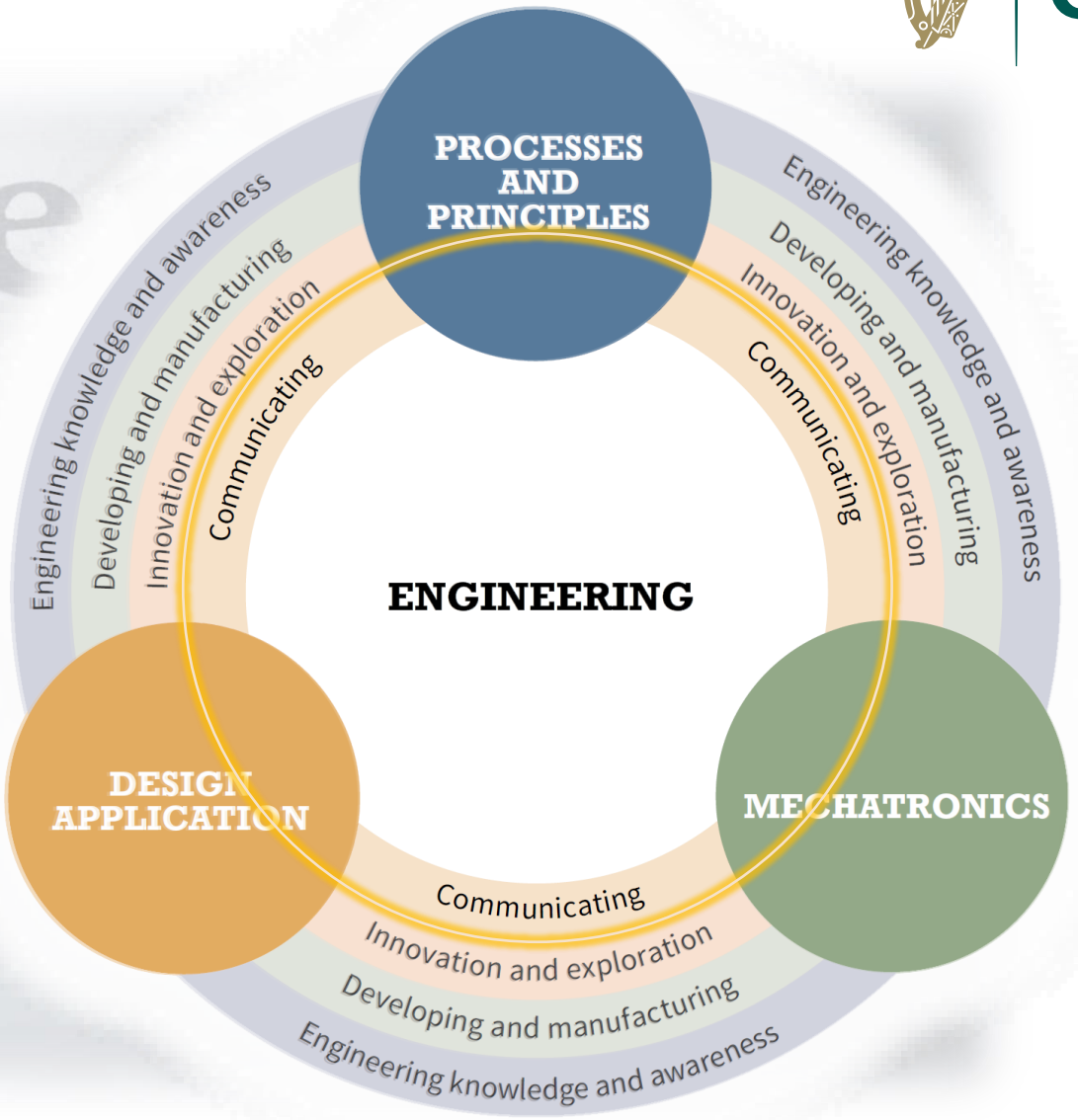
- Each person picks one card from the blue deck
- You have 1 minute to communicate what is on your card without the use of words

Pause and Reflect

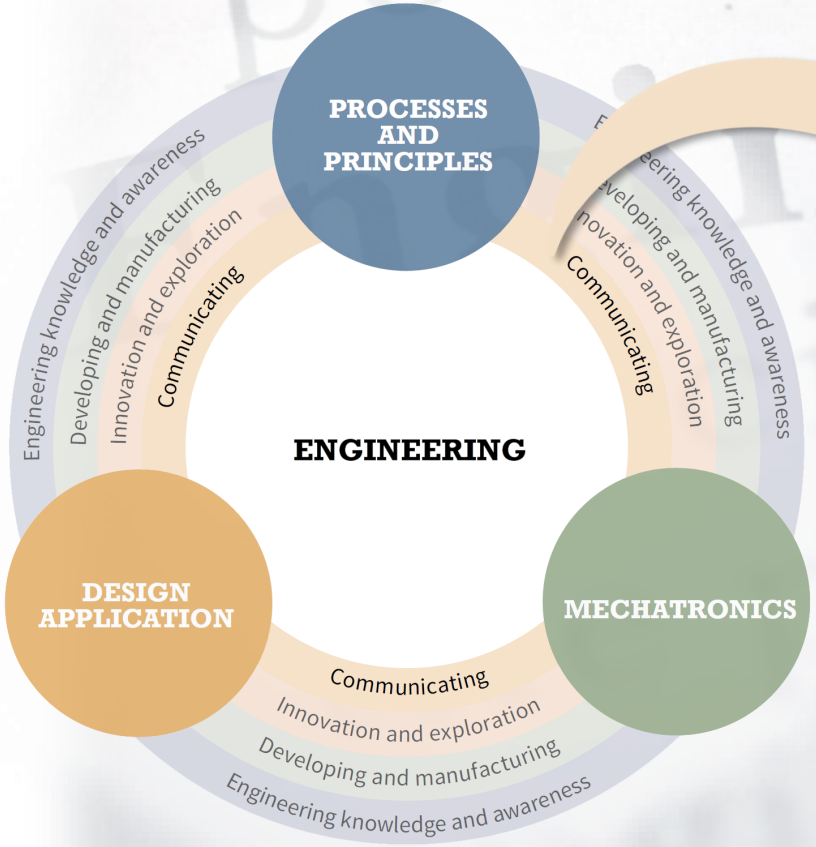
Would your students find this activity challenging?

How could an activity like this support the development of the Engineering mindset?


An Roinn Oideachais agus Scileanna
Junior Cycle Engineering

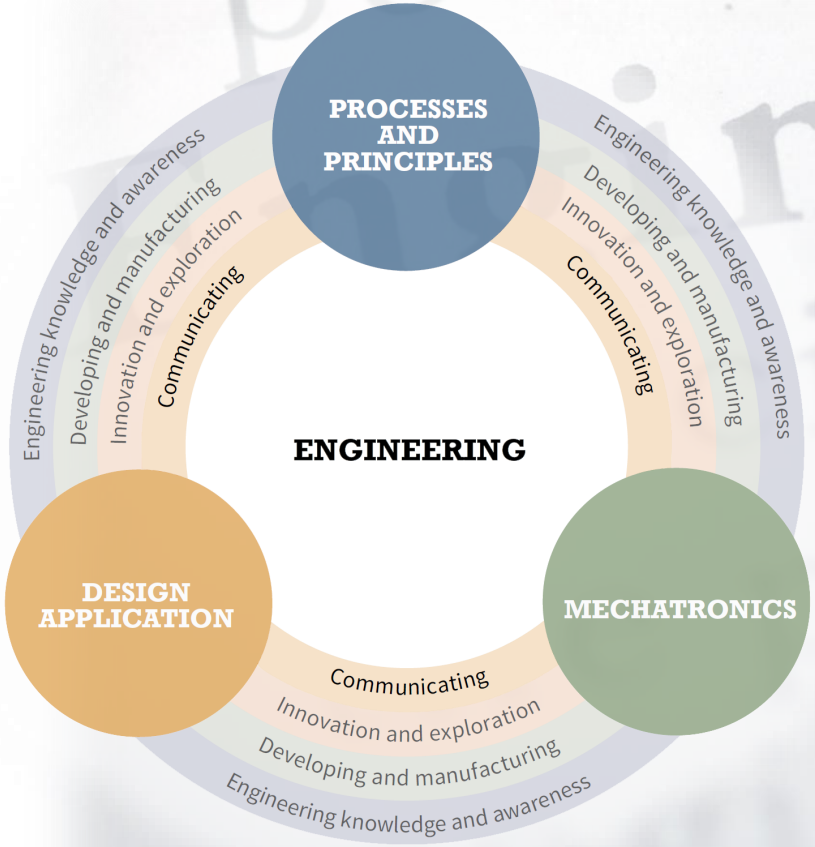

PROCESSES AND PRINCIPLES
DESIGN APPLICATION
MECHATRONICS
ENGINEERING
Engineering knowledge and awareness
Developing and manufacturing
Innovation and exploration
Communicating
Communicating
Innovation and exploration
Developing and manufacturing
Engineering knowledge and awareness
Communicating
Innovation and exploration
Developing and manufacturing
Engineering knowledge and awareness

Communicating



Communicating
Throughout this element, the learning outcomes encourage students to communicate, through **appropriate media**, to relay **technical information**, **design ideas** and the **impact engineering has on the environment around them**..

Communicating



Technical Information

Design Ideas

The impact engineering has on the environment around them

Appropriate Media

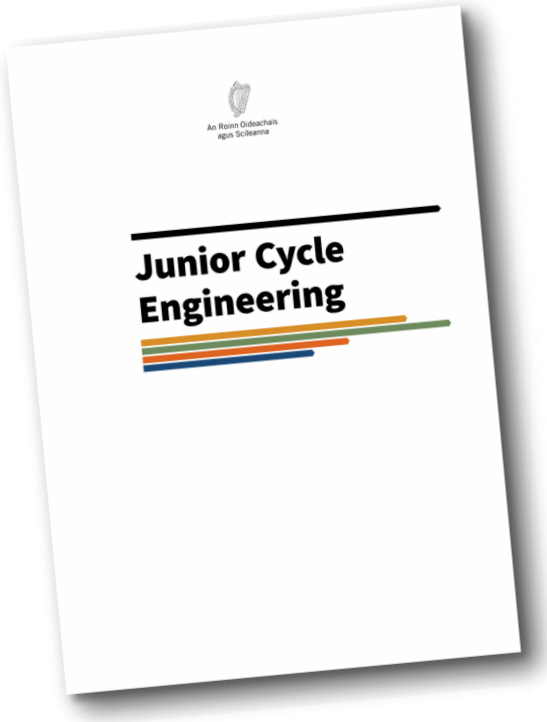
Why is communication important in Engineering?

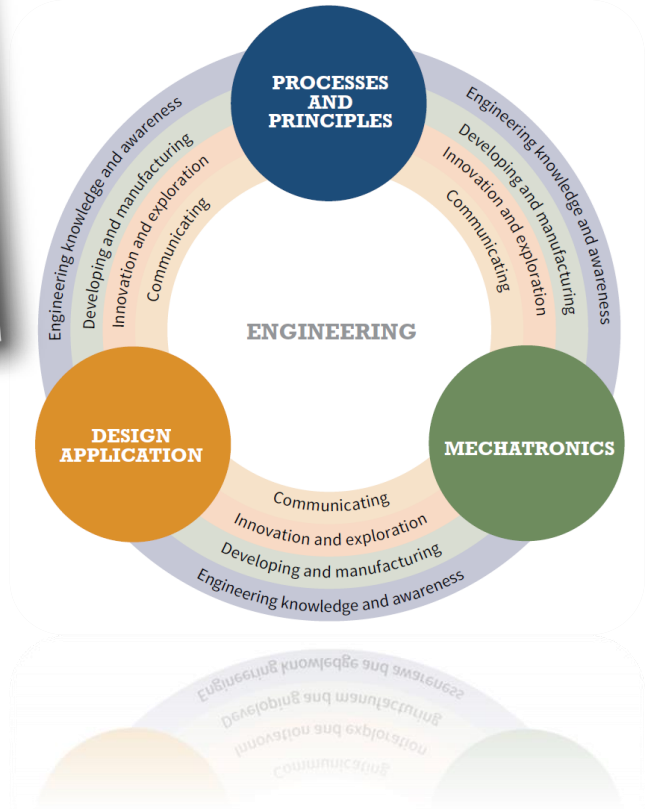
Pause and Reflect

Oide

What does communication look like in your Engineering classroom?

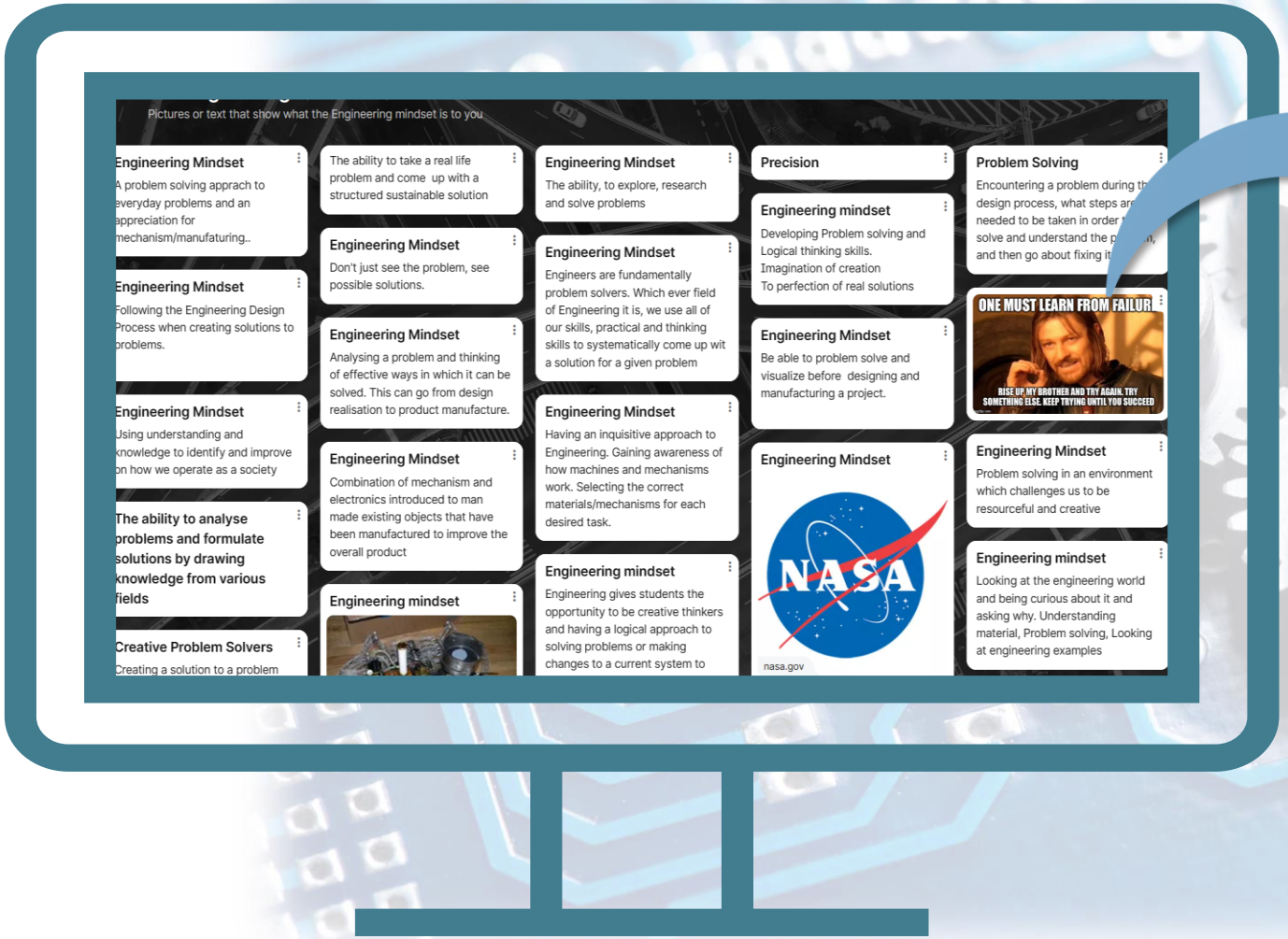
The Engineering Specification





Through the study of engineering, students will have the **opportunity to behave as engineers**, and **develop an engineering mindset.**

The Engineering Mindset

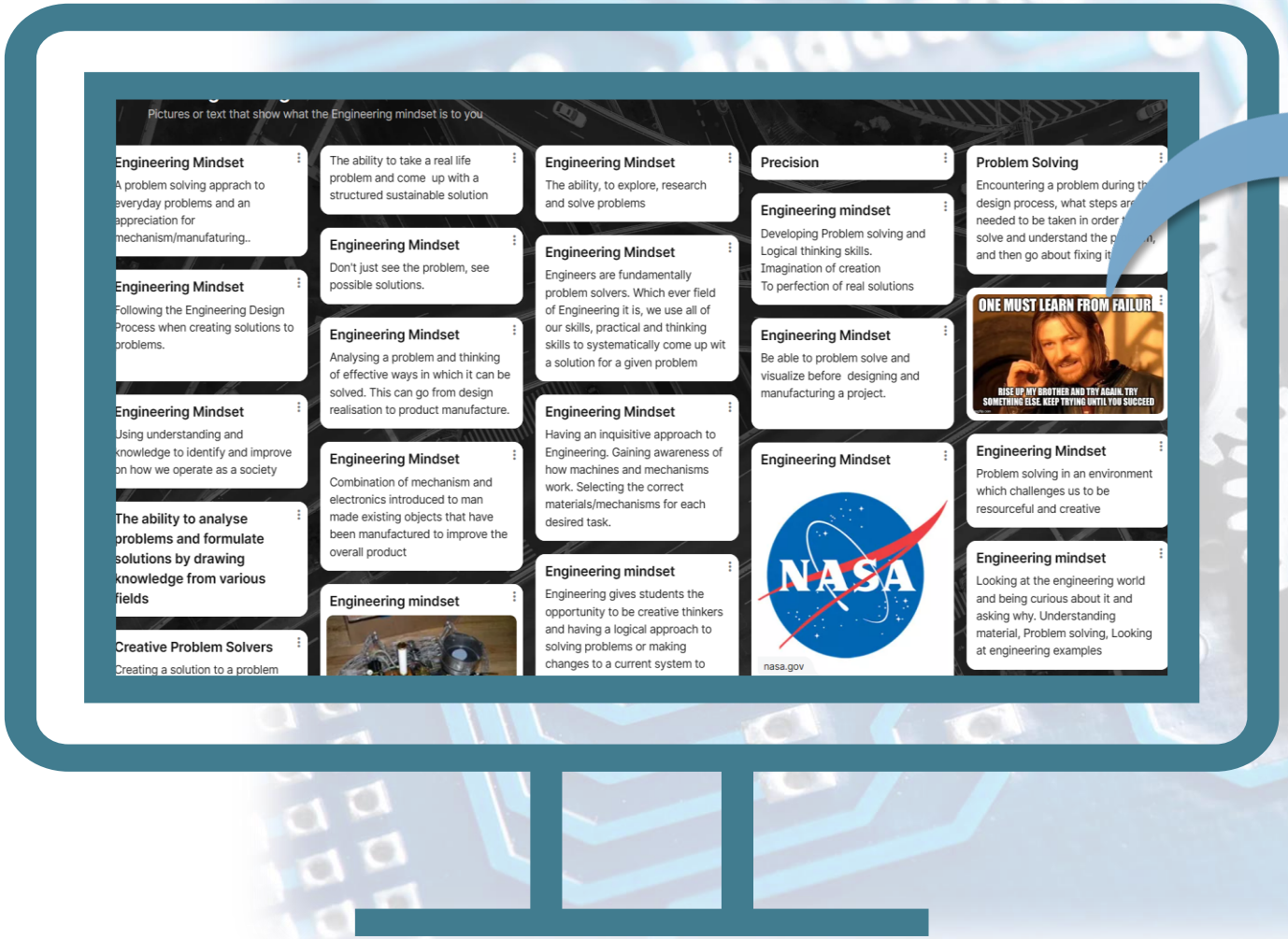


Engineering Mindset

Engineers are fundamentally problem solvers. Which ever field of Engineering it is, we use all of our skills, practical and thinking skills to systematically come up wit a solution for a given problem

The engineer as a ‘problem solver’

The Engineering Mindset



The ability for students to be able to think creatively about a design problem and have the practical skill to bring them thoughts to life.

