



Oide

Tacú leis an bhFoghlaim
Ghairmiúil i measc Ceannairí
Scoile agus Múinteoirí

Supporting the Professional
Learning of School Leaders
and Teachers

Graphics

PLE 2023/24





Oide

Oide is a new support service for school leaders and teachers, funded by the Department of Education.

Launched on September 1, 2023.

Formed from the integration of four existing support services:

- Centre for School Leadership (CSL)
- Junior Cycle for Teachers (JCT)
- National Induction Programme for Teachers (NIPT)
- Professional Development Service for Teachers (PDST)



Partners



Oide



An Roinn Oideachais
Department of Education

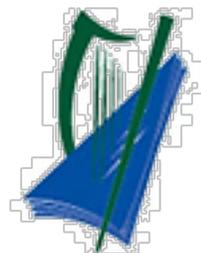
www.education.ie



NCCA

An Chomhairle Náisiúnta
Curaclaim agus Measúnachta
National Council for
Curriculum and Assessment

www.ncca.ie



Coimisiún na Scrúduithe Stáit
State Examinations Commission

www.examinations.ie



www.oide.ie

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Key Website / Online information



Oide

www.curriculumonline.ie

www.ncca.ie

www.oide.ie

X @Oide_PP_Tech4

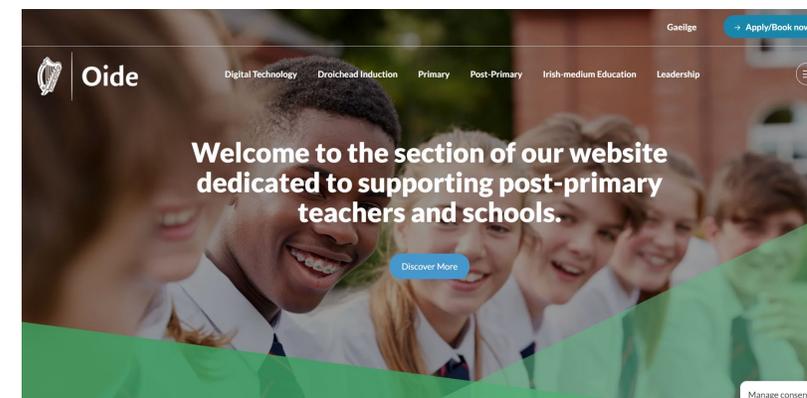
E: info@oide.ie



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Mailing List

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Supporting the Professional
Learning of School Leaders
and Teachers

Meet the Team - Graphics



Oide



Seán Kehoe
Professional Learning Leader



Barry Nolan
Senior Leader



Kevin Grant
Professional Learning Leader



Andrew Doherty
Professional Learning Leader



John Kilgannon
Professional Learning Leader



Today's Workshop

Break

11.00 – 11.20

Lunch

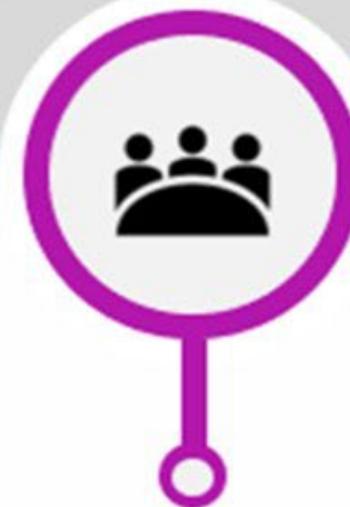
1.00 – 2.00



9.30 – 11.00



11.20 – 1.00



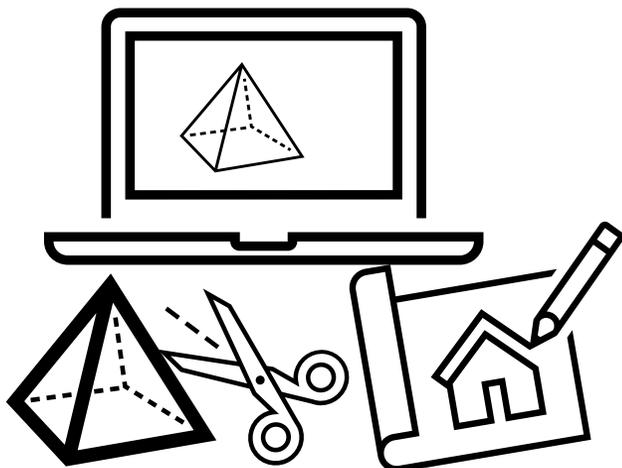
2.00 – 3.30

Session 1

Session 2



Theme for Today



Students as active agents in
their learning



Workshop
Resources



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Students as active agents in their learning

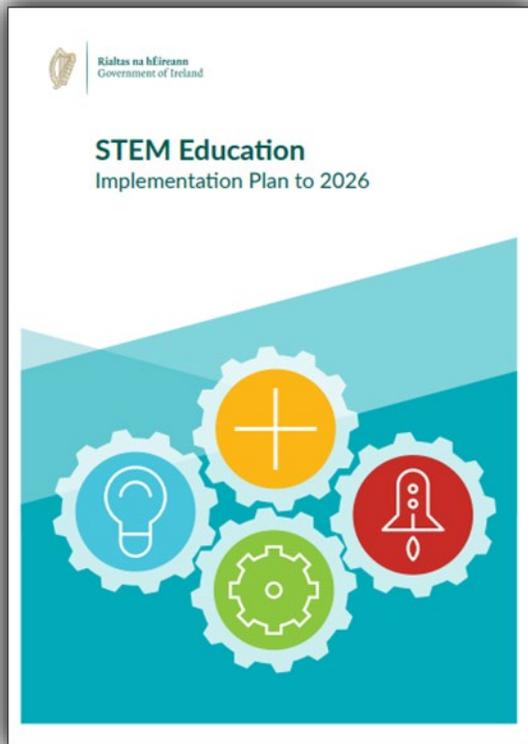
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STEM Education - Implementation Plan to 2026



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We must enable learners to become active and reflective participants by providing a range of learning and formative assessment experiences that enhances their curiosity, inquiry, creativity and problem-solving abilities.

STEM Education Implementation Plan to 2026, page 19



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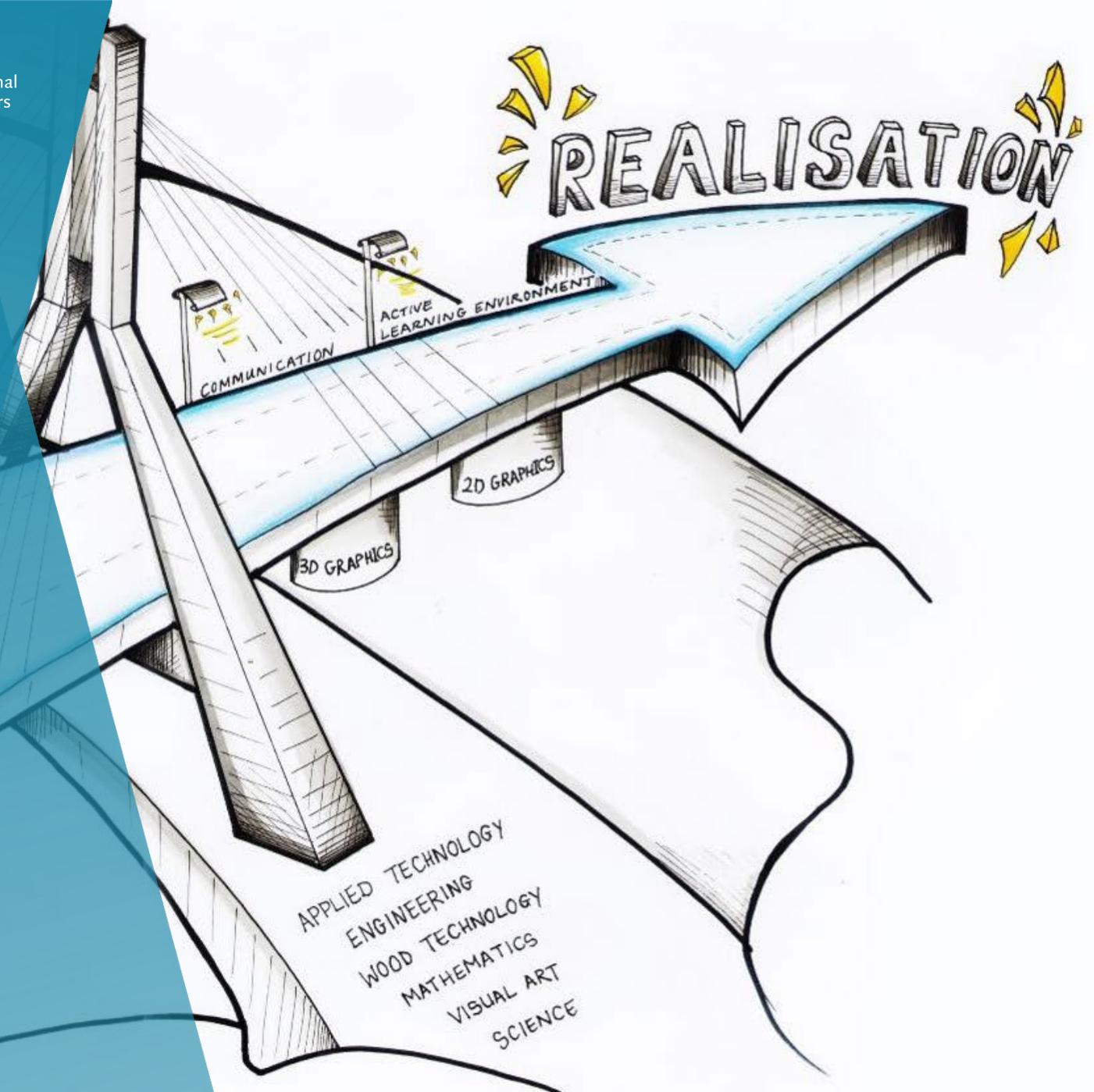
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Graphics

PLE 2023/2024

Session 1





In this session, we will...



Explore how the communication element provides opportunities to enrich learning in the Graphics classroom

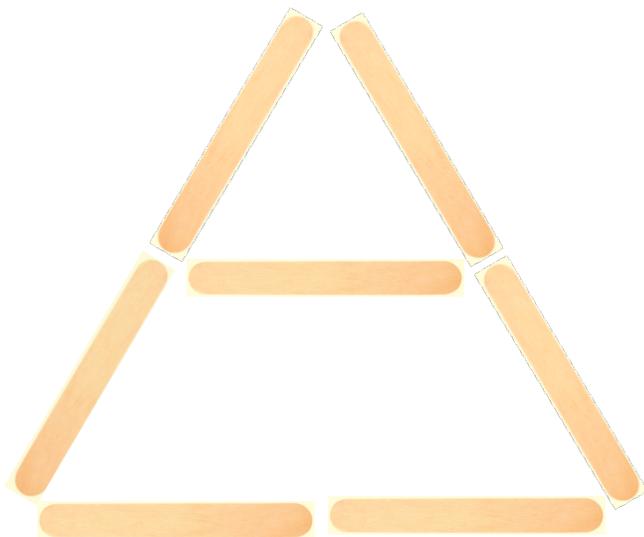


Consider how a variety of graphical media can be used to communicate an understanding of geometry

Introductions: Group Activity

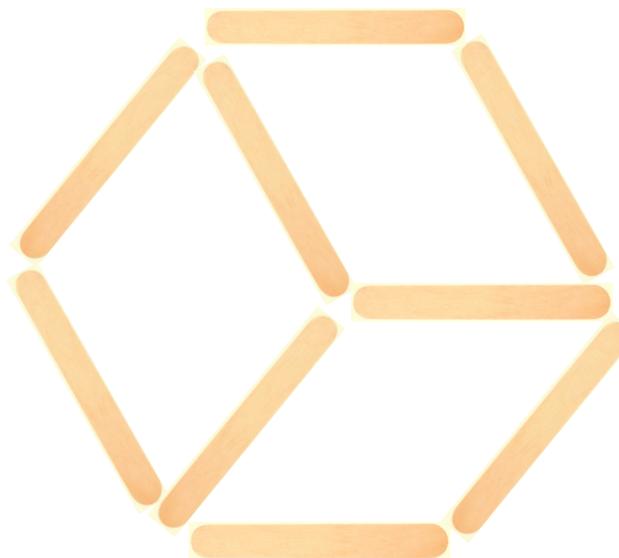


Challenge 1



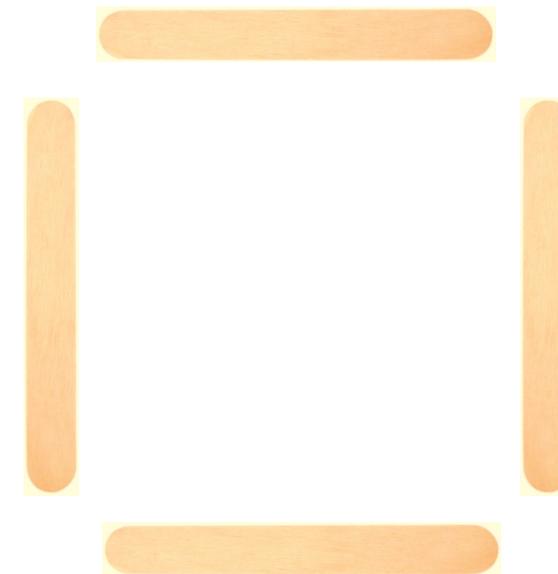
Can you form three triangles by moving two lollipop sticks?

Challenge 2



Can you form three triangles by moving three lollipop sticks?

Challenge 3

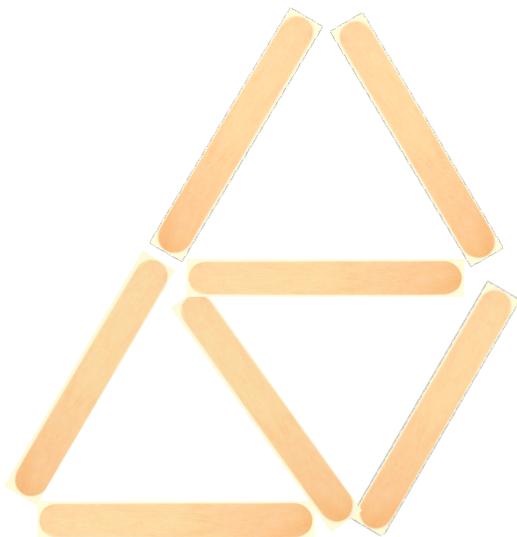


By adding just four lollipop sticks can you form four triangles and two squares?



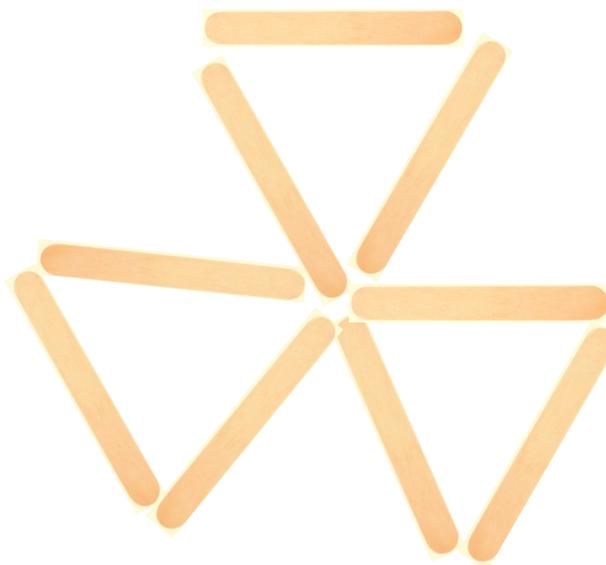
Solutions

Challenge 1



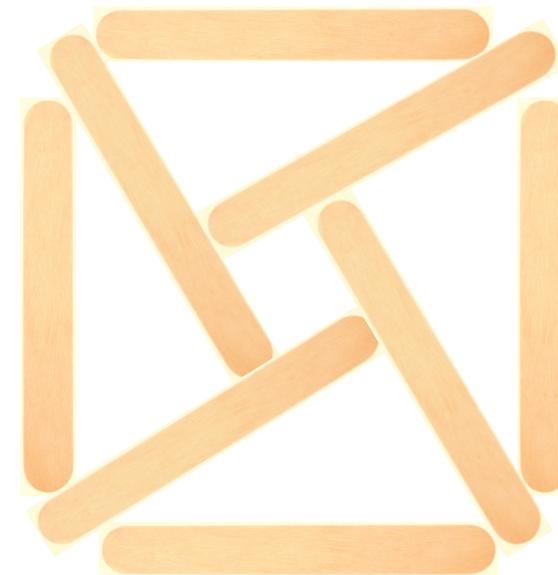
Can you form three triangles by moving two lollipop sticks?