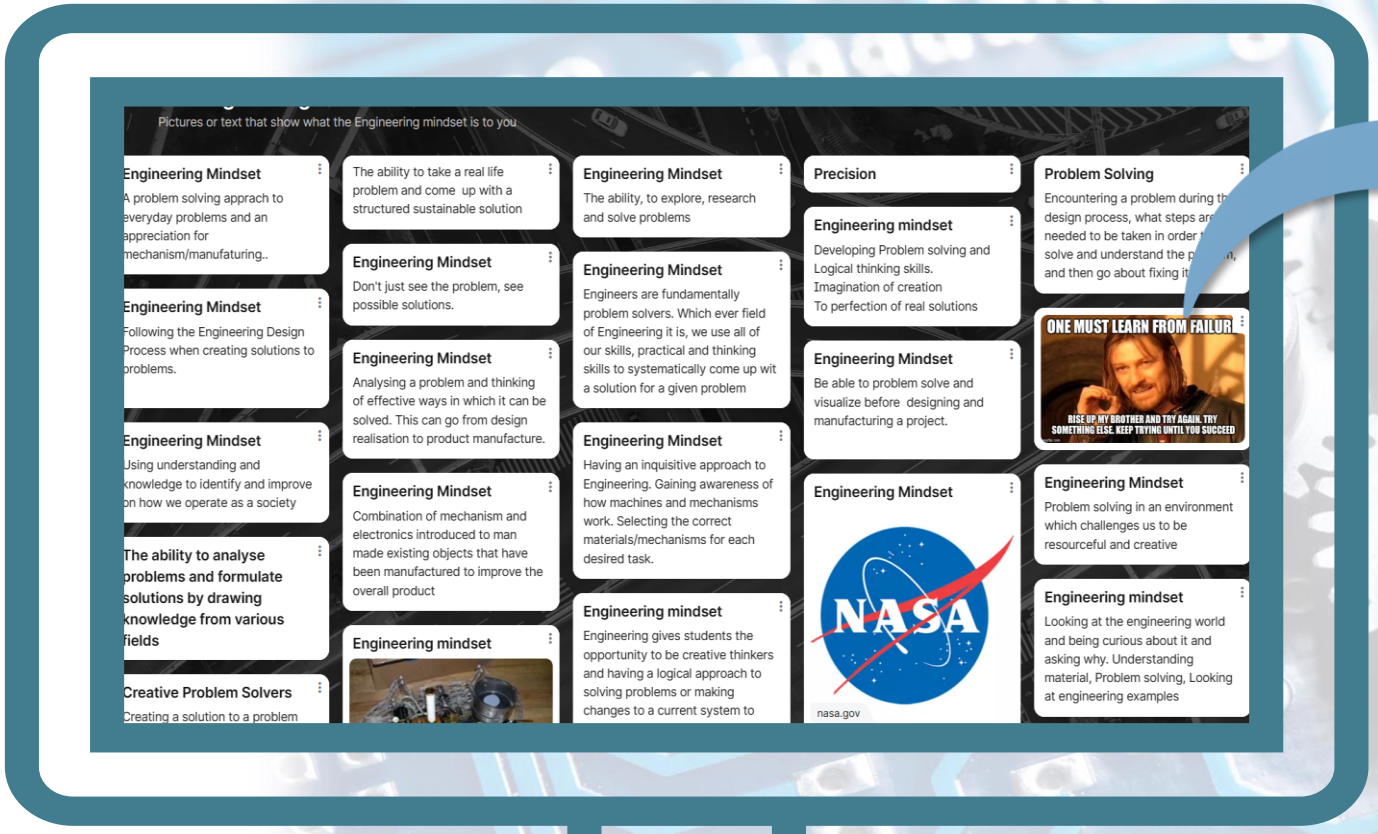
Gain an understanding of how machines and various mechanisms work.

Develop skills with hand tools as well as machinery

Be able to graphically communicate and solve problems

The engineer as a ‘problem solver’

The Engineering Mindset



Engineering Mindset

Problem solving through design and manufacturing. Overcoming challenges using an open minded approach. Communicating through sketching, modelling and manufacturing. Being able to use spatial ability and apply this skill with practical ability. Engineering mindset also includes constant evolution according to the needs of the world.

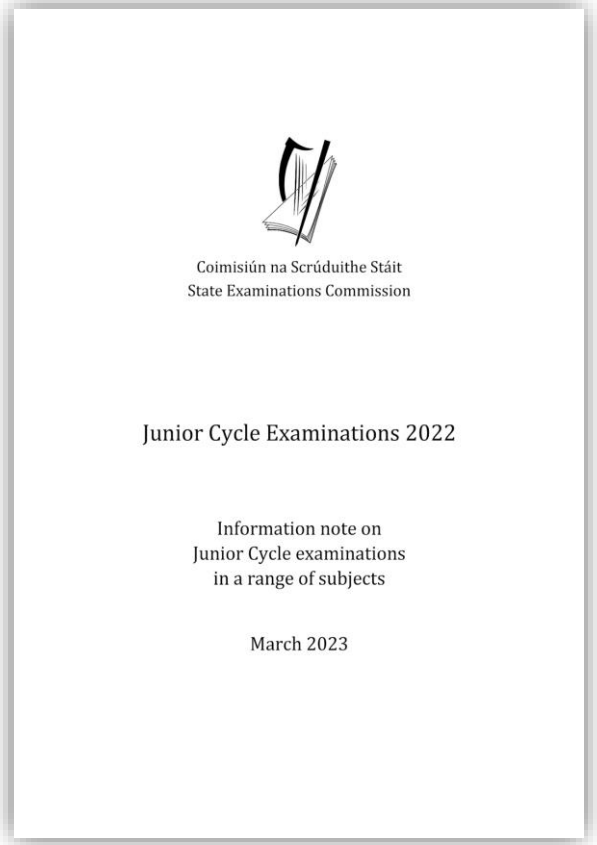
The engineer as a ‘problem solver’

Role of Communication in Problem Solving

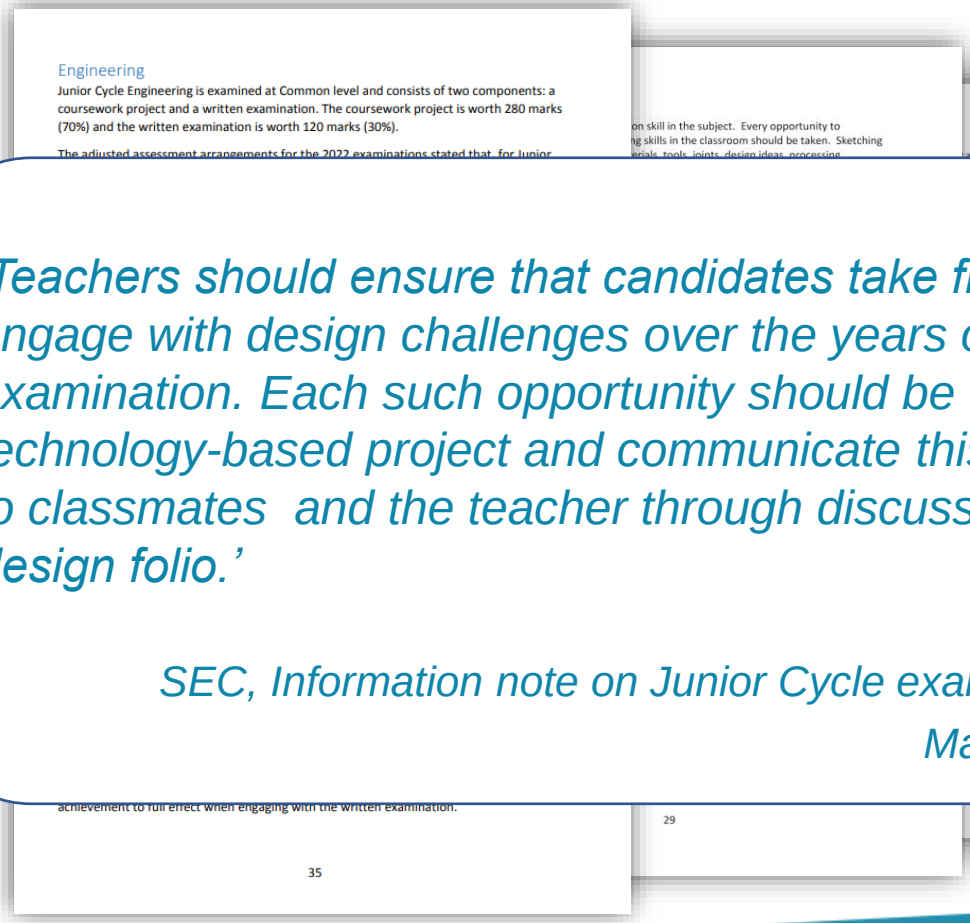
Consider the role of communication in the engineering classroom, particularly conveying design ideas when problem solving.

Which mode of communication was most effective and why?

Information note on Junior Cycle examinations in a range of subjects, March 2023, S.E.C.



https://www.examinations.ie/misc-doc/EN-AR-19213727.pdf



'Teachers should ensure that candidates take frequent opportunities to engage with design challenges over the years of study leading to the examination. Each such opportunity should be used to research a technology-based project and communicate this technological information to classmates and the teacher through discussion, presentation, or in a design folio.'

SEC, Information note on Junior Cycle examinations in a range of subjects, March 2023, Engineering, page 37

Pause and Reflect

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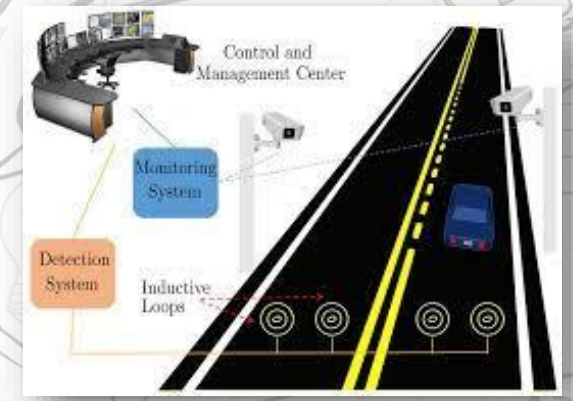
What opportunities do you provide for students to engage in design activities?

What does communication of technical information look like in your Engineering classroom?

Learner Experiences

When designing learner experiences that will provide opportunities to develop communication skills in Engineering:

- Where do you start?
- Do you ever explore local issues that require engineered solutions?



Virgin media NEWS

RTÉ News

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Supporting the Professional Learning of School Leaders and Teachers

Design Challenge

‘Defending Cork’

- Sráid Oide is located in Cork city, close to the river Lee.
- During periods of high tide + heavy rain, it is prone to flooding.

- You have been tasked by the local authority to design and engineer a prototype flood defence system to protect the street in the event of flooding occuring.
- Justify your design decisions during the process.

Student Context

- 2nd Year Engineering, term two/three

Prior Learning:

Design tasks, mechanism and motion types, communication of research, manufacturing skills, assembly skills. Basic circuit design and construction

Focus of Learning:

- Modelmaking and Prototyping
- Design communication and research skills
- Justification of design decisions
- An application of mechatronics in a real-world context.

Chosen Learning Outcomes:

1.11 **create** sketches, models and working drawings
1.13 **use** appropriate technical language and notations
2.11 **present** ideas through modelling and prototyping, using appropriate media
3.3 **appreciate** the application of mechanisms in a controlled system
3.5 **investigate** the impact of mechatronics on the environment and society

Key Learning:

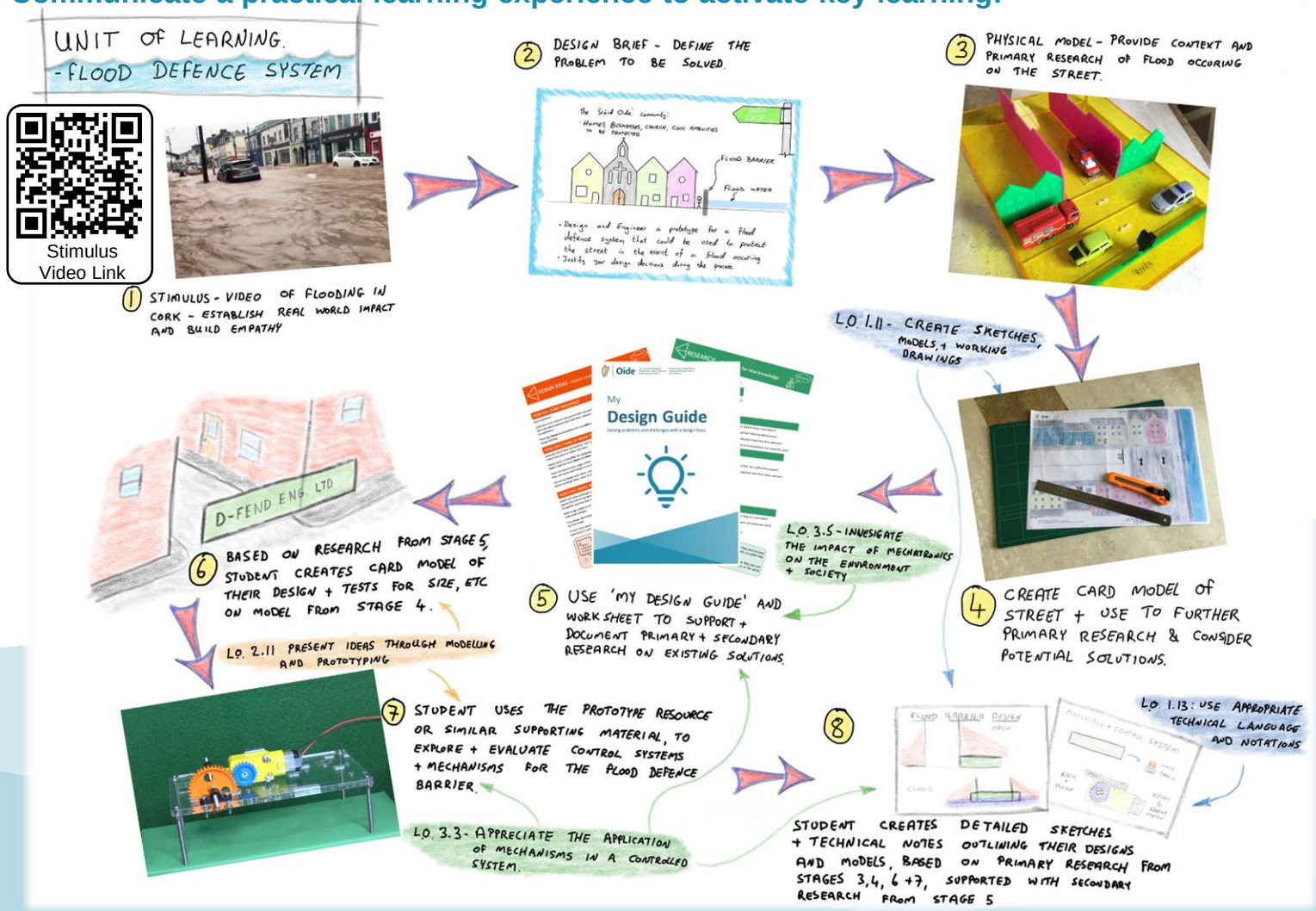
Using action verbs to support your thinking.

- Explore initial solution using the card cut-out model
- Investigate existing solutions and identify useful information
- Model suitable chosen solution using card cut-out model
- Identify a suitable mechanism to power the chosen solution using the control prototyping kit
- Justify and present your chosen solution

What resources would be needed?

Stimulus Video, Physical and Card Model of the 'Sráid Oide'. Control Prototype resource, nut drives, screw drivers, resource sheets, sketching equipment and media to use to communicate and justify design choices. Reflection sheets to document their learning.

Communicate a practical learning experience to activate key learning:

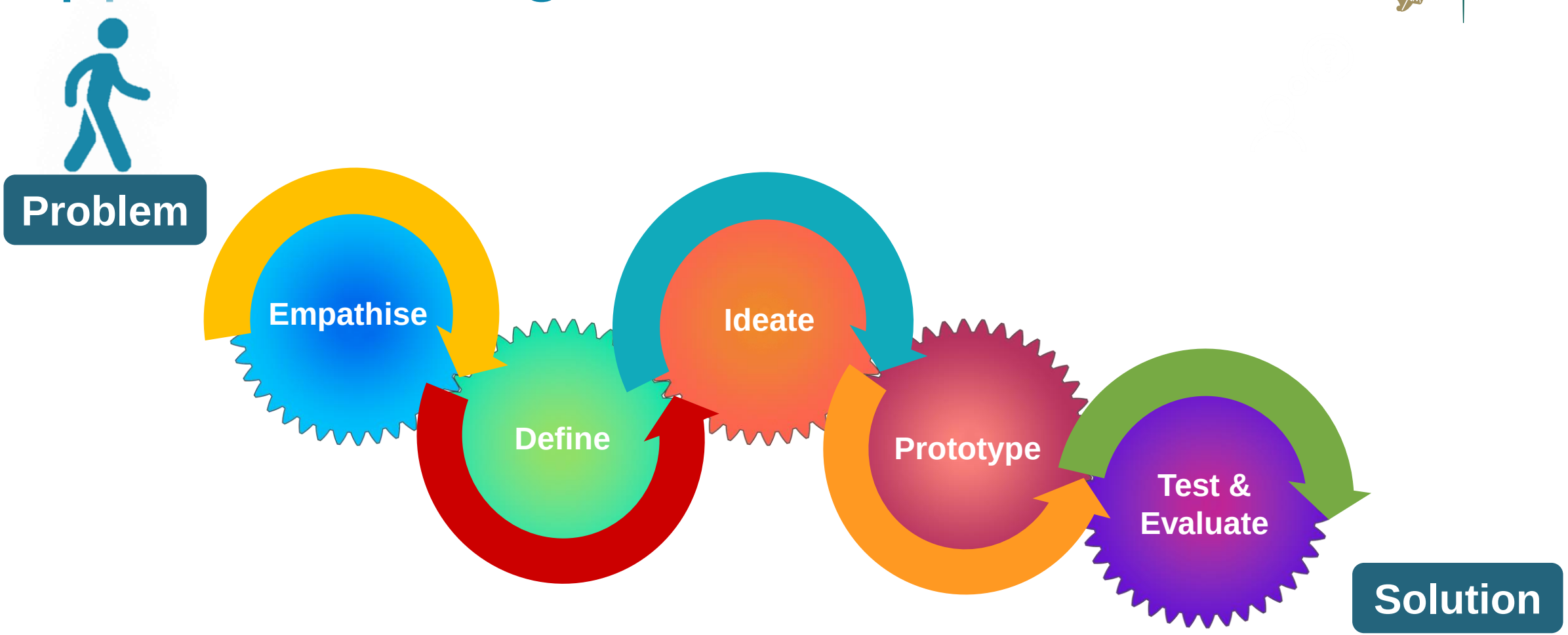


How could the key learning be assessed?

- Design ideas for the flood defence system
- Communication of research conducted and identification of relevant information
- Selection of suitable mechanism
- Construction of mechanism to solve the design task using control prototyping kit
- Justification of the design choices made, supported by prototyping of solution and sketches that define their solution

A3 Worksheet

Support for Design Activities



Support for Design Activities

Oide

Oide

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Supporting the Professional Learning of School Leaders and Teachers

Stimulus Media

‘Defending Cork’

Stimulus Media

Oide

Focus Questions:

- What effect is this problem having on the local people?
- Why is it important to engineer an effective solution?

Empathise

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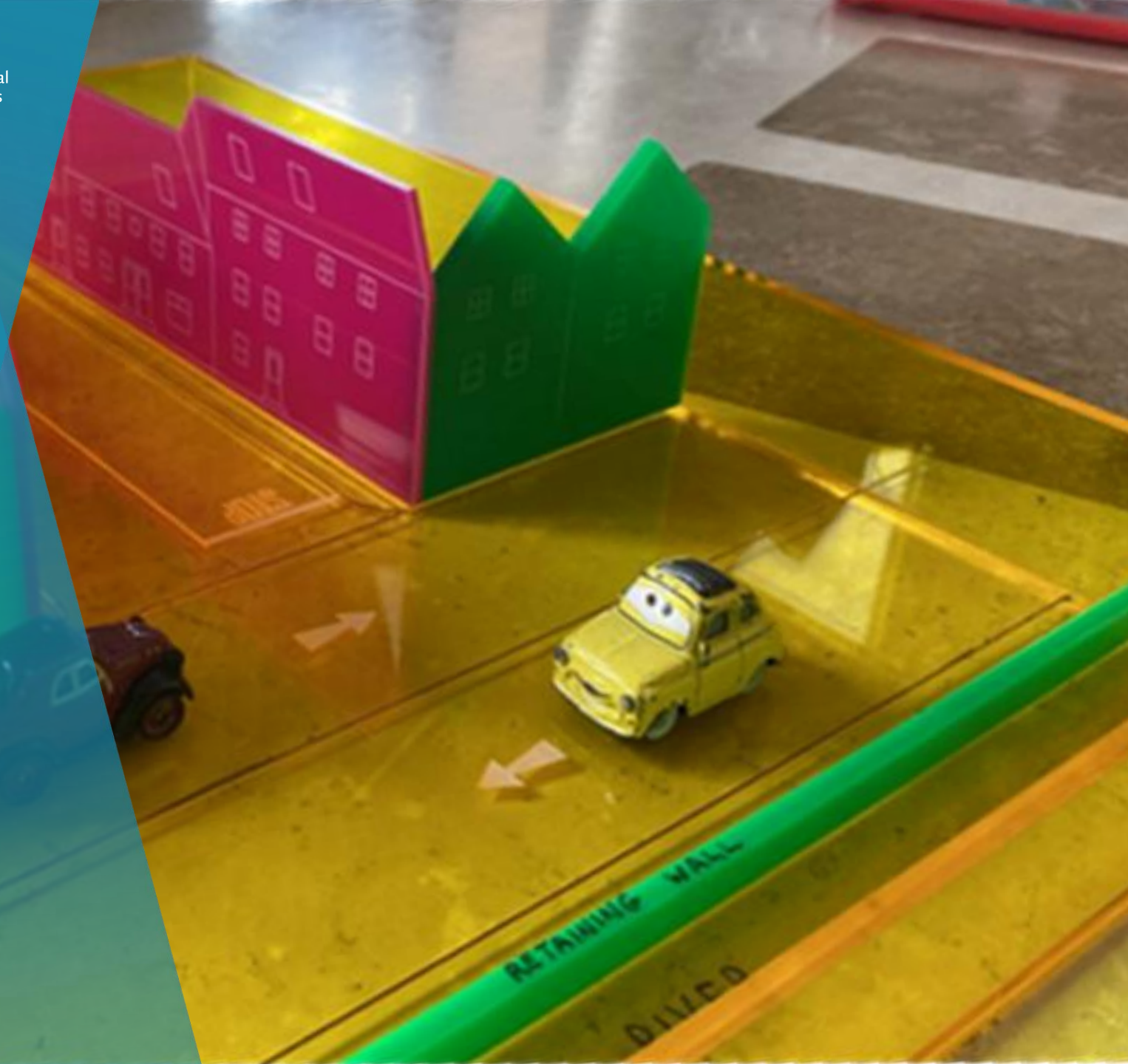
Stimulus Media

‘Physical Flood Model’ Primary Research



Progressing the Design Journey

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Problem

Empathise

Define

Ideate

Prototype

Test

Solution

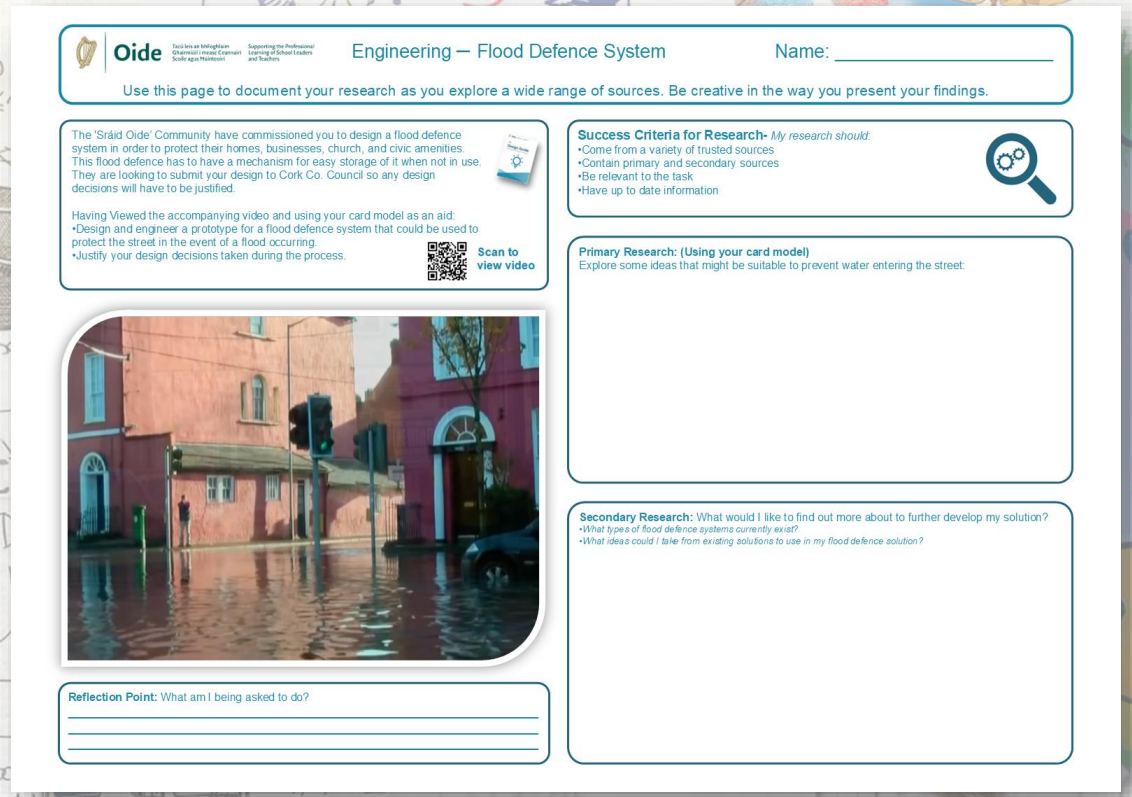
Design Challenge

Facilitating/Encouraging Designer Empathy

A3 Worksheet

Using the ‘Sráid Oide’ resource, cut out the Kirigami street scape to prototype possible solutions.

Design Challenge


Oide — Tacú leis an bhFoghlaim Ghairmiúil i measc Ceannairí Scoile agus Múinteoirí — Supporting the Professional Learning of School Leaders and Teachers

Engineering – Flood Defence System Name: _____

Use this page to document your research as you explore a wide range of sources. Be creative in the way you present your findings.

The 'Sráid Oide' Community have commissioned you to design a flood defence system in order to protect their homes, businesses, church, and civic amenities. This flood defence has to have a mechanism for easy storage of it when not in use. They are looking to submit your design to Cork Co. Council so any design decisions will have to be justified.

Having Viewed the accompanying video and using your card model as an aid:
•Design and engineer a prototype for a flood defence system that could be used to protect the street in the event of a flood occurring.
•Justify your design decisions taken during the process.

Scan to view video

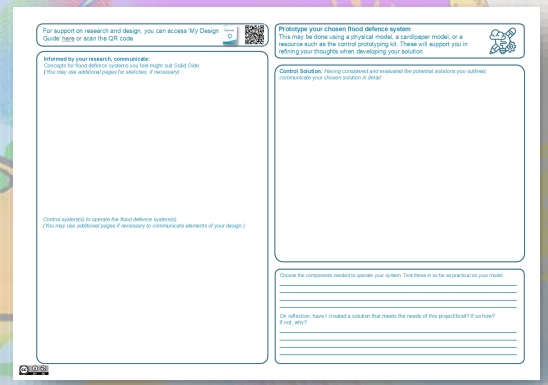
Success Criteria for Research- *My research should:*
•Come from a variety of trusted sources
•Contain primary and secondary sources
•Be relevant to the task
•Have up to date information

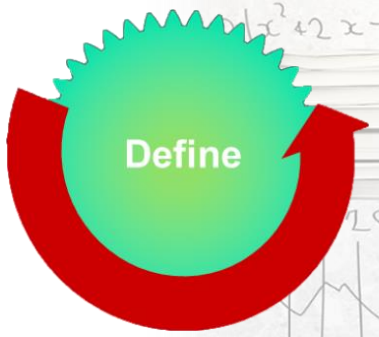
Primary Research: (Using your card model)
Explore some ideas that might be suitable to prevent water entering the street:

Secondary Research: What would I like to find out more about to further develop my solution?
•What types of flood defence systems currently exist?
•What ideas could I take from existing solutions to use in my flood defence solution?

Reflection Point: What am I being asked to do?

Pages 3-4





Use your Sráid Oide model to complete primary research.
Use sheet 1 to document the development of your potential solutions.

Stimulating Design Thinking

Oide

WHY?

Why does this problem exist? Why is a solution needed?

Why has it not been solved already?

Why is it designed and made in this way?

WHAT?

What do you need to know more about?

What is it used for? What problems exist?

What other solutions exist? Are they effective?

What materials and components are currently used?

WHEN?

When is it used?

Can it be used at a different time, for a different purpose?

HOW?

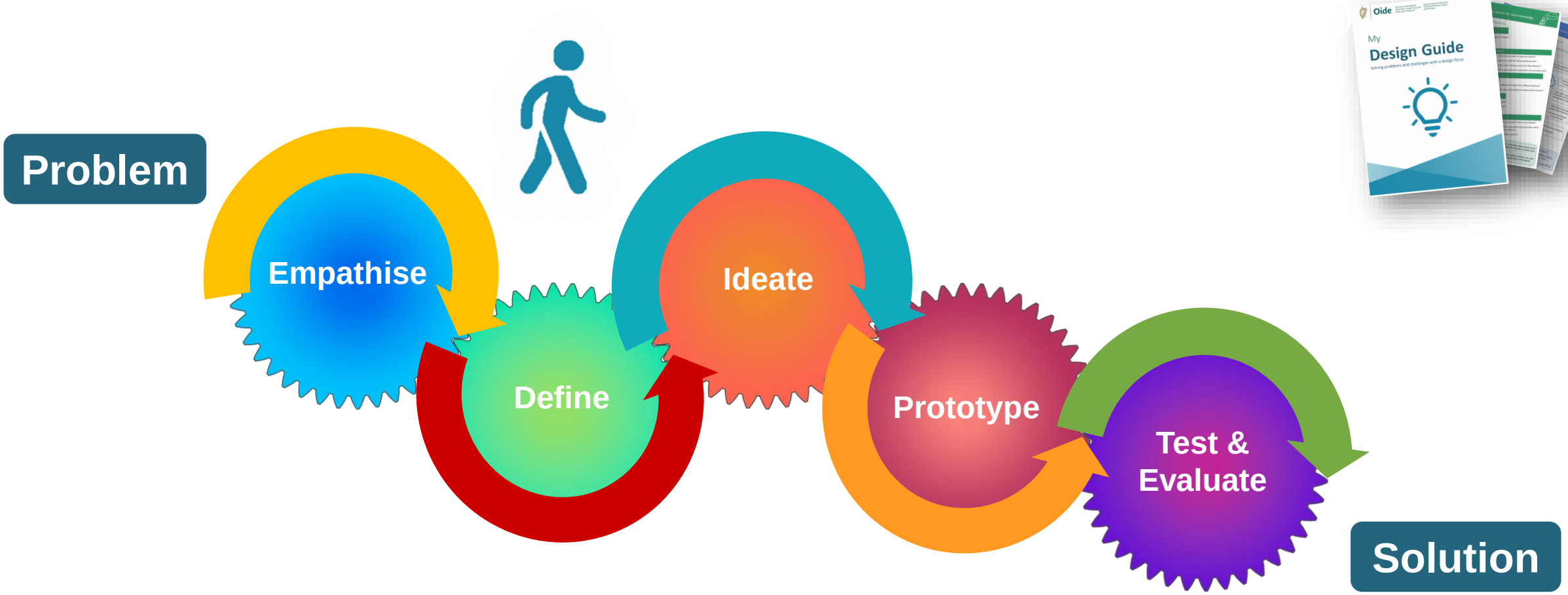
How does it work? How is it made? How is it controlled?

Are there other materials, components and processes which could be used to create a solution?

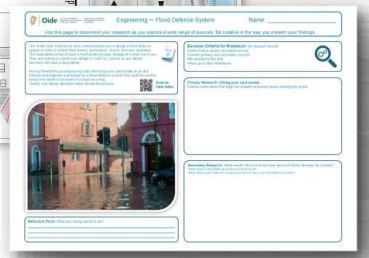
How might I create a better solution?

Progressing the Design Journey

Oide



Design Challenge



For support on research and design, you can access 'My Design Guide' here or scan the QR code

Informed by your research, communicate:
Concepts for flood defence systems you feel might suit Sráid Oide.
(You may use additional pages for sketches, if necessary)

Control system(s) to operate the flood defence system(s).
(You may use additional pages if necessary to communicate elements of your design.)

Prototype your chosen flood defence system
This may be done using a physical model, a card/paper model, or a resource such as the control prototyping kit. These will support you in refining your thoughts when developing your solution

Control Solution: *Having considered and evaluated the potential solutions you outlined, communicate your chosen solution in detail.*

Choose the components needed to operate your system. Test these in so far as practical on your model.

On reflection, have I created a solution that meets the needs of this project/brief? If so how?
If not, why?

Pages 5-6

Use Sheet 2 to document your initial solution ideas and to communicate your chosen solution.