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Can you form three triangles by moving three lollipop sticks?

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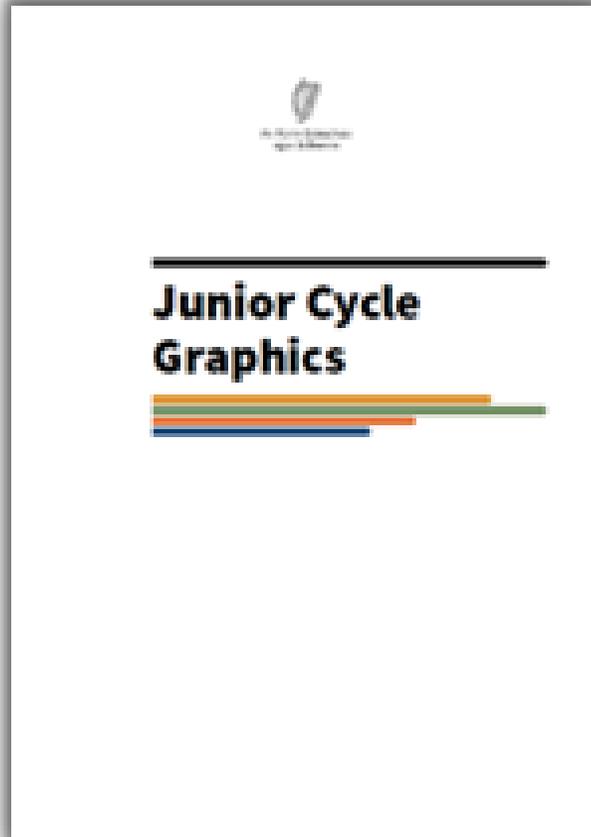
Group Feedback & Discussion



- What are the opportunities for student learning in this task/activity?
- What are the challenges for students in this task/activity?
- Are there opportunities for further learning in this task?

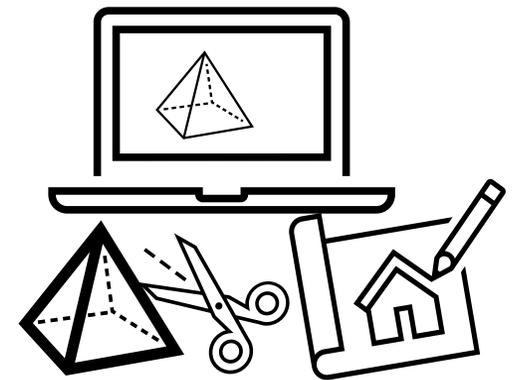


Graphics Specification



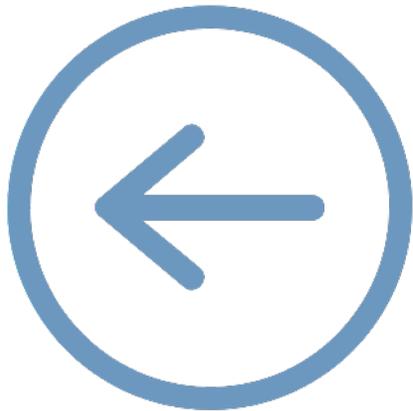
The study of Graphics at junior cycle aims to: develop students cognitive and practical skills associated with modelling and graphical communication.

Graphics Specification, page 5





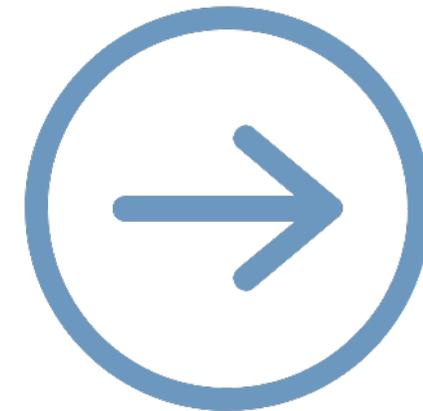
Pause and Reflect



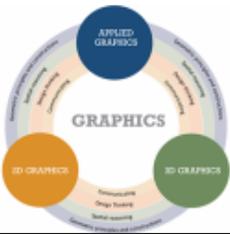
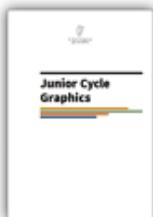
Reflecting on Feedback..



What is new in Graphics classroom?



How did this inform the design of today's PLE workshop?



Graphics – Planning Tool



Scan or click on the QR code to access the Junior Cycle Graphics specification



Action Verbs

Analyse: study or examine something in detail, break down in order to bring out the essential elements or structure; identify parts and relationships, and to interpret information to reach conclusions

Apply: select and use information and/or knowledge and understanding to explain a given situation or real circumstances

Appreciate: recognise the meaning of something a practical understanding

Communicate: use visual, gestural, verbal or other signs to share meaning or exchange information; interaction between sender and recipient; both work together to understand

Construct: develop information in a diagrammatic or logical form; not by factual recall but by analogy or by using and putting together information

Create: process and give form to the topic of what is to be created using selected methods and material and/or to give the material used a new form

Demonstrate: prove or make clear by reasoning or evidence; illustrating with examples of practical application

Derive: to formulate or prepare from concepts

Develop: advance a piece of work or an idea from an initial state to a more advanced state

Evaluate: (data) collect and examine data to make judgements and appraisals; describe how evidence supports or does not support a conclusion in an inquiry or investigation; identify the limitations of data in conclusions; make judgements about the ideas, solutions or methods

Spatial Reasoning- The learning outcomes from the different strands that are associated with this element encourage students to investigate a range of shapes, graphical information, objects and artefacts to assist students in developing their spatial ability. The learning outcomes aid the student in developing their abilities from initially recognising spatial properties to visualising their manipulation.

Design Thinking- The learning outcomes from the different strands that are associated with this element encourage students to use their understanding of Graphics to develop ideas and solutions to everyday problems. Students will develop the creative and innovative skills needed to develop and communicate their design solutions, influenced by their learning under the three strands.

Communicating- The learning outcomes from the different strands that are associated with this element encourage students to communicate through appropriate media to relay technical information, and to design ideas and solutions to problems. Emphasis should be placed on developing the students' abilities to communicate through a range of graphical media and make decisions on the appropriateness of specific media relative to specific stages of a design process.

Geometric principles and constructions- The learning outcomes from the different strands that are associated with this element encourage students to execute their understanding of geometric shapes and objects in the construction of two-dimensional and three-dimensional representations and in the solving of geometric problems. Students will adapt their knowledge from classroom activities to explore the role of geometric principles and constructions in the natural world around them.

Strand 1: 2D Graphics- In this strand, students will engage with, understand and apply the fundamental concepts and principles of 2D constructions, 2D shapes and projection systems. Throughout their studies, students will gain an appreciation of the application of 2D graphics to problem solving and develop an understanding of the role of 2D graphics in the creation of 3D objects and representations. Students should, as a result, be able to create clear representations of objects in space and accurately represent these in two-dimensions.

Students should be able to:

- 1 visualise the manipulation of 2D shapes
- 2 analyse graphical information for the planning of a 2D solution
- 3 derive 2D solutions using appropriate media

- 4 appreciate the role of 2D graphics in the creation of solutions
- 5 illustrate ideas using free-hand sketches to accurately communicate their thought process
- 6 apply their understanding of geometric principles to solve problems
- 7 interpret and create graphical representations of data/information

- 8 communicate the progression of ideas and thinking during the course of an activity using a variety of media
- 9 represent 3D information using 2D conventions

- 10 understand the properties of geometric shapes
- 11 appreciate the application of geometric constructions in the study of other areas
- 12 construct 2D solutions accurately in accordance with graphical conventions

- 13 generate and develop design ideas using appropriate geometric principles and constructions
- 14 apply geometric principles to construct accurate 3D solutions in accordance with graphical conventions

Strand 2: 3D Graphics- In this strand, students will engage with, understand and use the fundamental concepts and principles underpinning 3D objects, modelling systems and graphical conventions. This strand is of specific importance in developing each student's ability in visual imagery and representation. Students should as a result be able to accurately represent objects in three dimensions and apply these skills to problem solving

Students should be able to:

- 2.1 visualise the manipulation of 3D objects
- 2.2 analyse graphical information for the planning of a 3D solution
- 2.3 derive 3D solutions using appropriate media

- 2.4 appreciate the role of 3D graphics in the creation of solutions
- 2.5 develop ideas using free-hand sketches and other media to accurately communicate the thought process
- 2.6 apply their understanding of 3D principles to solve problems
- 2.7 construct solutions to presented and/or defined problems

- 2.8 construct a 3D representation of an artefact or abstract idea using a variety of media and methods
- 2.9 communicate the progression of ideas/thinking during the course of an activity using a variety of media

- 2.10 understand the properties of geometric objects and surfaces
- 2.11 appreciate the application of geometric principles in the study of other areas
- 2.12 generate and develop design ideas using appropriate geometric principles and constructions
- 2.13 apply geometric principles to construct accurate 3D solutions in accordance with graphical conventions

- 2.14 represent 3D information using 2D conventions

Strand 3: Applied Graphics- In this strand, students will draw on the knowledge, principles and techniques developed through the 2D Graphics and 3D Graphics strands to create and communicate solutions and information graphically. Students should be encouraged to investigate their physical environment and to apply the principles of 2D Graphics and 3D Graphics to the solution of a variety of problems. Students should be able to select the most appropriate methods to communicate their solutions and solve these problems, both in terms of their selection of graphical media and the mechanism for their utilisation.

Students should be able to:

- 3.1 recognise 2D and 3D features in everyday objects and artefacts
- 3.2 appreciate the hidden features of an object or an artefact necessary for its representation
- 3.3 demonstrate their spatial understanding by modelling and/or simulation

- 3.4 solve real-context and abstract problems using graphical techniques
- 3.5 analyse and evaluate both their own work, and the work of others

- 3.6 develop design ideas/solutions through modeling and prototyping using a variety of media
- 3.7 use computer-aided graphics to communicate design solutions effectively
- 3.8 represent graphically their approach to a design task
- 3.9 apply a variety of rendering and presentation techniques to enhance the communication of solutions

- 3.10 investigate and apply the principles of plane and descriptive geometries to create solutions
- 3.11 investigate how geometric principles and constructions found in the natural world have provided inspiration for human applications
- 3.12 develop an appropriate graphical representation of a solution to a contextual problem of their choice

- 3.13 generate and develop design ideas using appropriate geometric principles and constructions
- 3.14 apply geometric principles to construct accurate 3D solutions in accordance with graphical conventions

Action Verbs

Evaluate: (ethical judgement) 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

Generate: to produce or create

Illustrate: (graphically) use drawings to describe something

Interpret: use knowledge and understanding to recognise trends and draw conclusions from given information

Interpret: (aesthetic) assign meaning to objects on the basis of observations and contextual knowledge, translate the effect of an image into words by reasoning and explaining on the basis of reflection and understanding why the image is how it is and is not different.

Investigate: observe, study, or make a detailed and systematic examination, to establish facts and reach new conclusions

Recognise: identify facts, characteristics or concepts that are critical (relevant/ appropriate) to the understanding of a situation, event, process or phenomenon

Represent: bringing clearly and distinctively to mind by use of description or imagination

Solve: find an answer through reasoning

Understand: have and apply a well-organised body of knowledge

Use: apply knowledge or rules to put theory into practice; employ something in a targeted way

Visualise: make something visible to the mind or imagination something that is abstract or not visible or present to the eye

2D convention	First angle orthographic, oblique, isometric drawing, axonometric
3D representation	A view which displays a physical object or an abstract concept in a form which reflects length, depth and height.
3D solution	A solution to a specific or abstract problem derived and/or presented using 3D techniques.
Plane & Descriptive geometries	The graphical representation, description and analysis of relationships between points, lines and planes in space. The graphical representation of three dimensional objects in two dimensions.

Graphical Conventions	Current standards, conventions and practices associated with drawing and illustration
Contextual problem	A problem which draws on a real world experience, situation or application
Geometric constructions	The accurate drawing of points, lines, circles, angles, bisectors, divisions and other shapes using standard drawing instruments
Geometric principles	The fundamental principles which define and describe the nature of points, lines and planes together with the two dimensional and three dimensional shapes, solids, projection systems and constructions derived from them.

Elements





The Communicating Element

Communicating- The learning outcomes from the different strands that are associated with this element encourage students to communicate through appropriate media to relay technical information, and to design ideas and solutions to problems. Emphasis should be placed on developing the students' abilities to communicate through a range of graphical media and make decisions on the appropriateness of specific media relative to specific stages of a design process.

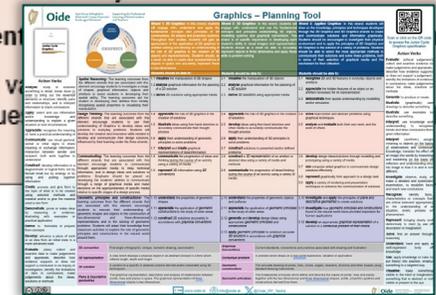
ns through modelling and
f media
s to communicate design
pproach to a design task
and presentation
ommunication of solutions



Explore the Learning Outcomes

‘Learning outcomes are statements that describe what **knowledge, understanding, skills** and **values** students should be able to demonstrate having studied Graphics in junior cycle’. *Graphics Specification, page 13*

<p>Communicating- The learning outcomes from the different strands that are associated with this element encourage students to communicate through appropriate media to relay technical information, and to design ideas and solutions to problems. Emphasis should be placed on developing the students' abilities to communicate through a range of graphical media and make decisions on the appropriateness of specific media relative to specific stages of a design process.</p>	<p>1.8 communicate the progression of ideas and thinking during the course of an activity using a variety of media</p>	<p>2.8 construct a 3D representation of an artefact or abstract idea using a variety of media and methods</p>	<p>3.6 develop design ideas/solutions through modelling and prototyping using a variety of media</p>
	<p>1.9 represent 3D information using 2D conventions</p>	<p>2.9 communicate the progression of ideas/thinking during the course of an activity using a variety of media</p>	<p>3.7 use computer-aided graphics to communicate design solutions effectively</p>



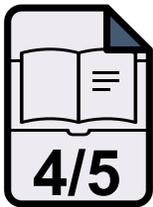
- Read the assigned learning outcomes and note the strand they align with
- Read the Element and Strand descriptor
- Consider and record the **knowledge, understanding, values** and **skills** for the assigned learning outcomes



Consider and record the **knowledge, understanding, values** and **skills** for the learning outcomes

Learning Outcome: _____ Action Verb: _____

Learning Outcome: _____ Action Verb: _____





Group Feedback & Discussion



20 minutes

Consider and record the **knowledge, understanding, values and skills** for the assigned learning outcomes



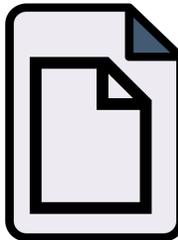


Sandcastle Activity



7 minutes

Graphically communicate how you would make a sandcastle



Success Criteria



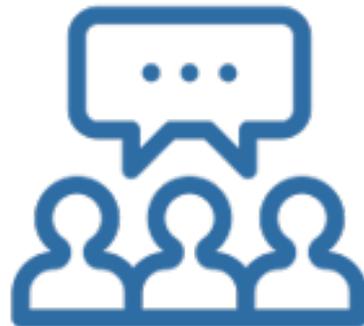
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They are developed by the teacher and/or the student and describe what success looks like.

They help the teacher and student to make judgements about the quality of student learning

NCCA, Focus on Learning, Workshop 01, page 5



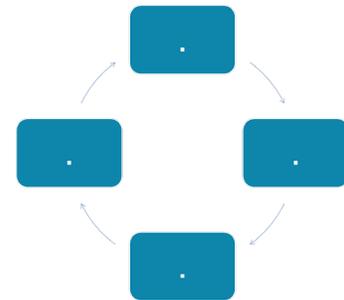
Sandcastle Activity



Oide



7 minutes



Graphically communicate how you would make a sandcastle



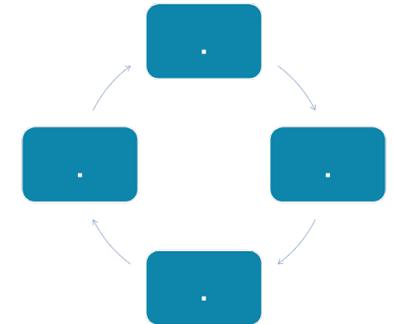
Effective Feedback / Peer Assessment



Feed Forward
with
Feed Back

Effective feedback

- ✓ Focused on the quality of the 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





Discussion Point

How does the co-construction of success criteria empower students to become active agents in their own learning?