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Supporting the Professional Learning of School Leaders and Teachers

Learner Experience

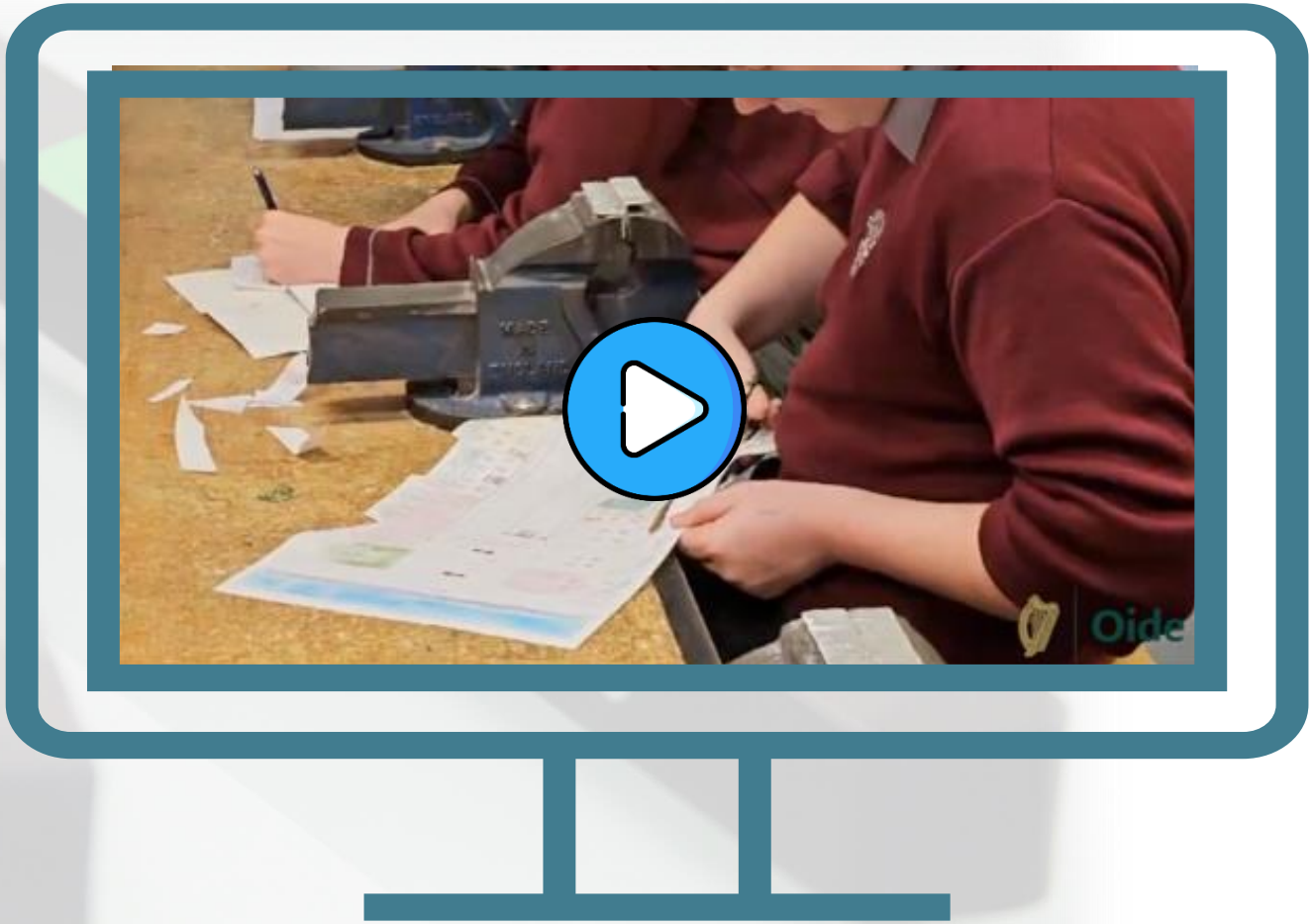
Classroom Footage

St. Declan's Community College, Kilmacthomas

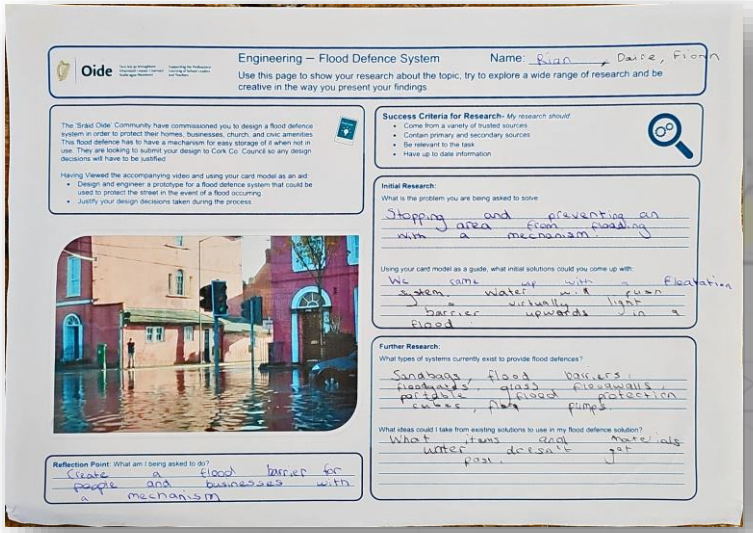
Learner Experience

Focus Question:

In the following video, what key activities along the design journey are students experiencing?



Samples of Student Responses


Oide

Engineering – Flood Defence System Name: Rian Daire, Fionn

Use this page to show your research about the topic, try to explore a wide range of research and be creative in the way you present your findings

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- Justify your design decisions taken during the process.

Success Criteria for Research- *My research should:*
- Come from a variety of trusted sources
- Contain primary and secondary sources
- Be relevant to the task
- Have up to date information

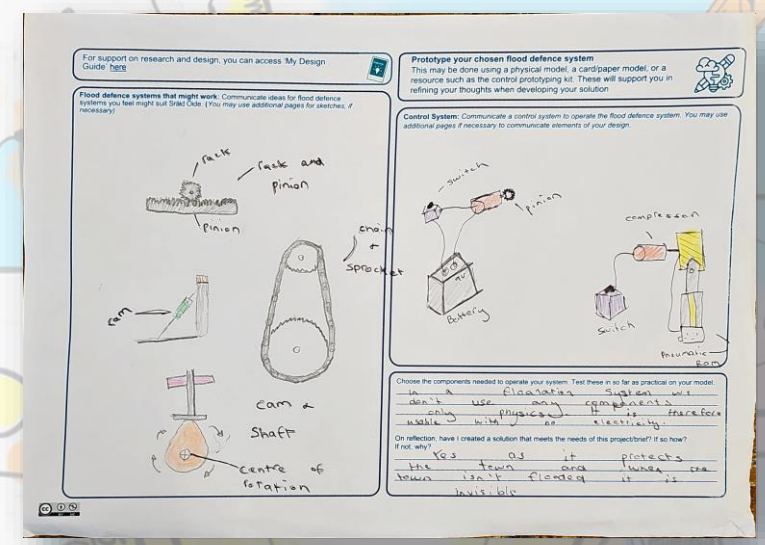
Initial Research:
What is the problem you are being asked to solve:
Stopping and preventing an area from flooding with a mechanism.

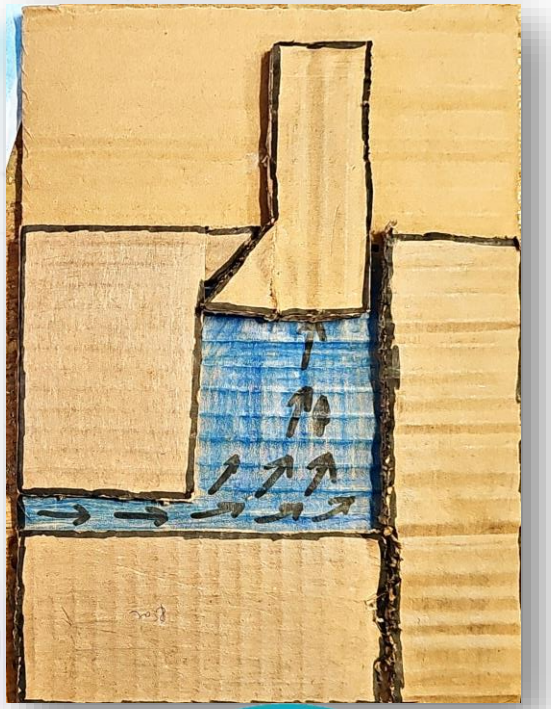
Using your card model as a guide, what initial solutions could you come up with:
We came up with a flotation system, water with a rain barrier virtually upwards in a flood light

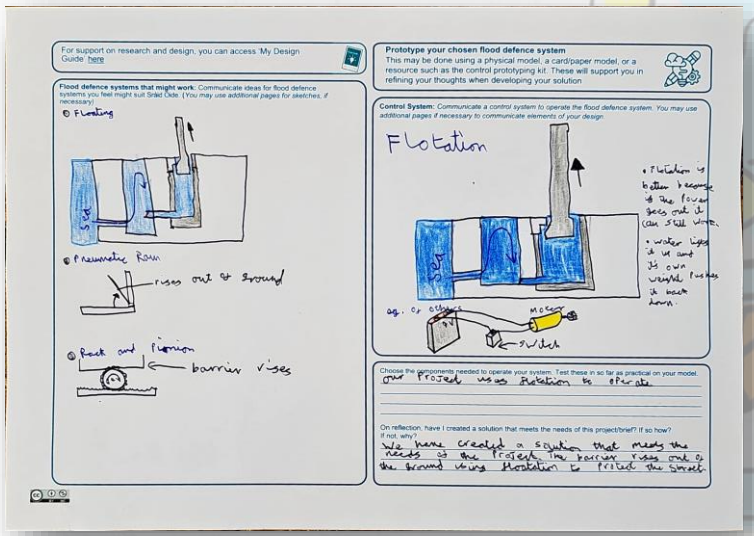
Further Research:
What types of systems currently exist to provide flood defences?
Sandbags, flood barriers, floodgards, glass floodwalls, pitbags, flood protection tubes, flood pumps

What ideas could I take from existing solutions to use in my flood defence solution?
What items and materials water doesn't get past.

Reflection Point: What am I being asked to do?
Create a flood barrier for people and businesses with a mechanism







Ideate

Progressing the Design Journey

Oide

Problem

Empathise

Define

Ideate

Prototype

Test & Evaluate

Solution

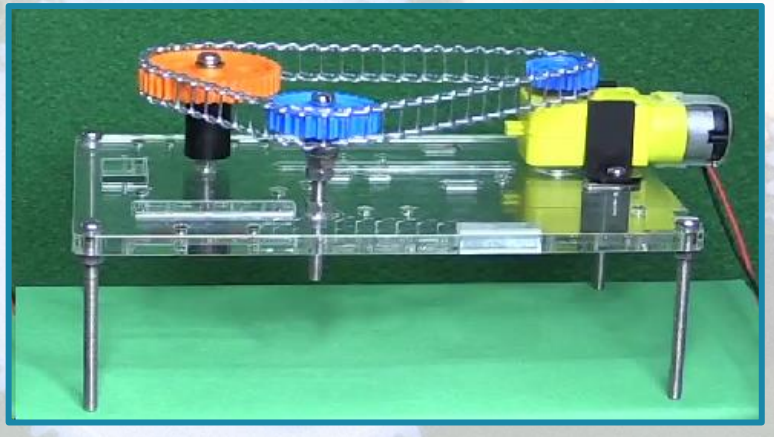
Mechanism Design

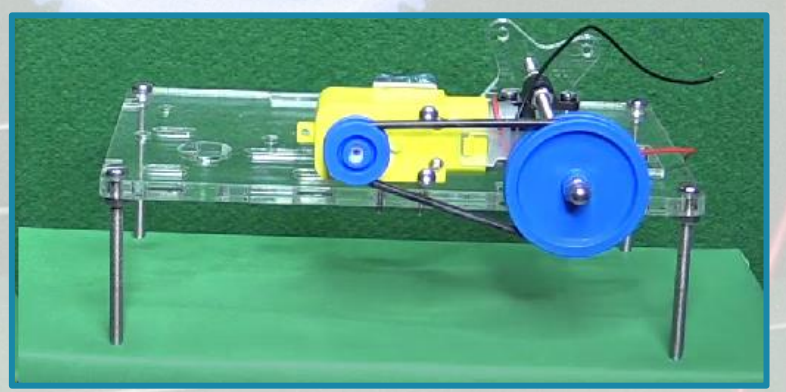
Having engaged in all our research and design, what stage is next?

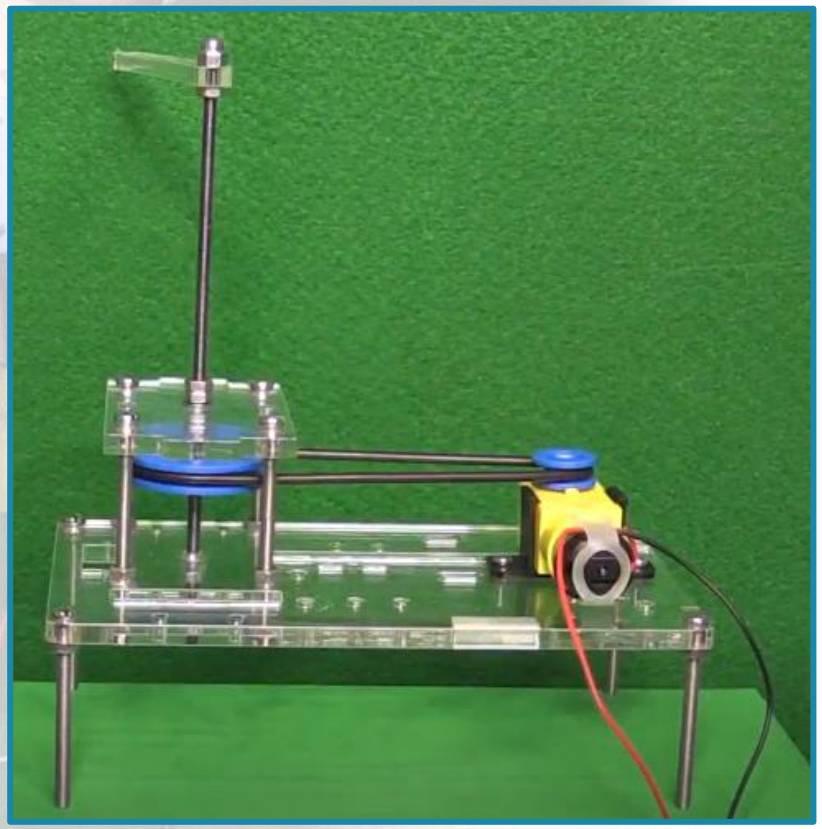
How could we effectively use primary research to determine the best mechanism for our solution?

Prototype

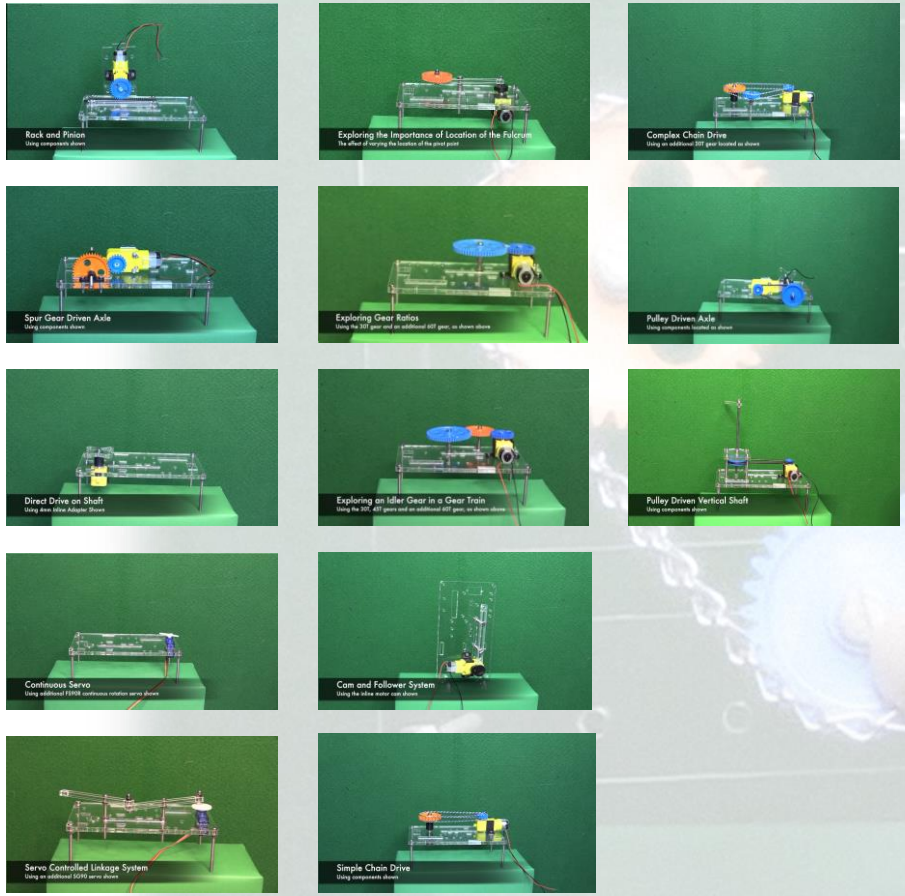
Control Prototype Resource







Overview Video
- Electro-mechanically controlled solutions



https://youtu.be/sU4-6jlVTgo

Oide

What mechanism could be used to operate your suggested solution?

Mechanising the solution

Oide

Using the resource, prototype a system to operate your flood defence solution

Completing the Design Journey

Oide

Problem

Empathise

Define

Ideate

Prototype

Test & Evaluate

Solution

Reflecting on the Design Journey

Oide

Problem

Empathise

Define

Ideate

Prototype

Test & Evaluate

Solution

Personal Reflection Moment

- What opportunities for developing communication skills did this task present?
- Are there opportunities for further learning in this task?

Oide

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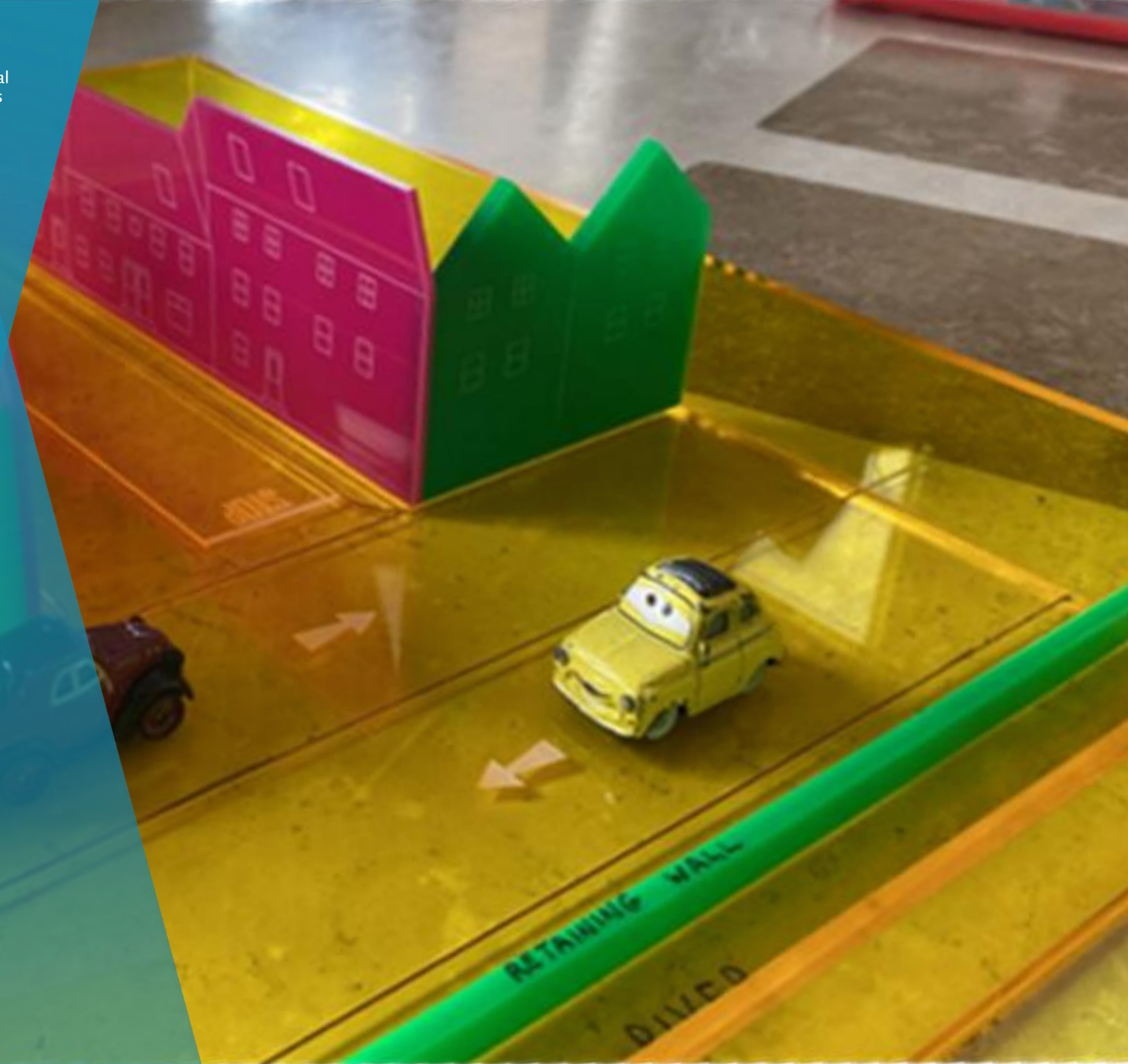
Supporting the Professional Learning of School Leaders and Teachers

Stimulus Media

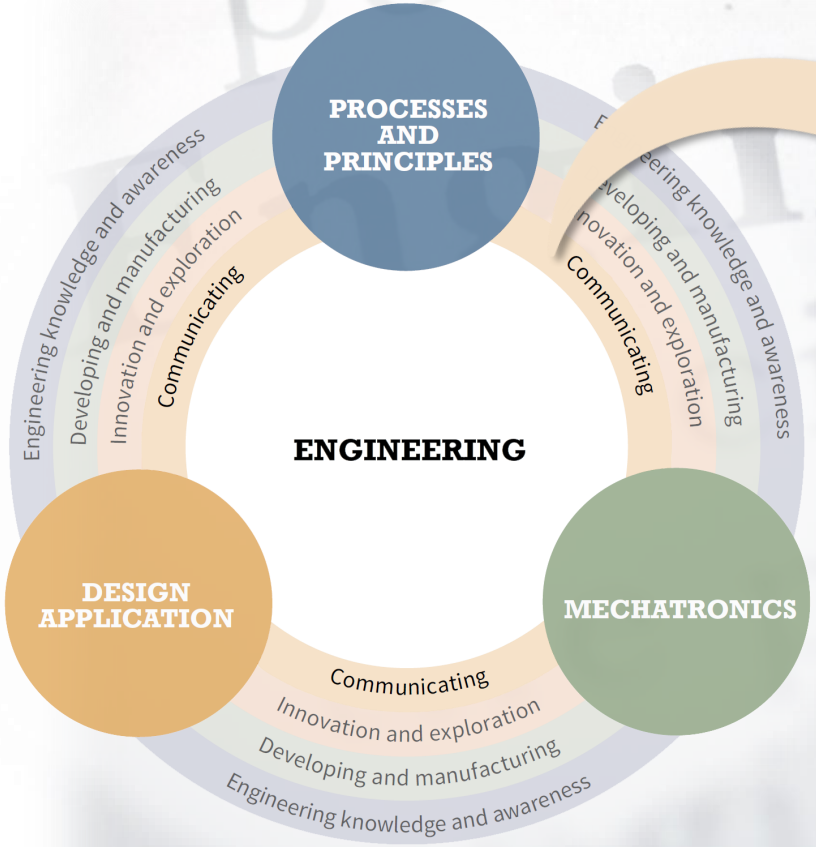
‘Further opportunities for learning’

Primary Research

Alternative Solutions

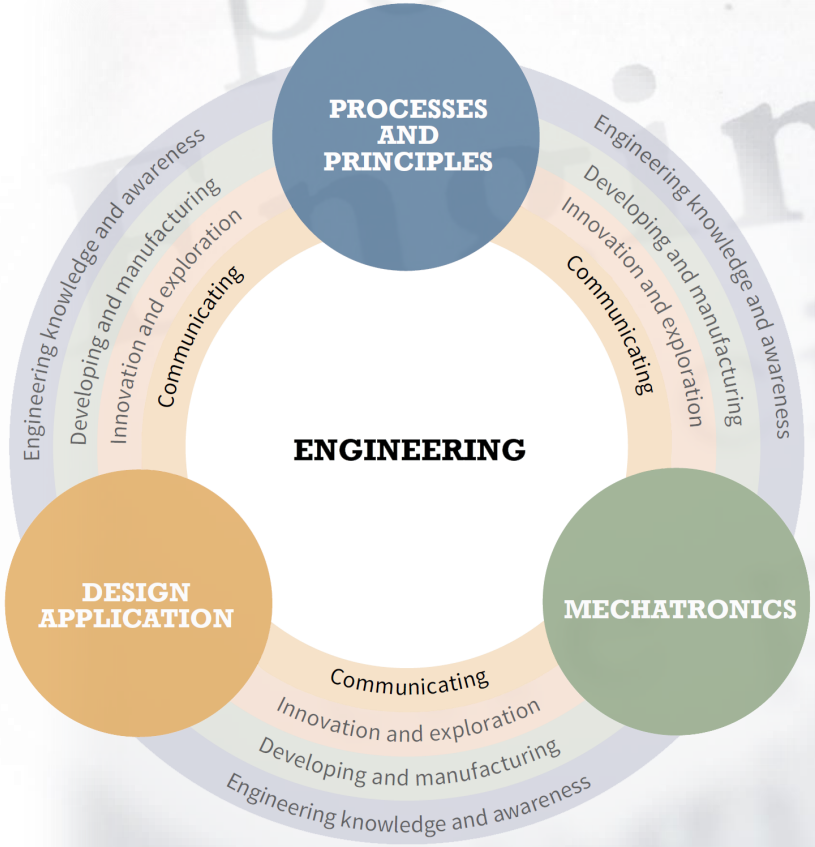


Communicating



Communicating
Throughout this element, the learning outcomes encourage students to communicate, through appropriate media, to relay technical information, design ideas and the impact engineering has on the environment around them..

Communicating



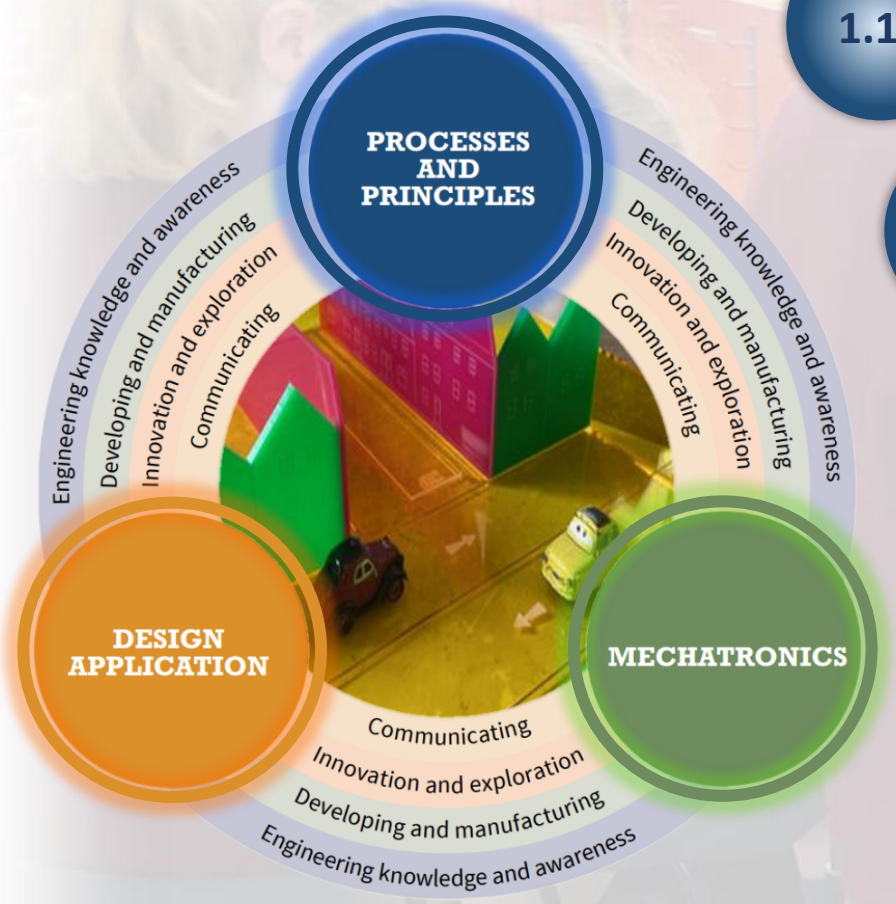
Technical Information

Design Ideas

The impact engineering has on the environment around them

Appropriate Media

How was communication evident in this task?



1.11 **create** sketches, models, and working drawings

1.13 **Use** appropriate technical language and notations

2.11 **Present** ideas through modelling and prototyping, using appropriate media

3.3 **Appreciate** the application of mechanisms in a controlled system

3.5 **Investigate** the impact of mechatronics on the environment and society

In this session, we will…

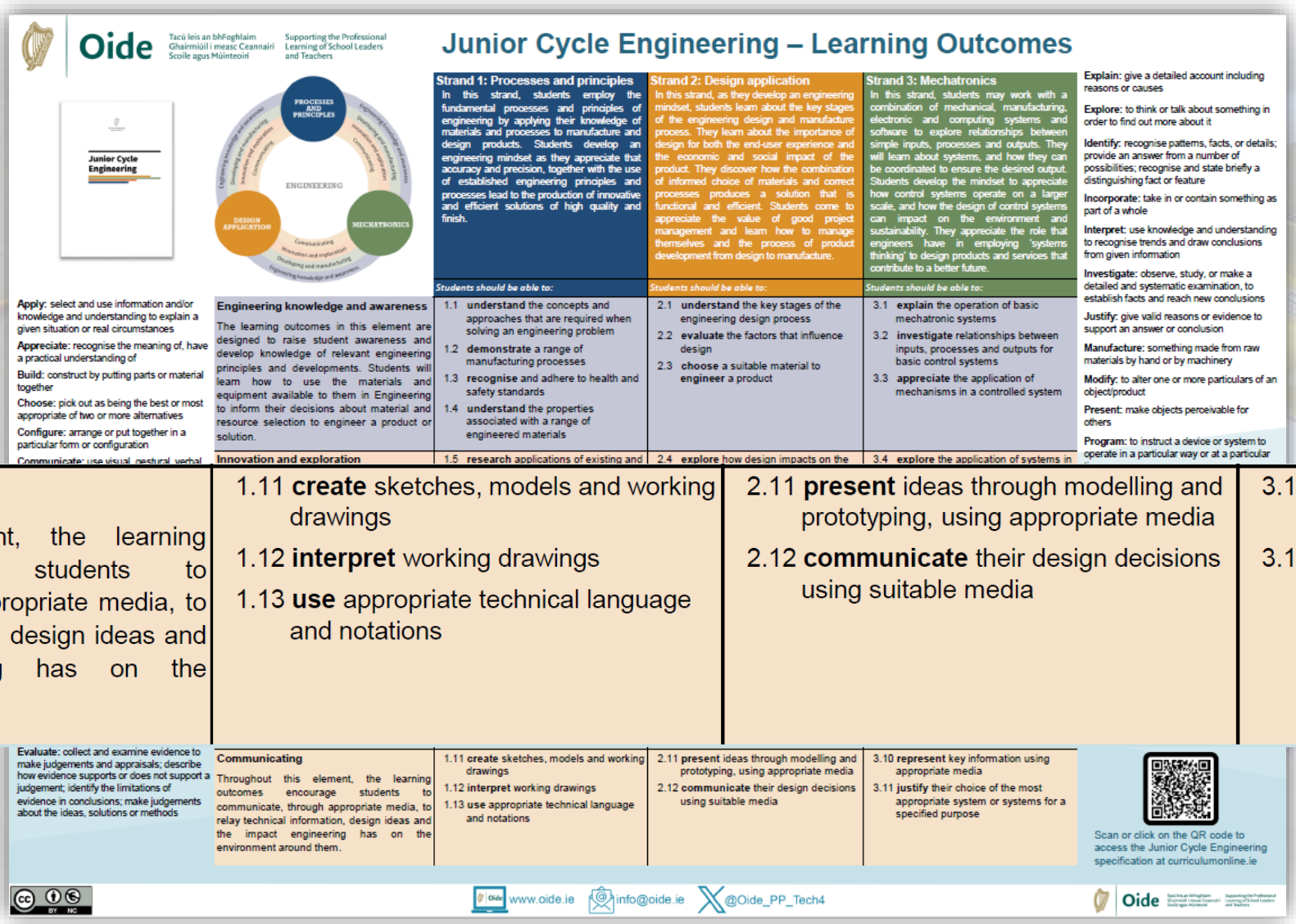
Explore how effective communication supports and enhances the student experience in Engineering

Reflection Point

Oide

How could we further develop communication skills in Engineering?

Let's Consider the Communication Element



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Junior Cycle Engineering – Learning Outcomes

Junior Cycle Engineering

PROCESSES AND PRINCIPLES · DESIGN APPLICATION · MECHATRONICS · ENGINEERING

Strand 1: Processes and principles
In this strand, students employ the fundamental processes and principles of engineering by applying their knowledge of materials and processes to manufacture and design products. Students develop an engineering mindset as they appreciate that accuracy and precision, together with the use of established engineering principles and processes lead to the production of innovative and efficient solutions of high quality and finish.

Strand 2: Design application
In this strand, as they develop an engineering mindset, students learn about the key stages of the engineering design and manufacture process. They learn about the importance of design for both the end-user experience and the economic and social impact of the product. They discover how the combination of informed choice of materials and correct processes produces a solution that is functional and efficient. Students come to appreciate the value of good project management and learn how to manage themselves and the process of product development from design to manufacture.

Strand 3: Mechatronics
In this strand, students may work with a combination of mechanical, manufacturing, electronic and computing systems and software to explore relationships between simple inputs, processes and outputs. They will learn about systems, and how they can be coordinated to ensure the desired output. Students develop the mindset to appreciate how control systems operate on a larger scale, and how the design of control systems can impact on the environment and sustainability. They appreciate the role that engineers have in employing 'systems thinking' to design products and services that contribute to a better future.

	Students should be able to:	*Students should be able to:*	*Students should be able to:*
Engineering knowledge and awareness The learning outcomes in this element are designed to raise student awareness and develop knowledge of relevant engineering principles and developments. Students will learn how to use the materials and equipment available to them in Engineering to inform their decisions about material and resource selection to engineer a product or solution.	1.1 **understand** the concepts and approaches that are required when solving an engineering problem 1.2 **demonstrate** a range of manufacturing processes 1.3 **recognise** and adhere to health and safety standards 1.4 **understand** the properties associated with a range of engineered materials	2.1 **understand** the key stages of the engineering design process 2.2 **evaluate** the factors that influence design 2.3 **choose** a suitable material to **engineer** a product	3.1 **explain** the operation of basic mechatronic systems 3.2 **investigate** relationships between inputs, processes and outputs for basic control systems 3.3 **appreciate** the application of mechanisms in a controlled system
Innovation and exploration	1.5 **research** applications of existing and	2.4 **explore** how design impacts on the	3.4 **explore** the application of systems in

Apply: select and use information and/or knowledge and understanding to explain a given situation or real circumstances
Appreciate: recognise the meaning of, have a practical understanding of
Build: construct by putting parts or material together
Choose: pick out as being the best or most appropriate of two or more alternatives
Configure: arrange or put together in a particular form or configuration
Communicate: use visual, gestural, verbal

Explain: give a detailed account including reasons or causes
Explore: to think or talk about something in order to find out more about it
Identify: recognise patterns, facts, or details; provide an answer from a number of possibilities; recognise and state briefly a distinguishing fact or feature
Incorporate: take in or contain something as part of a whole
Interpret: use knowledge and understanding to recognise trends and draw conclusions from given information
Investigate: observe, study, or make a detailed and systematic examination, to establish facts and reach new conclusions
Justify: give valid reasons or evidence to support an answer or conclusion
Manufacture: something made from raw materials by hand or by machinery
Modify: to alter one or more particulars of an object/product
Present: make objects perceivable for others
Program: to instruct a device or system to operate in a particular way or at a particular

Evaluate: collect and examine evidence to make judgements and appraisals; describe how evidence supports or does not support a judgement; identify the limitations of evidence in conclusions; make judgements about the ideas, solutions or methods

Communicating Throughout this element, the learning outcomes encourage students to communicate, through appropriate media, to relay technical information, design ideas and the impact engineering has on the environment around them.	1.11 **create** sketches, models and working drawings 1.12 **interpret** working drawings 1.13 **use** appropriate technical language and notations	2.11 **present** ideas through modelling and prototyping, using appropriate media 2.12 **communicate** their design decisions using suitable media	3.10 **represent** key information using appropriate media 3.11 **justify** their choice of the most appropriate system or systems for a specified purpose

Scan or click on the QR code to access the Junior Cycle Engineering specification at curriculumonline.ie

www.oide.ie info@oide.ie @Oide_PP_Tech4

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Communication in Engineering

Communicating			
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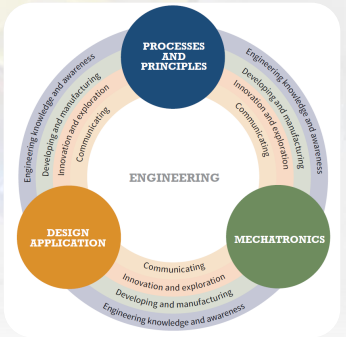
- In groups, explore two Learning Outcomes
- Consider the **knowledge**, **understanding**, **skills**, and **values** associated with each Learning Outcome

15 minutes

Page 8

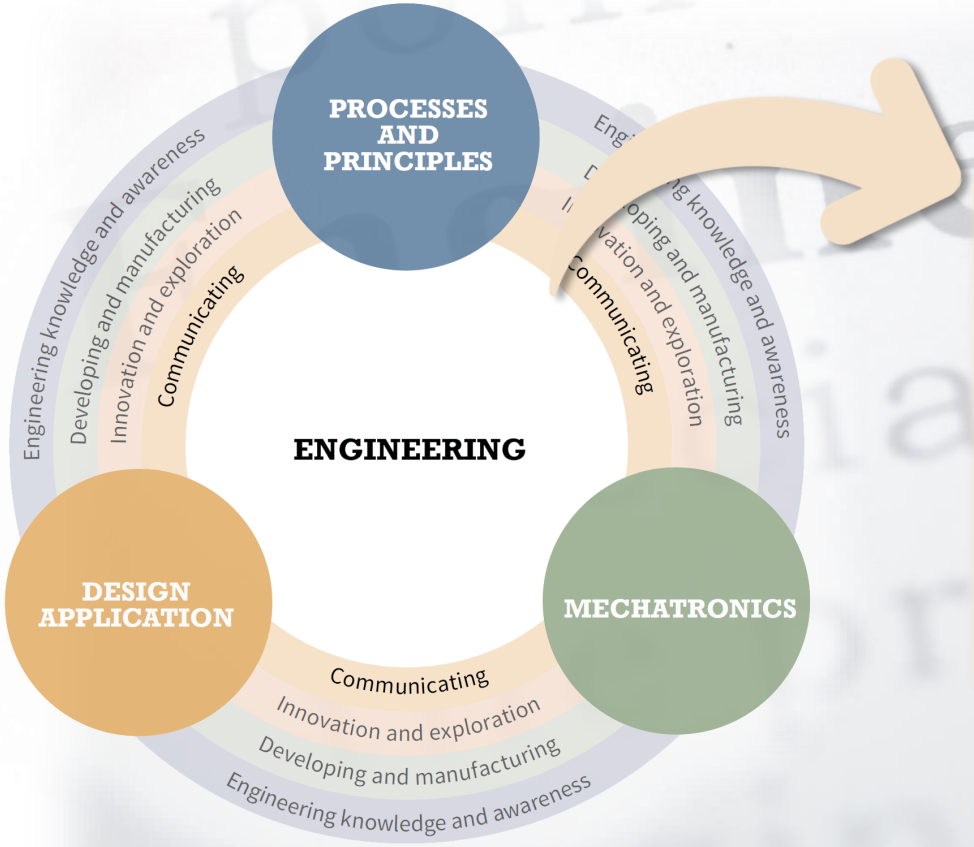


Feedback

What **knowledge**, **understanding**, **skills**, and **values** have you identified in each Learning Outcome?