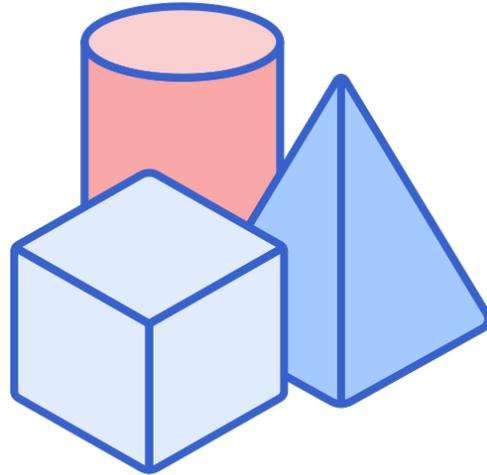
Pedagogical Approaches



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Real world



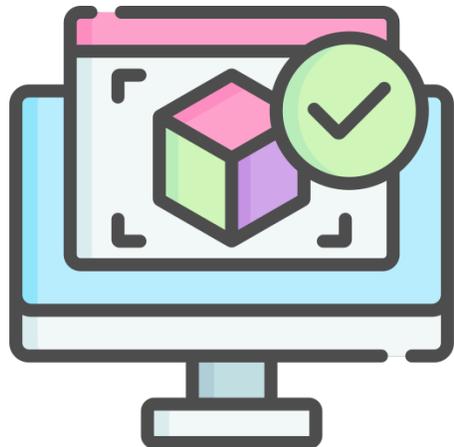
3D - models



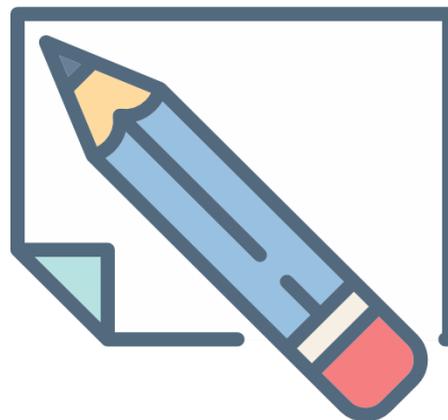
Research



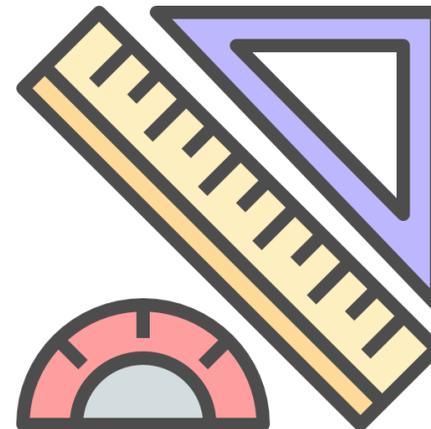
3D -> 2D -> 3D



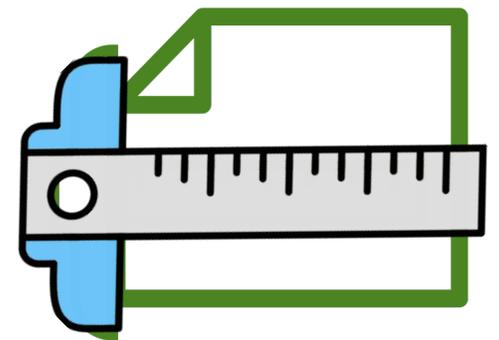
CAD



Sketching



Accuracy



2D solutions

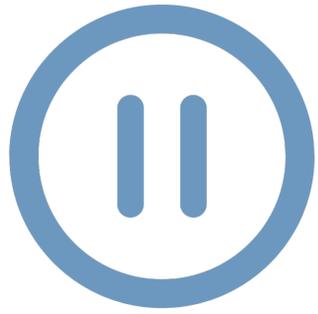


Accessing Learning



<p>Communicating- The learning outcomes from the different strands that are associated with this element encourage students to communicate through appropriate media to relay technical information, and to design ideas and solutions to problems. Emphasis should be placed on developing the students' abilities to communicate through a range of graphical media and make decisions on the appropriateness of specific media relative to specific stages of a design process.</p>	<p>1.8 communicate the progression of ideas and thinking <u>during the course of an activity</u> using a variety of media</p> <p>1.9 represent 3D information using 2D conventions</p>	<p>2.8 construct a 3D representation of an artefact or abstract idea using a variety of media and methods</p> <p>2.9 communicate the progression of ideas/thinking <u>during the course of an activity</u> using a variety of media</p>	<p>3.6 develop design ideas/solutions through modelling and prototyping using a variety of media</p> <p>3.7 use computer-aided graphics to communicate design solutions effectively</p> <p>3.8 represent graphically their approach to a design task</p> <p>3.9 apply a variety of rendering and presentation techniques to enhance the communication of solutions</p>
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How is the communicating element evident in this activity?



Personal Reflection Moment

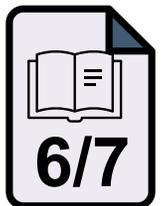


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10 minutes

- What are the opportunities for student learning in this task/activity?
- What are the challenges for students in this task/activity?
- Are there opportunities for further learning in this task?



Let's consider the approach of a Graphics teacher



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Context



St Declan's Community College

- Rural school
- 700 students approx.
- 2nd Year Graphics Class, term 1
- Prior Learning
 - basic geometric constructions, construction of polygons, orthographic projection, research project on food packaging
- Focus of Learning
 - Regular geometric solids and projection systems



Graphics – Planning Tool



Scan or click on the QR code to access the Junior Cycle Graphics specification



Action Verbs

Analyse: study or examine something in detail, break down in order to bring out the essential elements or structure, identify parts and relationships, and to interpret information to reach conclusions

Apply: select and use information and/or understanding in a particular situation or real world context

Appreciate: recognise the value of, have a practical understanding of

Communicate: convey information verbally or otherwise, explain the meaning or relationship between things, interact with a recipient, both as sender and recipient; both understand and be understood

Construct: develop a diagrammatic or factual recall of a concept using and applying information

Create: produce a new work on the topic of work using selected materials and/or methods used a new form

Demonstrate: show or prove by reasoning, illustrating a practical application

Derive: to obtain from concepts

Develop: advance a piece of work or an idea from an initial state to a more advanced state

Evaluate: (data) collect and examine data to make judgements and appraisals; describe how evidence supports or does not support a conclusion in an inquiry or investigation; identify the limitations of data in conclusions; make judgements about the ideas, solutions or methods

Spatial Reasoning- The learning outcomes from the different strands that are associated with this element encourage students to investigate a range of shapes, graphical information, objects and artefacts to assist students in developing their spatial ability. The learning outcomes aid the student in developing their abilities from initially recognising spatial properties to visualising their manipulation.

Design Thinking- The learning outcomes from the

Strand 1: 2D Graphics- In this strand, students will engage with, understand and apply the fundamental concepts and principles of 2D constructions, 2D shapes and projection systems. Throughout their studies, students will gain an appreciation of the application of 2D graphics to problem solving and develop an understanding of the role of 2D graphics in the creation of 3D objects and representations. Students should, as a result, be able to create clear representations of objects in space and accurately represent these in two-dimensions.

Students should be able to:

- 1.1 visualise the manipulation of 2D shapes
- 1.2 analyse graphical information for the planning of a 2D solution
- 1.3 derive 2D solutions using appropriate media
- 1.4 appreciate the role of 2D graphics in the

Strand 2: 3D Graphics- In this strand, students will engage with, understand and use the fundamental concepts and principles underpinning 3D objects, modelling systems and graphical conventions. This strand is of specific importance in developing each student's ability in visual imagery and representation. Students should as a result be able to accurately represent objects in three dimensions and apply these skills to problem solving

Students should be able to:

- 2.1 visualise the manipulation of 3D objects
- 2.2 analyse graphical information for the planning of a 3D solution
- 2.3 derive 3D solutions using appropriate media
- 2.4 appreciate the role of 3D graphics in the creation

Strand 3: Applied Graphics- In this strand, students will draw on the knowledge, principles and techniques developed through the 2D Graphics and 3D Graphics strands to create and communicate solutions and information graphically. Students should be encouraged to investigate their physical environment and to apply the principles of 2D Graphics and 3D Graphics to the solution of a variety of problems. Students should be able to select the most appropriate methods to communicate their solutions and solve these problems, both in terms of their selection of graphical media and the mechanism for their utilisation.

Students should be able to:

- 3.1 recognise 2D and 3D features in everyday objects and artefacts
- 3.2 appreciate the hidden features of an object or an artefact necessary for its representation
- 3.3 demonstrate their spatial understanding by modelling and/or simulation
- 3.4 solve real-context and abstract problems using

Action Verbs

Evaluate: (ethical judgement) 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

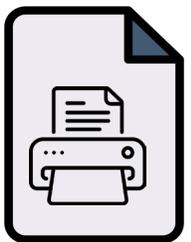
Generate: to produce or create

Illustrate: (graphically) use drawings to describe something

Illustrate: use examples to describe something

2.7	construct solutions to presented and/or defined problems
1.9	represent 3D information using 2D conventions
2.8	construct a 3D representation of an artefact or abstract idea using a variety of media and methods
3.6	develop design ideas/solutions through modelling and prototyping using a variety of media
2.10	understand the properties of geometric objects and surfaces

Classroom activities to explore the role of geometric principles and constructions in the natural world around them.	2.13 apply geometric principles to construct accurate 3D solutions in accordance with graphical conventions	Graphical Conventions	Current standards, conventions and practices associated with drawing and illustration	Solve: find an answer through reasoning
2D convention	First angle orthographic, oblique, isometric drawing, axonometric	Contextual problem	A problem which draws on a real world experience, situation or application	Understand: have and apply a well-organised body of knowledge
3D representation	A view which displays a physical object or an abstract concept in a form which reflects length, depth and height.	Geometric constructions	The accurate drawing of points, lines, circles, angles, bisectors, divisions and other shapes using standard drawing instruments	Use: apply knowledge or rules to put theory into practice; employ something in a targeted way
3D solution	A solution to a specific or abstract problem derived and/or presented using 3D techniques.	Geometric principles	The fundamental principles which define and describe the nature of points, lines and planes together with the two dimensional and three dimensional shapes, solids, projection systems and constructions derived from them.	Visualise: make something visible to the mind or imagination something that is abstract or not visible or present to the eye
Plane & Descriptive geometries	The graphical representation, description and analysis of relationships between points, lines and planes in space. The graphical representation of three dimensional objects in two dimensions.			





Prior Learning: basic geometric constructions, construction of polygons, orthographic projection, research project of food packaging

Focus of Learning:

Regular geometric solids and projection systems

Learning Outcomes:
2.7 construct solutions to presented and/or defined problems
2.8 construct a 3D representation of an artefact or abstract idea using a variety of media and methods
3.6 develop design ideas/solutions through modelling and prototyping using a variety of media
2.10 understand the properties of geometric objects and surfaces
3.9 apply a variety of rendering and presentation techniques to enhance the communication of solutions

Key Learning:
• Create a CAD model of their chosen geometric solid
• Make a card model of their chosen geometric solid
• Communicate their analysis of the chosen geometric solid to include rendered sketches, real world examples
• Use a planes board to generate the orthographic views of their model
• Present their completed project to their peers

- How can students experience the Key Learning?
Evidence of Learning:
How...

Key Learning:

- Create a CAD model of their chosen geometric solid
Make a card model of their chosen geometric solid
Communicate their analysis of the chosen geometric solid to include rendered sketches, real world examples
Use a planes board to generate the orthographic views of their model
Present their completed project to their peers



Geometric
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An Roinn Oideachais
Department of Education

Looking at Our School 2022: A Quality Framework for Post-Primary Schools

Inspectorate

Standards	Statements of effective practice	Statements of highly effective practice
	Students take pride in their learning and follow the guidance they receive to improve it.	Students have a sense of ownership of their learning , take pride in it, and take responsibility for improving it .
	Students reflect on their behaviour and attitude to learning, and are able to contribute to setting meaningful goals for themselves.	Students reflect on their behaviour and attitude to learning, and are able to set meaningful personal goals as a result of their reflection .
	Where the school curriculum provides opportunities to do so, students are able to negotiate their learning, thereby increasing their autonomy as learners.	Where the school curriculum provides opportunities to do so, students are able to negotiate and reflect on their learning , thereby increasing their autonomy and effectiveness as learners.

Students take responsibility for their own learning and use the learning resources, including digital technologies, provided to them to develop their skills, apply their understanding and extend their knowledge.

Students take responsibility for their own learning and use the learning resources, including digital technologies, provided to them **and sourced by themselves**, to develop their skills, apply their understanding and extend their knowledge.



	that takes place in other contexts.	and learning that takes place in other contexts.
	Students can, with some guidance, transfer and apply skills learned in one context to another context.	Students can, of their own initiative , transfer and apply skills learned in one context to another context.
	Students are aware of the key skills underpinning the curriculum and of their relevance to present and future learning.	Students can explain the key skills underpinning the curriculum and understand their relevance to present and future learning.
	Students take the opportunities provided by curriculum and other learning experiences to apply and develop these key skills.	Students take the opportunities provided by curriculum and other learning experiences to apply and develop these key skills consciously and deliberately .
	Students are confident in using technology individually and with peers to enhance the	Students are innovative , confident and creative in using technology individually and with

Student Engagement



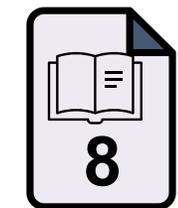
Oide



Looking Out Activity



Oide



Looking out

Some questions to consider

Geometric Solid: Find an example of a **regular prism** in the world around you.

Sketch the object in the space below. Analyse the object and identify the geometry. Render your sketch.

What is the name of the prism you have selected?
 What geometry can you identify in the prism?
 How many planer surfaces are on the prism?
 Use the space below to accurately draw the regular polygon your prism is based on

What I found difficult was...

I might have learned better if...

Pause and reflect
 What do I know now?
 What have I learned about these geometric solids?

Sheet 1

My Geometry Journey

- Junior Cycle Graphics

Reflecting on my geometry learning journey in Graphics

Notes:

	Name

Use the given message cards to construct a development of your prism.
 Create a model of your prism from the development.
 (a) equal to the perimeter of the polygon
 (b) equal to length of the prism

Sheet 2

Use board to help you. Draw a net to the horizontal and vertical plane of the elevation.
 E view
 F view
 G view

(b) How many surfaces are seen as a true shape in each view? Why are the surfaces true shapes?

Elevation	Why are the surfaces true shapes?
Plan	
End elevation	

(c) How many of the following can be found in the prism?

Planar surfaces	Edges
Vertical surfaces	Points
Horizontal surfaces	Parallel Planes

(d) Draw a freehand pictorial sketch of another 3D solid that will have the same elevation as the solution to part (a)

(e) Use CAD to model the 3D solid of your solution to (d). How could you use your CAD model to evaluate your sketch?

Sheet 3

Consider how this resource could be adapted for your context?

Model Making Activity



Oide

Looking out

Geometric Solid: Find an example of a **regular prism** in the world around you.

Sketch the object in the space below. Analyse the object and identify the geometry. Render your sketch.

Some questions to consider

What is the name of the prism you have selected?
 What geometry can you identify in the prism?
 How many planar surfaces are on the prism?
 Use the space below to accurately draw the regular polygon your prism is based on.

What I found difficult was...

What I might have learned better is...

Please and reflect
 What did I enjoy most?
 What have I learned about these geometric solids?

Sheet 1

	Name

Use the given rectangle aabb to construct a development of your prism.
 Create a 3D model of your prism from the development.

$|aa|$ equal to the perimeter of the polygon
 $|ab|$ equal to length of the prism

Sheet 2



(4) Using your model of the prism and a plane board to help you. Draw:

- An elevation with the longest edges parallel to the horizontal and vertical plane
- A plan and end elevation projected from the elevation. Indicate three points on your prism in each view.
- Name the views and insert three dimensions.

(5) How many surfaces are seen as a true shape in each view?

Elevation	Why are the surfaces true shapes?
Plan	
End elevation	

(6) How many of the following can be found in the prism?

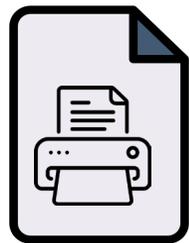
Planar surfaces	Edges
Vertical surfaces	Points
Horizontal surfaces	Parallel Planes

(8) Draw a freehand pictorial sketch of another 3D solid that will have the same elevation as the solution to part (4).