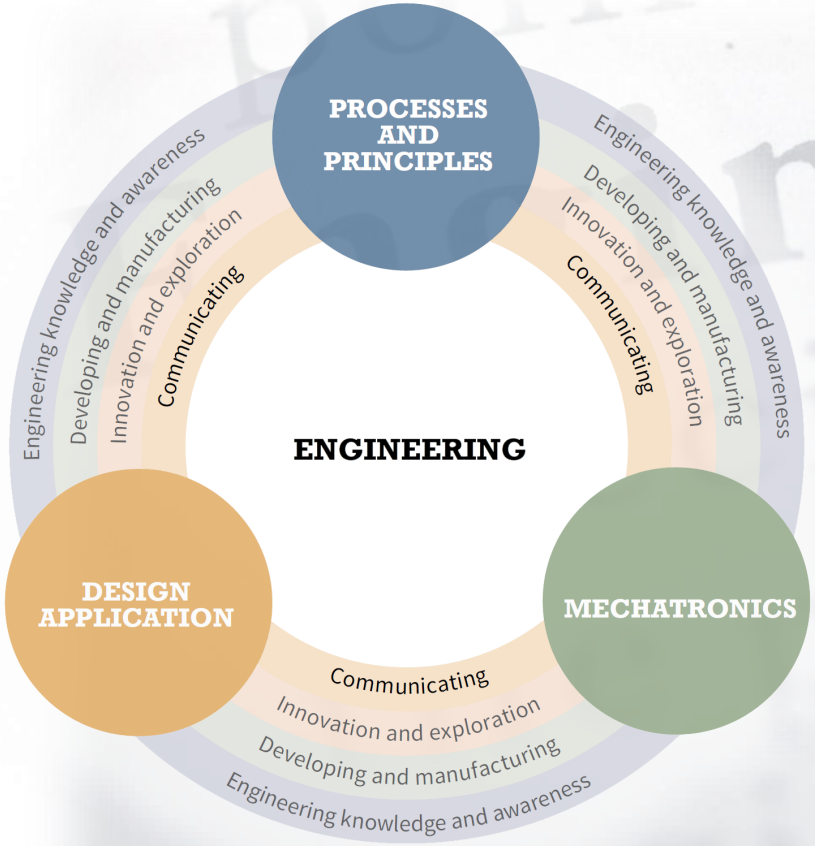
Communicating Throughout this element, the learning outcomes encourage students to communicate, through appropriate media, to relay technical information, design ideas and the impact engineering has on the environment around them.	1.11 **create** sketches, models and working drawings 1.12 **interpret** working drawings 1.13 **use** appropriate technical language and notations	2.11 **present** ideas through modelling and prototyping, using appropriate media 2.12 **communicate** their design decisions using suitable media	3.10 **represent** key information using appropriate media 3.11 **justify** their choice of the most appropriate system or systems for a specified purpose

Communicating



Communicating
Throughout this element, the learning outcomes encourage students to communicate, through appropriate media, to relay technical information, design ideas and the impact engineering has on the environment around them..

Communicating



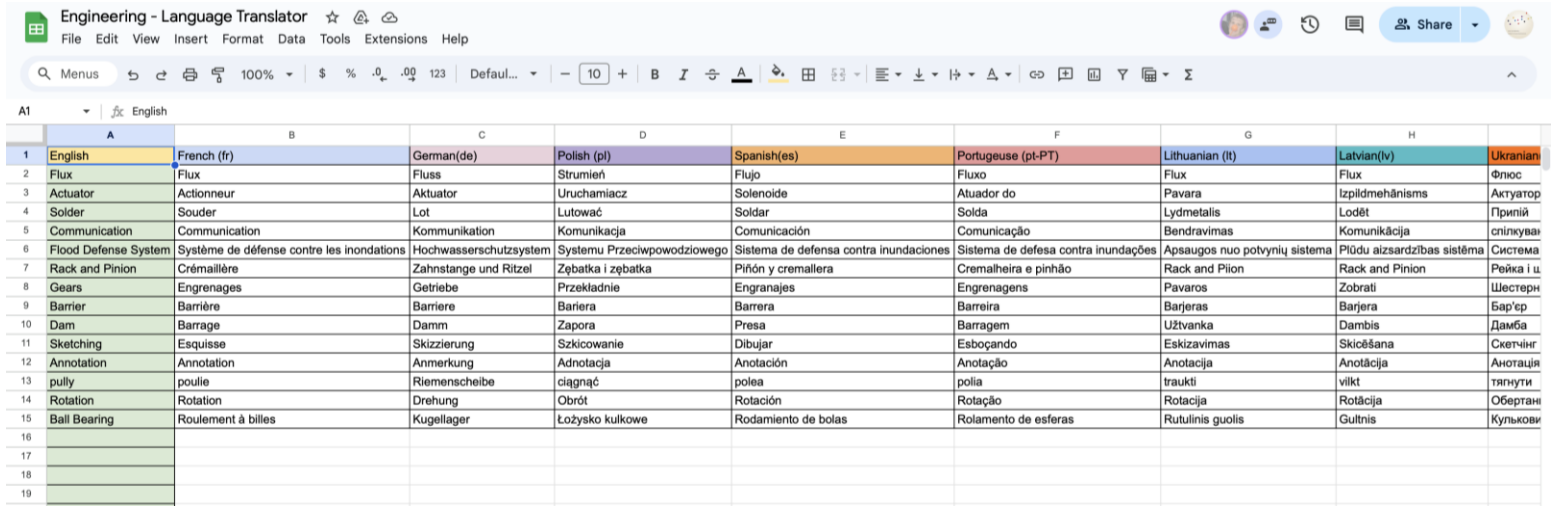
Technical Information

Appropriate Media

How do your students currently communicate technical information?

Supporting Students with EAL

- [Engineering - Language Translator - Google Sheets]



Engineering - Language Translator

File Edit View Insert Format Data Tools Extensions Help

Share

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A1 English

	A	B	C	D	E	F	G	H	
1	English	French (fr)	German(de)	Polish (pl)	Spanish(es)	Portugeuse (pt-PT)	Lithuanian (lt)	Latvian(lv)	Ukranian
2	Flux	Flux	Fluss	Strumień	Flujo	Fluxo	Flux	Flux	Флюс
3	Actuator	Actionneur	Aktuator	Uruchamiacz	Solenoide	Atuador do	Pavara	Izpildmehānisms	Актуатор
4	Solder	Souder	Lot	Lutować	Soldar	Solda	Lydmetalis	Lodēt	Припій
5	Communication	Communication	Kommunikation	Komunikacja	Comunicación	Comunicação	Bendravimas	Komunikācija	спілкуван
6	Flood Defense System	Système de défense contre les inondations	Hochwasserschutzsystem	Systemu Przeciwpowodziowego	Sistema de defensa contra inundaciones	Sistema de defesa contra inundações	Apsaugos nuo potvynių sistema	Plūdu aizsardzības sistēma	Система
7	Rack and Pinion	Crémaillère	Zahnstange und Ritzel	Zębatka i zębatka	Piñón y cremallera	Cremalheira e pinhão	Rack and Pion	Rack and Pinion	Рейка і ш
8	Gears	Engrenages	Getriebe	Przekładnie	Engranajes	Engrenagens	Pavaros	Zobrati	Шестерн
9	Barrier	Barrière	Barriere	Bariera	Barrera	Barreira	Barjeras	Barjera	Бар'єр
10	Dam	Barrage	Damm	Zapora	Presa	Barragem	Užtvanka	Dambis	Дамба
11	Sketching	Esquisse	Skizzierung	Szkicowanie	Dibujar	Esboçando	Eskizavimas	Skicēšana	Скетчінг
12	Annotation	Annotation	Anmerkung	Adnotacja	Anotación	Anotação	Anotacija	Anotācija	Анотація
13	pully	poulie	Riemenscheibe	ciągnąć	polea	polia	traukti	vilkt	тягнути
14	Rotation	Rotation	Drehung	Obrót	Rotación	Rotação	Rotacija	Rotācija	Обертан
15	Ball Bearing	Roulement à billes	Kugellager	Łożysko kulkowe	Rodamiento de bolas	Rolamento de esferas	Rutulinis guolis	Gultnis	Кулькови
16									
17									
18									
19									

Reflection Moment

Oide

5 minutes

What opportunities do your students have to demonstrate and develop communication of technical information in your classroom?

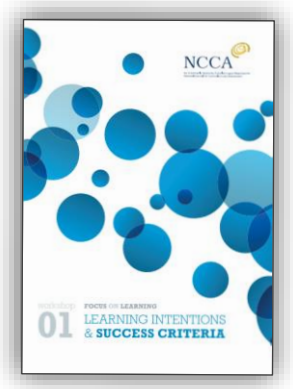
Communicating Technical Information from a Process

Pause and Consider

Oide

When communicating technical information, what structures could you put in place to promote effective communication with your students?

Learning Intentions

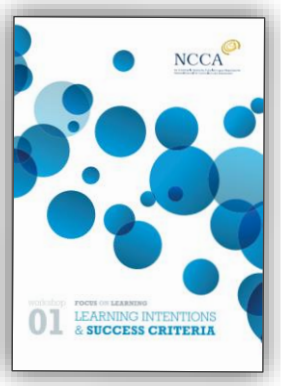


Learning Intentions → Success Criteria → Feedback

We are learning to:

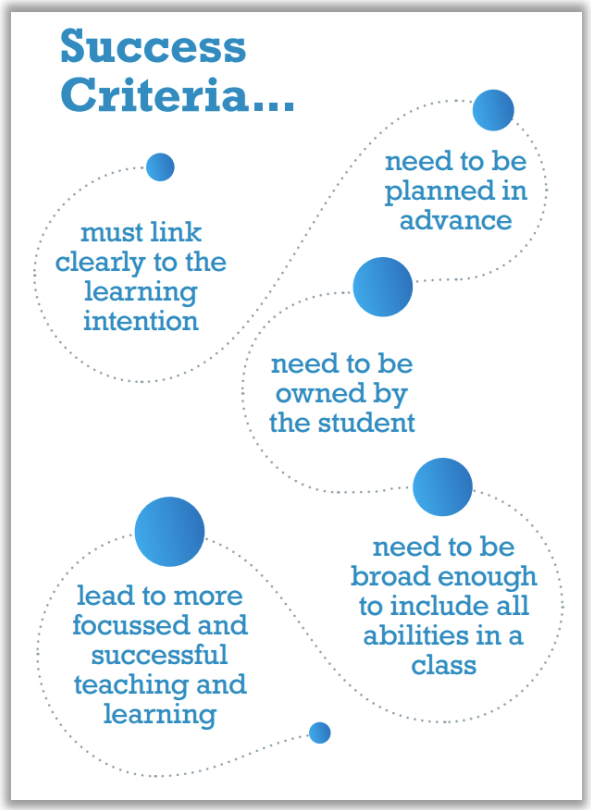
effectively communicate the technical information associated with a process

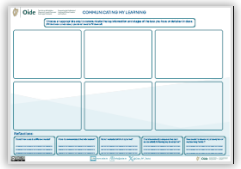
Success Criteria



Learning Intentions → **Success Criteria** → Feedback

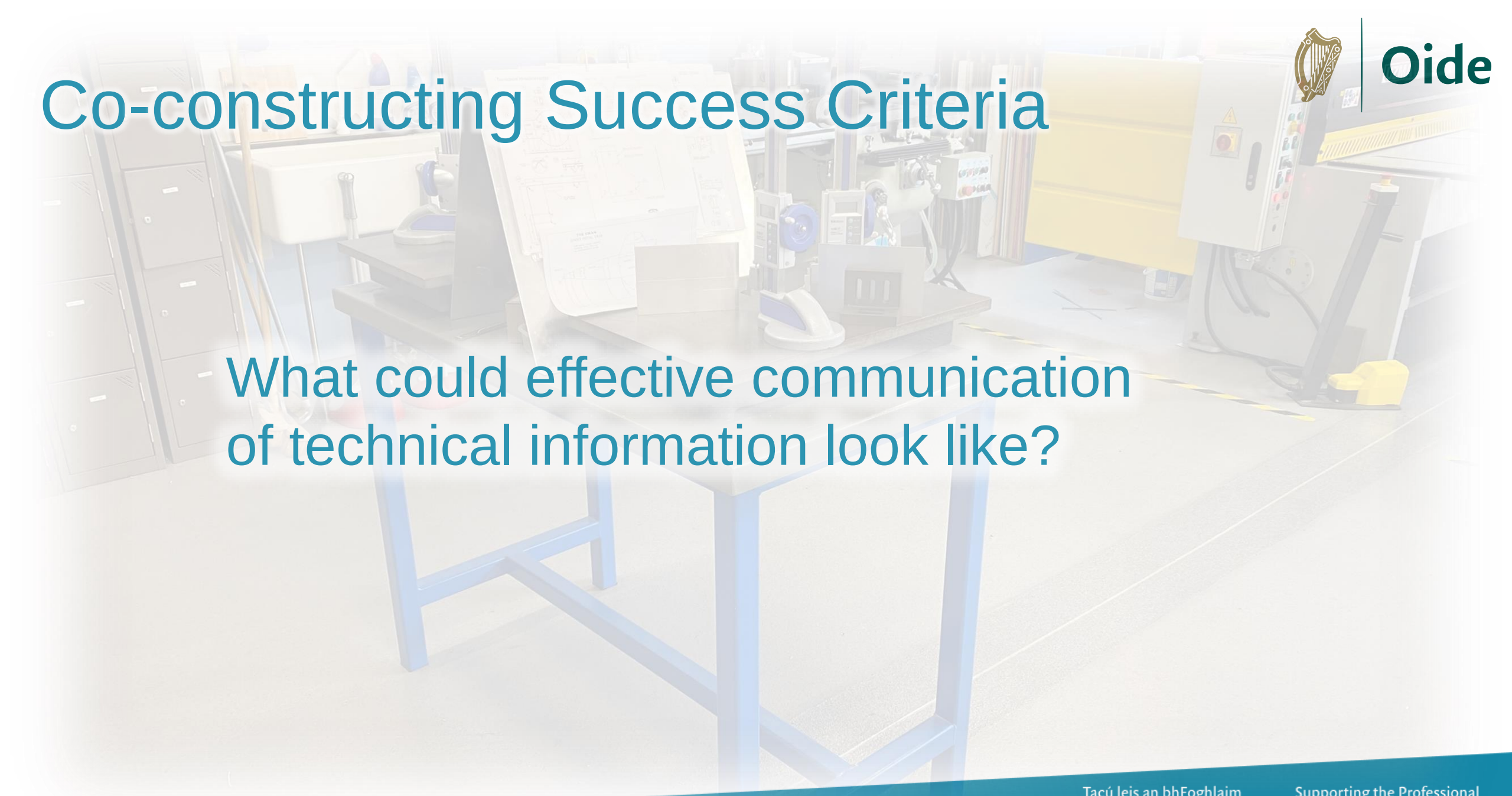
What success criteria could you co-create with your students to support this learning?





A3 Worksheet

Co-constructing Success Criteria



What could effective communication of technical information look like?

Co-constructing Success Criteria

Based on your conversations, let's refine the thoughts of the group into a list of success criteria, to enhance the communication of technical information.

Record the success criteria on your sheet to guide you.

10 minutes

A3 Worksheet

Live Demonstration of Soldering

Communicating Technical Information

- Having witnessed the process, now communicate the process to a friend who would not have seen it.
- Use the co-constructed success criteria to guide you.

A3 Worksheet

5 minutes

Marketplace

Swap your sheet with your colleagues

What evidence of effective communication do you see in your colleagues' sheet?

Could you suggest some feedback to your colleagues that would improve their communication?