(9) Use CAD to model the 3D solid of your solution to (8). How could you use your CAD model to evaluate your sketch?

Sheet 3

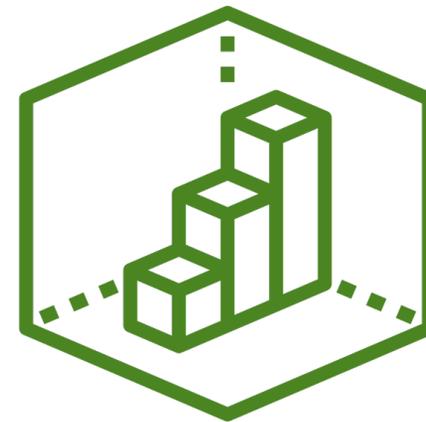
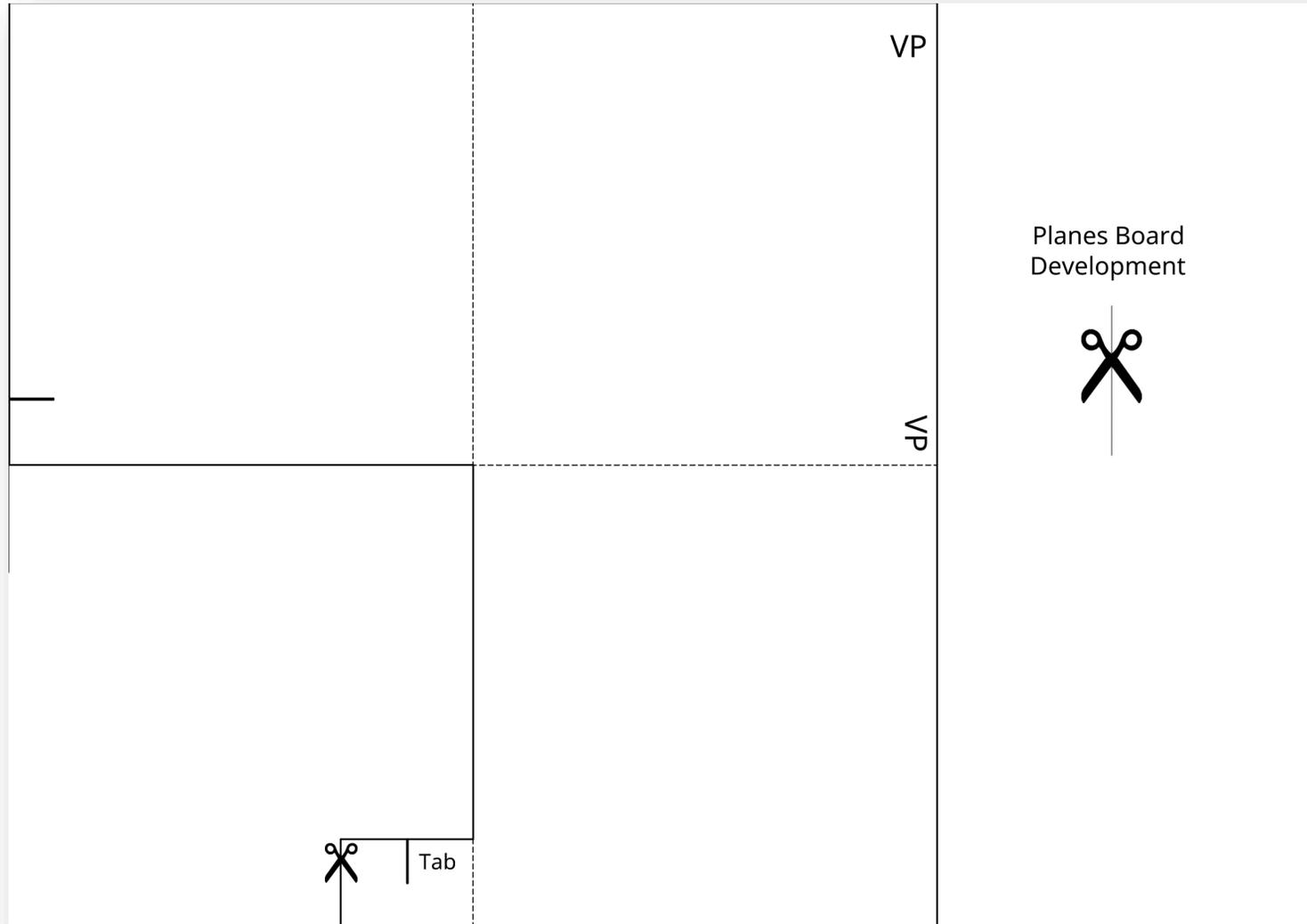
Use the given rectangle to construct your prism



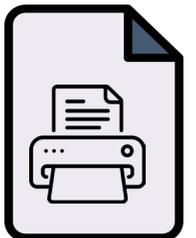
Planes Board



Oide



3D -> 2D -> 3D



Activating the Learning



Looking out

Geometric Solid: Find an example of a **regular prism** in the world around you. Sketch the object in the space below. Analyse the object and identify the geometry. Render your sketch.

Some questions to consider

What is the name of the prism you have selected?
 What geometry can you identify in the prism?
 How many planar surfaces are on the prism?
 Use the space below to draw your sketch.

Pair and reflect
 What did I know?
 What have I learned about these geometric solids?

What I found out
 I might have learned

	Name

Use the given rectangle width to construct a development of your prism.
 Create a 3D model of your prism from the development.
 (a) equal to the perimeter of the polygon
 (b) equal to length of the prism

(a) Using your model of the prism and a planes board to help you. Draw:

- An elevation with the longest edges parallel to the horizontal and vertical plane
- A plan and end-elevation projected from the elevation. Index three points on your prism in each view.
- Name the views and insert three dimensions.

(b) How many surfaces are seen as a true shape in each view

Elevation		Why are the surfaces true shapes?
Plan		
End-elevation		

(c) How many of the following can be found in the prism

Planar surfaces		Edges	
Vertical surfaces		Points	
Horizontal surfaces		Parallel Planes	

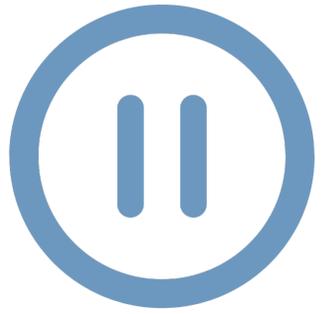
(d) Draw a freehand pictorial sketch of another 3D solid that will have the same elevation as the solution to part (a)

(e) Use CAD to model the 3D solid of your solution to (d). How could you use your CAD model to evaluate your sketch?

Sheet 3



How can model making be used to support student understanding in the Graphics classroom?



Group Feedback & Discussion

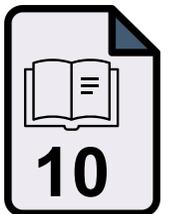


Oide



5 minutes

- What are the opportunities for student learning in this task/activity?
- What are the challenges for students in this task/activity?
- Are there opportunities for further learning in this task?





An Roinn Oideachais
Department of Education

Looking at Our School 2022: A Quality Framework for Post-Primary Schools

Inspectorate
August 2022



Standards	Statements of effective practice	Statements of highly effective practice
	Students take pride in their learning and follow the guidance they receive to improve it.	Students have a sense of ownership of their learning , take pride in it, and take responsibility for improving it .
	Students reflect on their behaviour and attitude to learning, and are able to contribute to setting meaningful goals for themselves.	Students reflect on their behaviour and attitude to learning, and are able to set meaningful personal goals as a result of their reflection .
	Where the school curriculum provides opportunities to do so, students are able to negotiate their learning, thereby increasing their autonomy as learners.	Where the school curriculum provides opportunities to do so, students are able to negotiate and reflect on their learning , thereby increasing their autonomy and effectiveness as learners.
	Students take responsibility for their own learning and use the learning resources, including digital technologies, provided to them to develop their skills, apply their understanding and extend their knowledge.	Students take responsibility for their own learning and use the learning resources, including digital technologies, provided to them and sourced by themselves, to develop their skills, apply their understanding and extend their knowledge.
develop the skills and attitudes necessary for lifelong learning	areas of the curriculum.	subjects and areas of the curriculum and use these connections to guide their learning .
	Students make meaningful connections between school-based learning and learning that takes place in other contexts.	Students make meaningful and authentic connections between school-based learning and learning that takes place in other contexts.
	Students can, with some guidance, transfer and apply skills learned in one context to another context.	Students can, of their own initiative , transfer and apply skills learned in one context to another context.
	Students are aware of the key skills underpinning the curriculum and of their relevance to present and future learning.	Students can explain the key skills underpinning the curriculum and understand their relevance to present and future learning.
	Students take the opportunities provided by curriculum and other learning experiences to apply and develop these key skills.	Students take the opportunities provided by curriculum and other learning experiences to apply and develop these key skills consciously and deliberately .
	Students are confident in using technology individually and with peers to enhance the	Students are innovative , confident and creative in using technology individually and with

CAD in the Graphics Classroom



Oide



CAD as a Teaching and Learning Tool



Oide

Looking out

Geometric Solid: Find an example of a regular prism in the world around you. Sketch the object in the space below. Analyse the object and identify the geometry. Render your sketch.