10 minutes

Feedback

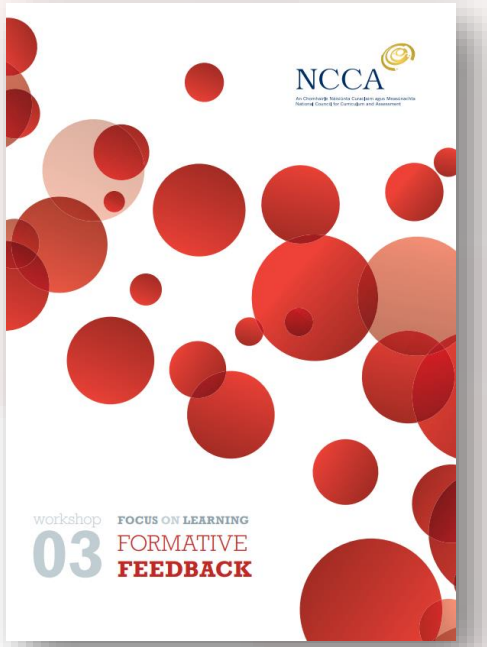
Oide

Learning Intentions → Success Criteria → Feedback

Effective feedback is designed to improve student learning

Feedback is effective when it:

- Focused on the quality of student work
- Related to agreed ***success criteria***
- Identifies success and achievement
- Indicates suggestions for improvement
- Prompts student thinking
- Allows time for improvement to take place

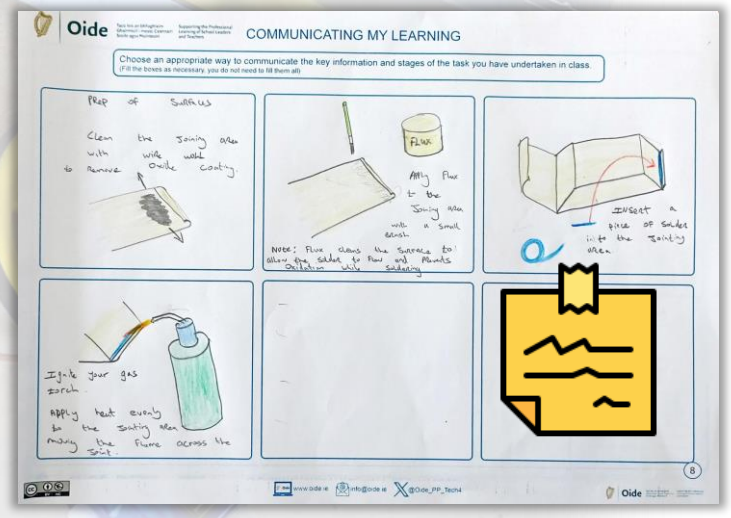


Marketplace

Oide

Using a post-it note, suggest some feedback to your colleague that would improve their communication.

5 minutes



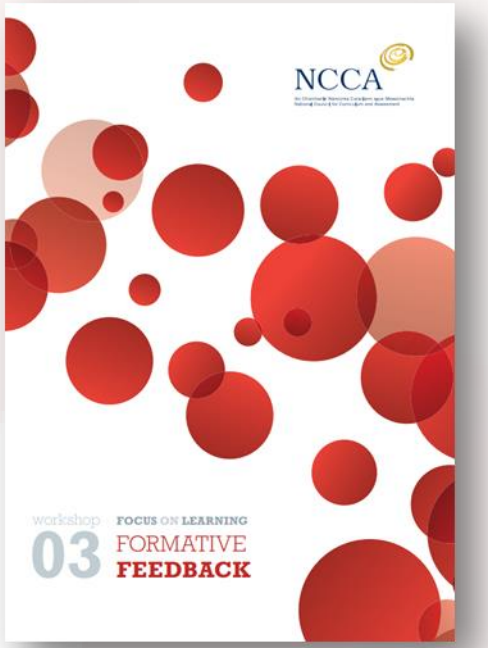
Review Your Feedback

Consider the feedback you offered your colleague.

Was it effective?

Feedback is effective when it:

- Focused on the quality of student work
- Related to agreed ***success criteria***
- Identifies success and achievement
- Indicates suggestions for improvement
- Prompts student thinking
- Allows time for improvement to take place



Personal Reflection Moment

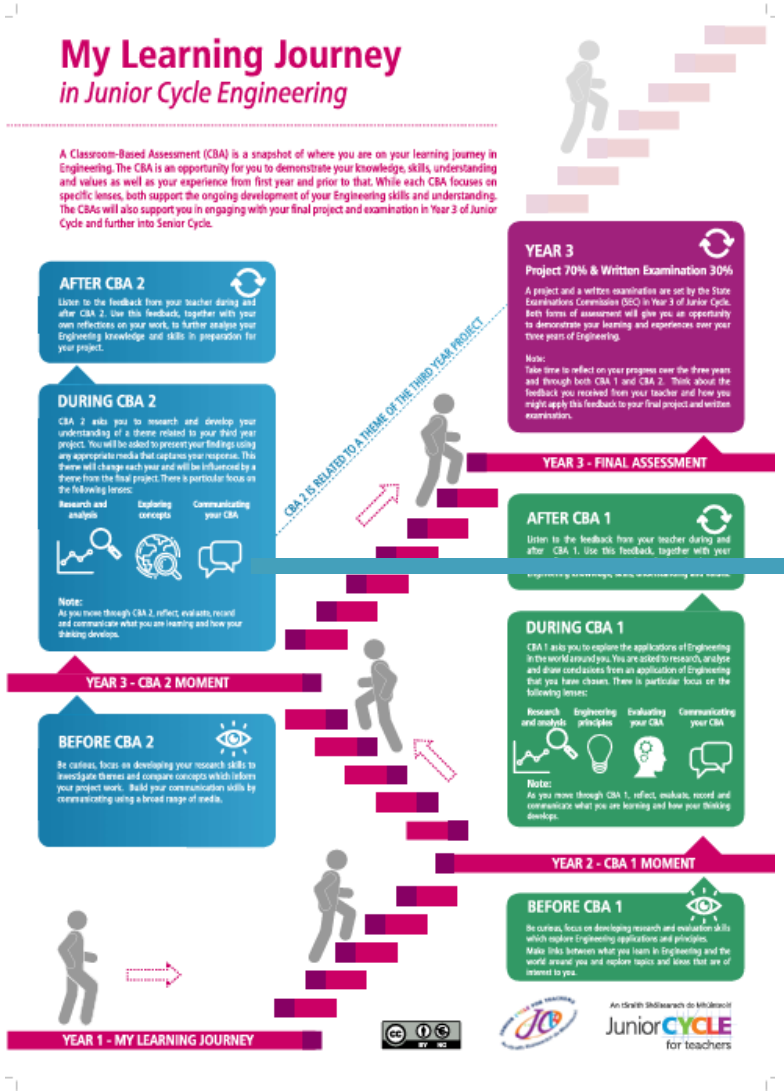
5 minutes

- How was the of development of student communication skills evident in this activity?
- How can the use of formative assessment support our students in enhancing communication skills in Engineering?

In this session, we will…

- Explore student approaches and teacher observations for CBA2
- Engage in planning to enhance teaching and learning

Learning Journey



AFTER CBA 2

Listen to the feedback from your teacher during and after CBA 2. Use this feedback together with your own reflections on your work to further develop your knowledge and understanding in the project domain.

DURING CBA 2

CBA 2 asks you to research and investigate the domain in which the final project will be situated and to present your findings graphically through any appropriate media. This domain will change each year and will be related to the Year 3 project. There is particular focus on the following lenses:

Research and analysis | Exploring concepts | Graphical presentation

Note:
As you move through CBA 2, reflect, evaluate, record and communicate what you are learning and how your thinking develops.

YEAR 3 - CBA 2 MOMENT

Engineering

The Guidelines for the Classroom-Based Assessments in Engineering have been updated and are available under the '*Assessment Guidelines*' tab.

Under the current Framework for Junior Cycle, students have access to a suite of technology subjects: Engineering, Wood Technology, Graphics and Applied Technology

Junior Cycle Engineering aims to develop the students' awareness of engineering processes while developing the necessary subject knowledge with the disciplinary skills to engineer products.

View Specification PDF

CBA2: Click here for the 2024/25 theme

View theme details

Click on graphic below

Curriculum Specification

Assessment Guidelines

Examples of Student Work

Previous CBA 2 Themes

CBA Revised Arrangements

Oide

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Supporting the Professional Learning of School Leaders and Teachers

CBA2 Exemplars

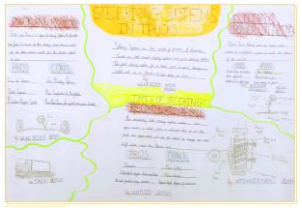
Sample 1

Overall Judgement:
Exceptional

Sample 2

Overall Judgement:
Exceptional

Sample 3



Overall Judgement:
In line with expectations

Sample 4

Overall Judgement:
In Line with expectations

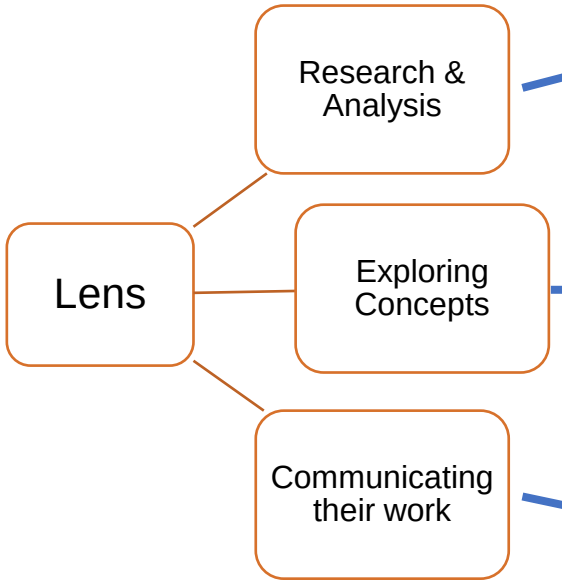
Sample 5

Overall Judgement:
Above expectations

Curriculum online
CBA 2 Samples Page

CBA 2

Lenses to address in CBA 2



CBA 2 Theme

Classroom-Based Assessment 2: Engineering

This Classroom-Based Assessments provides opportunities for students to investigate and develop their understanding of a theme related to their upcoming project, which will be later issued by the State Examinations Commission.

For 2024/2025 third year students, the theme is: **Linear Actuators**.

The student can communicate the Classroom-Based Assessment through any appropriate media that captures their response. To help structure their approach to the Classroom-Based Assessment, the students should focus their work through the lens of:

Research and analysis
An area of focus for completion of the Classroom-Based Assessment is developing a student's research skills on a prescribed area. Students should try to define their idea(s) such as brainstorming key words, phrases and other pieces of information that will assist their research. Each student will be required to gather data and information from different sources to research the prescribed theme. Each individual student must conduct their own research using some field (primary) research and/or some desk (secondary) research. It is important that each student records the source(s) of all the information gathered in order to assess its reliability and quality, and to ensure that the sources used can be referenced in the task. They should be encouraged to search effectively, evaluate and analyse material.

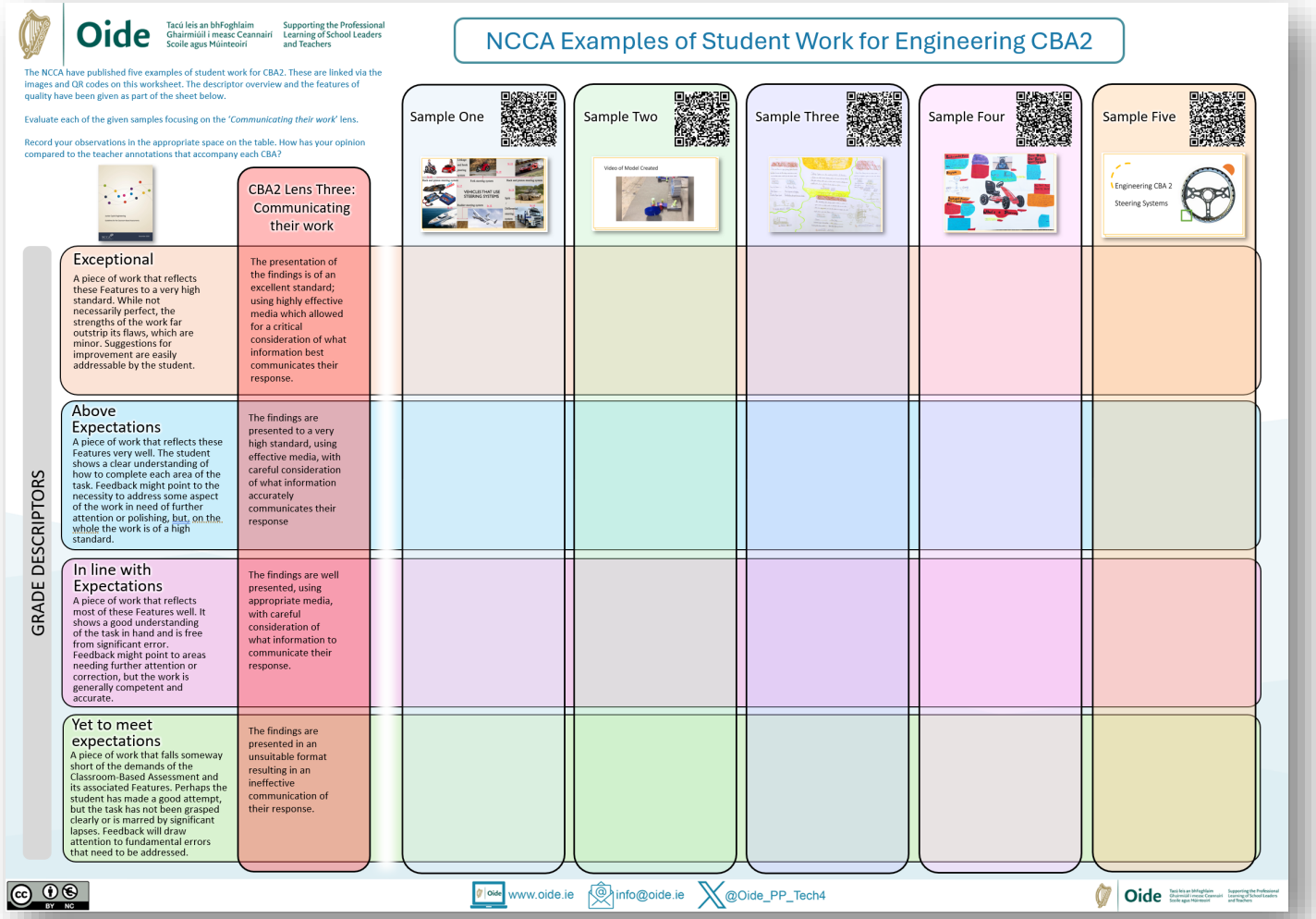
Exploring concepts
After completing their initial research, students should be encouraged to identify and explore relevant concepts associated with the theme. These concepts can relate to the theme as a whole, or, to distinct aspects of the theme. Students can draw on existing knowledge but should support their work with research to enhance their knowledge of their identified concepts. By exploring concepts relevant to the theme, students should be able to show a genuine understanding of the theme and should consider what key information will be needed to accurately communicate their findings.

Communicating their work
Each student will present on what they have learned having completed the Classroom-Based Assessment. The information should be presented in their own words to demonstrate personal understanding of the knowledge and ideas relevant to the theme. Students should be encouraged to identify which information best communicates their work and choose the most suitable medium in which to present it.

Features of Quality

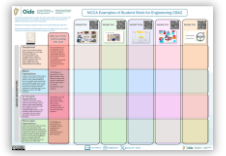
Features of Quality: Research and development	
Exceptional A piece of work that reflects these Features to a very high standard. While not necessarily perfect, the strengths of the work far outstrip its flaws, which are minor. Suggestions for improvement are easily addressable by the student.	▪ The research method chosen demonstrated a comparison of a range of sources which led to the production of a comprehensive and detailed analysis of the data/findings. ▪ The response demonstrated a comprehensive understanding of a range of concepts in relation to the theme. ▪ The presentation of the findings is of an excellent standard; using highly effective media which allowed for a critical consideration of what information best communicates their response.
Above expectations A piece of work that reflects these Features very well. The student shows a clear understanding of how to complete each area of the task. Feedback might point to the necessity to address some aspect of the work in need of further attention or polishing, but, on the whole the work is of a high standard.	▪ The research method chosen was effective for the theme and generated an in-depth level of analysis of the data/findings. ▪ The response demonstrated a high level of understanding of concepts relevant to the theme. ▪ The findings are presented to a very high standard, using effective media, with careful consideration of what information accurately communicates their response.
In line with expectations A piece of work that reflects most of these Features well. It shows a good understanding of the task in hand and is free from significant errors. Feedback might point to areas needing further attention or correction, but the work is generally competent and accurate.	▪ The research method chosen was appropriate for their area of learning and generated a suitable analysis. ▪ The response demonstrated some level of understanding of concepts relevant to the theme. ▪ The findings are well presented, using appropriate media, with careful consideration of what information to communicate their response.
Yet to meet expectations A piece of work that falls someway short of the demands of the Classroom-Based Assessment and its associated Features. Perhaps the student has made a good attempt, but the task has not been grasped clearly or is marred by significant lapses. Feedback will draw attention to fundamental areas that	▪ The research method chosen for the theme was ineffective and the analysis of the data/findings lacks depth. ▪ The response demonstrated little or no understanding of concepts relevant to the theme. ▪ The findings are presented in an unsuitable format resulting in an ineffective communication of their response.

Assigning Descriptors



15 minutes

SLAR Facilitation Resource



A3 Worksheet

NCCA Examples of Student Work for Engineering CBA2

The NCCA have published five examples of student work for CBA2. These are linked via the images and QR codes on this worksheet. The descriptor overview and the features of quality have been given as part of the sheet below.

Evaluate each of the given samples focusing on the '*Communicating their work*' lens.

Record your observations in the appropriate space on the table. How has your opinion compared to the teacher annotations that accompany each CBA?

GRADE DESCRIPTORS	CBA2 Lens Three: Communicating their work	Sample One	Sample Two	Sample Three	Sample Four	Sample Five
Exceptional A piece of work that reflects these Features to a very high standard. While not necessarily perfect, the strengths of the work far outstrip its flaws, which are minor. Suggestions for improvement are easily addressable by the student.	The presentation of the findings is of an excellent standard; using highly effective media which allowed for a critical consideration of what information best communicates their response.					
Above Expectations A piece of work that reflects these Features very well. The student shows a clear understanding of how to complete each area of the task. Feedback might point to the necessity to address some aspect of the work in need of further attention or polishing, but, on the whole the work is of a high standard.	The findings are presented to a very high standard, using effective media, with careful consideration of what information accurately communicates their response					
In line with Expectations A piece of work that reflects most of these Features well. It shows a good understanding of the task in hand and is free from significant error. Feedback might point to areas needing further attention or correction, but the work is generally competent and accurate.	The findings are well presented, using appropriate media, with careful consideration of what information to communicate their response.					
Yet to meet expectations A piece of work that falls someway short of the demands of the Classroom-Based Assessment and its associated Features. Perhaps the student has made a good attempt, but the task has not been grasped clearly or is marred by significant lapses. Feedback will draw attention to fundamental errors that need to be addressed.	The findings are presented in an unsuitable format resulting in an ineffective communication of their response.					

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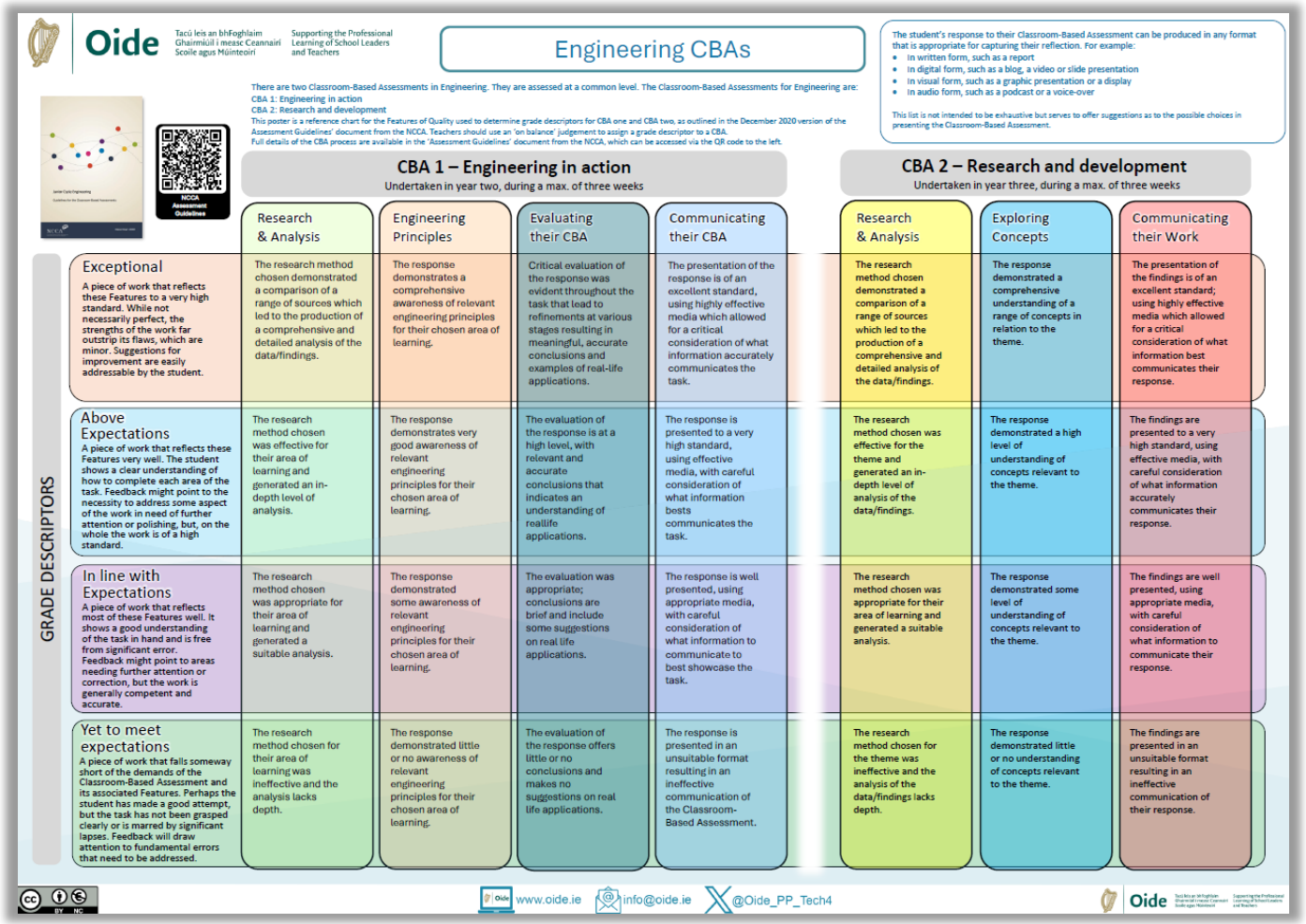
Supporting the Professional Learning of School Leaders and Teachers

Group Feedback & Discussion

Explore student approaches and teacher observations for CBA2

CBA 2 Descriptor Resource

15 minutes



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Supporting the Professional Learning of School Leaders and Teachers

Engineering CBAs

There are two Classroom-Based Assessments in Engineering. They are assessed at a common level. The Classroom-Based Assessments for Engineering are:
CBA 1: Engineering in action
CBA 2: Research and development
This poster is a reference chart for the Features of Quality used to determine grade descriptors for CBA one and CBA two, as outlined in the December 2020 version of the Assessment Guidelines' document from the NCCA. Teachers should use an 'on balance' judgement to assign a grade descriptor to a CBA.
Full details of the CBA process are available in the 'Assessment Guidelines' document from the NCCA, which can be accessed via the QR code to the left.

The student's response to their Classroom-Based Assessment can be produced in any format that is appropriate for capturing their reflection. For example:
- in written form, such as a report
- in digital form, such as a blog, a video or slide presentation
- in visual form, such as a graphic presentation or a display
- in audio form, such as a podcast or a voice-over

This list is not intended to be exhaustive but serves to offer suggestions as to the possible choices in presenting the Classroom-Based Assessment.

GRADE DESCRIPTORS	CBA 1 – Engineering in action (Undertaken in year two, during a max. of three weeks)				CBA 2 – Research and development (Undertaken in year three, during a max. of three weeks)		
	Research & Analysis	Engineering Principles	Evaluating their CBA	Communicating their CBA	Research & Analysis	Exploring Concepts	Communicating their Work
Exceptional A piece of work that reflects these Features to a very high standard. While not necessarily perfect, the strengths of the work far outstrip its flaws, which are minor. Suggestions for improvement are easily addressable by the student.	The research method chosen demonstrated a comparison of a range of sources which led to the production of a comprehensive and detailed analysis of the data/findings.	The response demonstrates a comprehensive awareness of relevant engineering principles for their chosen area of learning.	Critical evaluation of the response was evident throughout the task that lead to refinements at various stages resulting in meaningful, accurate conclusions and examples of real-life applications.	The presentation of the response is of an excellent standard, using highly effective media which allowed for a critical consideration of what information accurately communicates the task.	The research method chosen demonstrated a comparison of a range of sources which led to the production of a comprehensive and detailed analysis of the data/findings.	The response demonstrated a comprehensive understanding of a range of concepts in relation to the theme.	The presentation of the findings is of an excellent standard; using highly effective media which allowed for a critical consideration of what information best communicates their response.
Above Expectations A piece of work that reflects these Features very well. The student shows a clear understanding of how to complete each area of the task. Feedback might point to the necessity to address some aspect of the work in need of further attention or polishing, but, on the whole the work is of a high standard.	The research method chosen was effective for their area of learning and generated an in-depth level of analysis.	The response demonstrates very good awareness of relevant engineering principles for their chosen area of learning.	The evaluation of the response is at a high level, with relevant and accurate conclusions that indicates an understanding of reallife applications.	The response is presented to a very high standard, using effective media, with careful consideration of what information bests communicates the task.	The research method chosen was effective for the theme and generated an in-depth level of analysis of the data/findings.	The response demonstrated a high level of understanding of concepts relevant to the theme.	The findings are presented to a very high standard, using effective media, with careful consideration of what information accurately communicates their response.
In line with Expectations A piece of work that reflects most of these Features well. It shows a good understanding of the task in hand and is free from significant error. Feedback might point to areas needing further attention or correction, but the work is generally competent and accurate.	The research method chosen was appropriate for their area of learning and generated a suitable analysis.	The response demonstrated some awareness of relevant engineering principles for their chosen area of learning.	The evaluation was appropriate; conclusions are brief and include some suggestions on real life applications.	The response is well presented, using appropriate media, with careful consideration of what information to communicate to best showcase the task.	The research method chosen was appropriate for their area of learning and generated a suitable analysis.	The response demonstrated some level of understanding of concepts relevant to the theme.	The findings are well presented, using appropriate media, with careful consideration of what information to communicate their response.
Yet to meet expectations A piece of work that falls someway short of the demands of the Classroom-Based Assessment and its associated Features. Perhaps the student has made a good attempt, but the task has not been grasped clearly or is marred by significant lapses. Feedback will draw attention to fundamental errors that need to be addressed.	The research method chosen for their area of learning was ineffective and the analysis lacks depth.	The response demonstrated little or no awareness of relevant engineering principles for their chosen area of learning.	The evaluation of the response offers little or no conclusions and makes no suggestions on real life applications.	The response is presented in an unsuitable format resulting in an ineffective communication of the Classroom-Based Assessment.	The research method chosen for the theme was ineffective and the analysis of the data/findings lacks depth.	The response demonstrated little or no understanding of concepts relevant to the theme.	The findings are presented in an unsuitable format resulting in an ineffective communication of their response.

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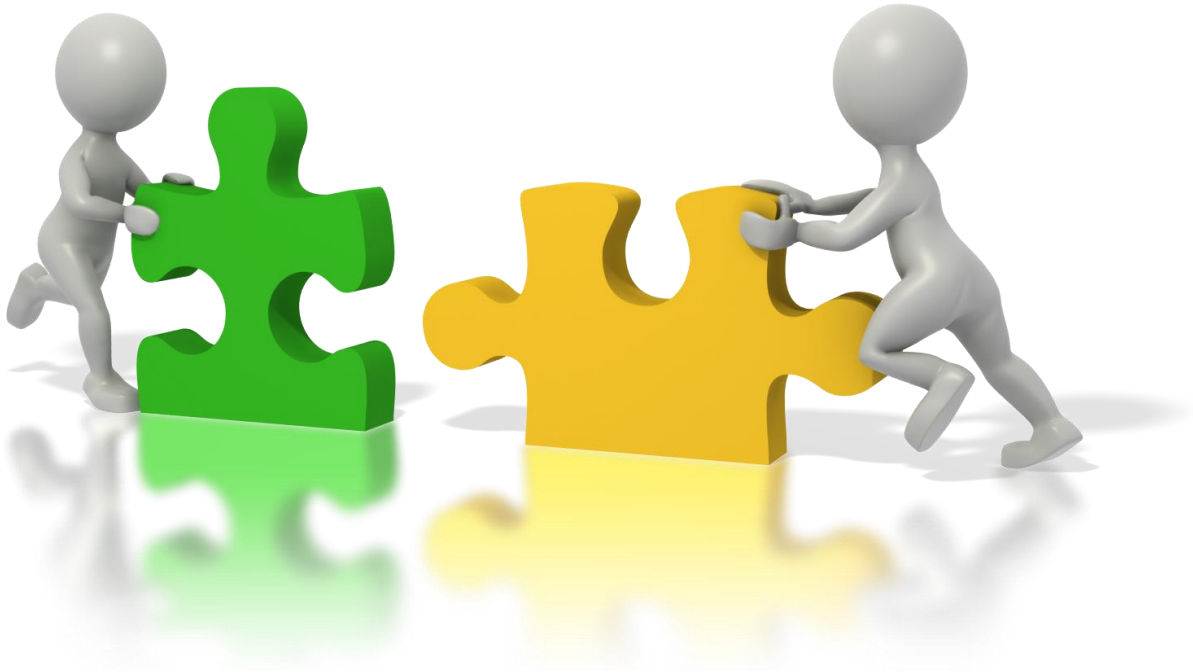
A3 Poster

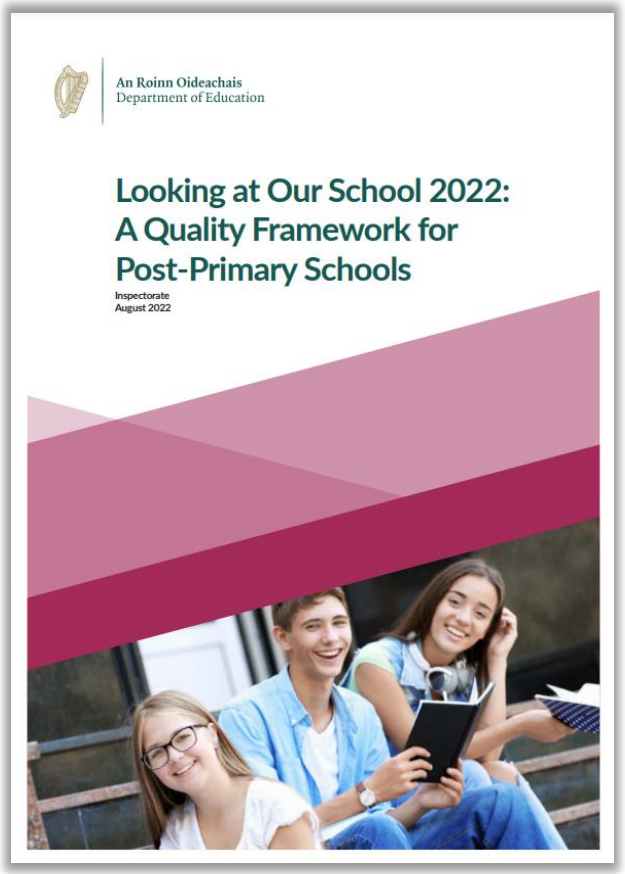
Personal Reflection Moment

must do, could do, like to do



5 minutes

Looking at Our School 2022



Schools as learning organisations: The quality framework views schools as dynamic learning organisations, where teachers are enabled to work and learn individually and collectively to build their professional capacity in order to support continuous improvement in learning and teaching.

Teachers contribute to building whole-staff capacity by sharing their expertise	Teachers recognise the value of building whole-staff capacity and are willing to share their expertise with other teachers in the school.	Teachers **value their role within a professional learning organisation** and, **as a matter of course**, share their expertise with other teachers in the school.
	Teachers are willing to share their expertise with teachers from other schools, for example through education centres, online forums, and school visits.	Teachers **share** their expertise with teachers from other schools, for example through education centres, online forums, and school visits.
	Teachers engage regularly in professional collaborative review of learning and teaching practices and use it to identify approaches.	Teachers engage regularly in professional collaborative review of learning and teaching practices, and **use it to identify and build on effective approaches**.
	Teachers respond positively to change and are open to building collective expertise in the skills and approaches, including those relating to digital competence, that are necessary to facilitate current and future student learning.	Teachers respond positively to change and are **proactive** in building collective expertise in the skills and approaches necessary, including those relating to digital competence, to facilitate current and future student learning.

Looking at Our School 2022

Schools as learning organisations: The quality framework views schools as dynamic learning organisations, where teachers are enabled to work and learn individually and collectively to build their professional capacity in order to support continuous improvement in learning and teaching.

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	Teachers are willing to share their expertise	Teachers **share** their expertise with teachers
	Teachers engage regularly in professional collaborative review of learning and teaching practices and use it to identify approaches.	Teachers engage regularly in professional collaborative review of learning and teaching practices, and **use it to identify and build on effective approaches.**
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Reflection Point

Considering all the activities from today, what one thing do you think could have the greatest impact in your classroom?

Empowering Teachers to Self-Evaluate

Teaching & Learning Improvement Plan:

- Step 1 - identify a focus
- Step 2 - gather evidence (data gathering)
- Step 3 - Analyse and make judgements
- Step 4 - Write and share report and improvement plan
- Step 5 - put improvement plan into action
- Step 6 - monitor actions and evaluate impact

Reflection Moment (Identifying a Focus)

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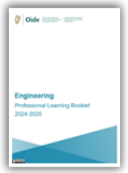
What area of Engineering do you feel needs further development and could form your focus?



Page 10

- Sketching & communicating knowledge
- Increase participation in the subject… gender balance
- Research and problem solving
- Developing the engineering mindset / Opportunities to behave as an engineer

Gathering Evidence

What evidence could inform the area identified for improvement?

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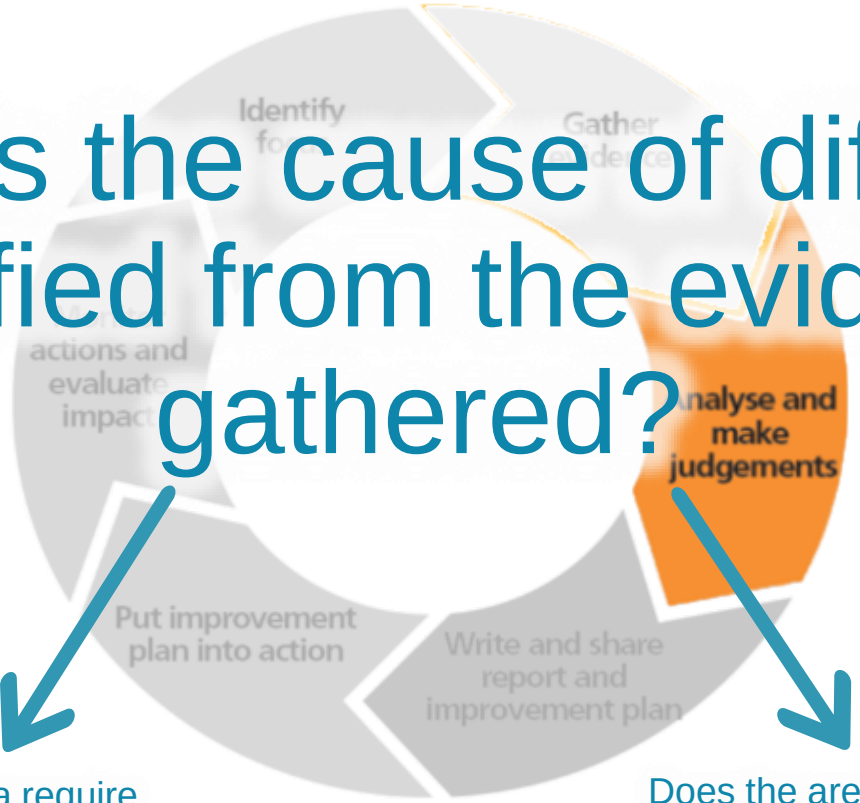
- Feedback from students
- Common trends in students' work
- Teacher observations
- National policy / statistics

Analyse and Make Judgements



What is the cause of difficulty identified from the evidence gathered?

Is there a lack of student confidence in the area?

Does the area require more supportive student scaffolding?

Does the area in focus require more real-world relevance?

Do students need more time and structure to reflect on learning?

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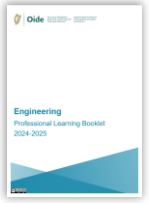
Write Improvement Plan

What strategies could you put in place to address the areas of difficulty you have identified?



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What steps could be put in place to improve areas of difficulty?

What improvements am I hoping to see?

How will I measure improvement?

Timeline? When will I evaluate impact?

Put Improvement Plan into Action

Remain consistent to proposed strategies to have the best chance of improvement

Monitor Actions and Evaluate Impact

Have the strategies you put in place had an impact?

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Compare to original evidence.

Have the strategies had an impact?

Thoughts on intervention?

Next steps?

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Supporting the Professional Learning of School Leaders and Teachers

Engineering

PLE 2024 - 2025

Thank you for your participation in today's session