Some questions to consider

What is the name of the prism you have selected?
What geometry can you identify in the prism?
How many planar surfaces are on the prism?
Use the space below to accurately draw the regular polygon your prism is based on.

Please and reflect

What do you know now?
What have you learned about these geometric solids?

	Name	

Use the green rectangle web to construct a development of your prism.
Create a 2D model of your prism from the development.

(a) equal to the perimeter of the polygon
(b) equal to length of the prism

(a) Using your model of the prism and a planes board to help you. Draw:

- An elevation with the longest edges parallel to the horizontal and vertical plane
- A plan and end-elevation projected from the elevation. Index three points on your prism in each view.
- Name the views and insert three dimensions.

(b) How many surfaces are seen as a true shape in each view

Elevation		Why are the surfaces true shapes?
Plan		
End-elevation		

(c) How many of the following can be found in the prism

Planar surfaces		Edges	
Vertical surfaces		Points	
Horizontal surfaces		Parallel Planes	

(d) Draw a freehand pictorial sketch of another 3D solid that will have the same elevation as the solution to part (a)

x _____ y

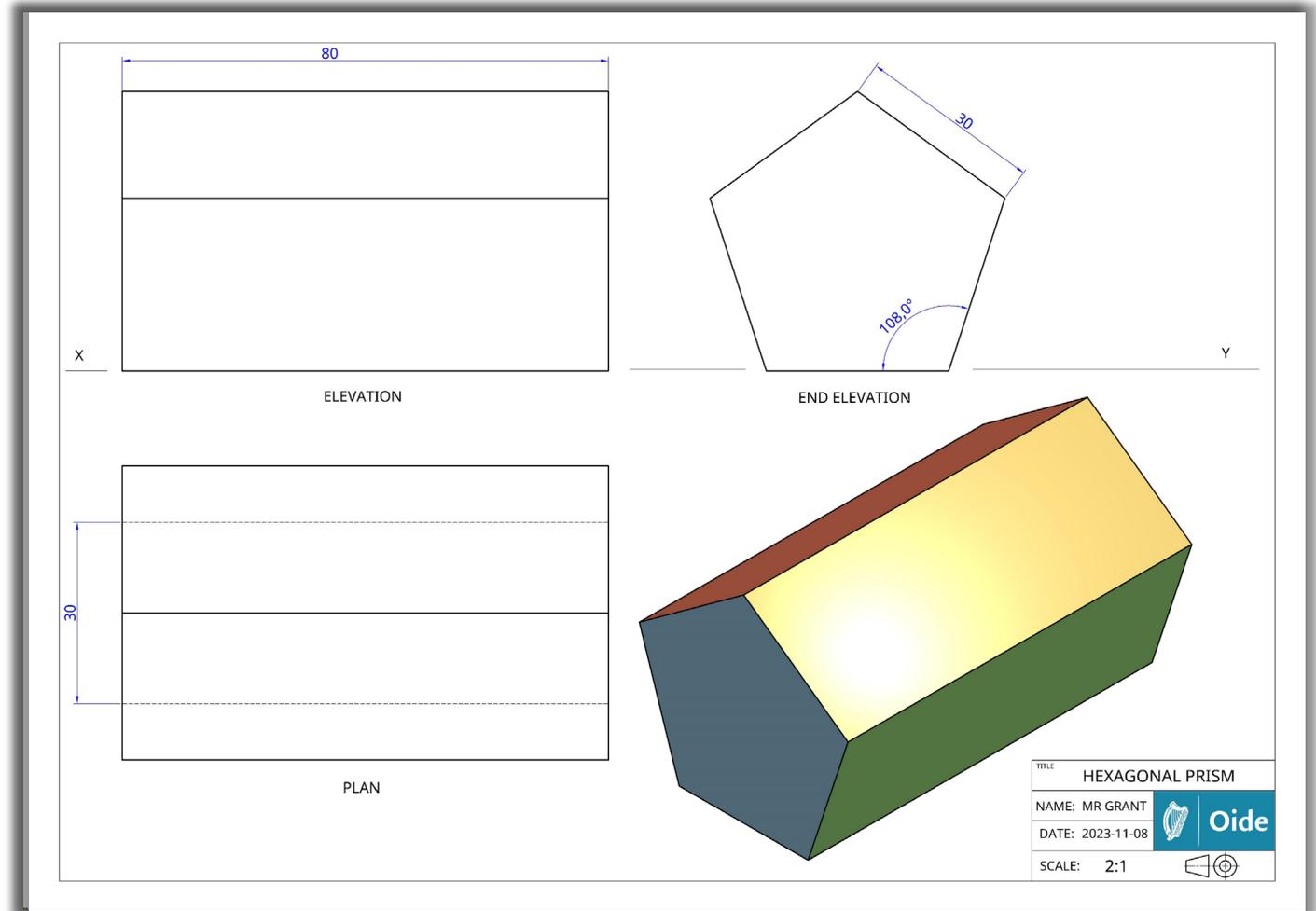


(e) Use CAD to model the 3D solid of your solution to (d). How could you use your CAD model to evaluate your sketch?



Enacting the Learning

- Model a solution to (d)
- Create a drawing to analyse and evaluate your solution to (d)





Group Feedback & Discussion



onshape®



5 minutes

How can I use CAD as a teaching and learning tool
in my Graphics classroom?



SEC Information Note March 2023



Oide



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Cycle Examinations 2022

Information note on
Junior Cycle examinations
in a range of subjects

March 2023

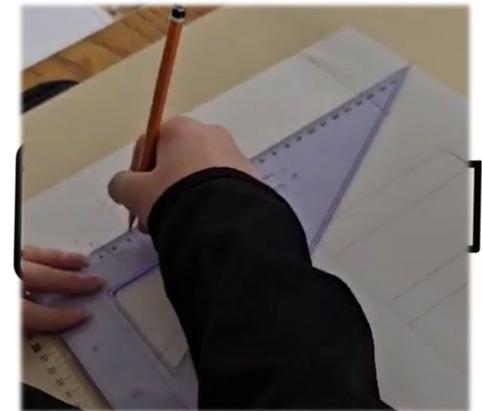
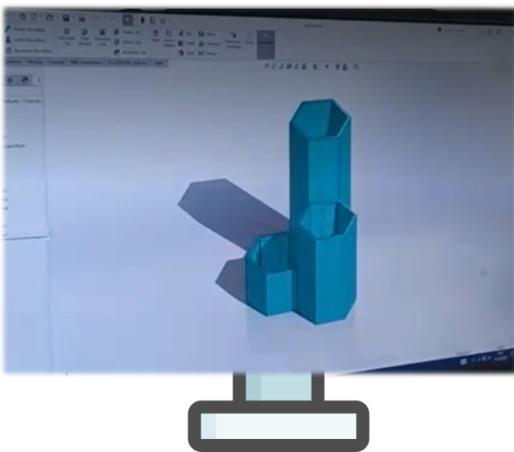
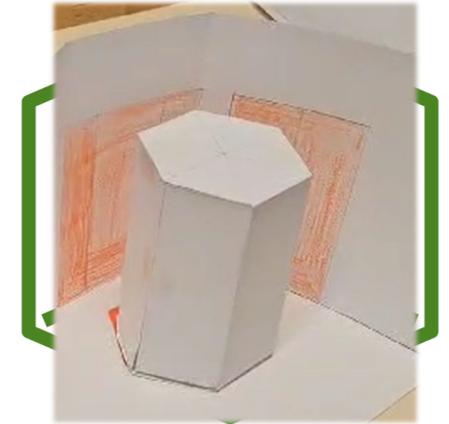
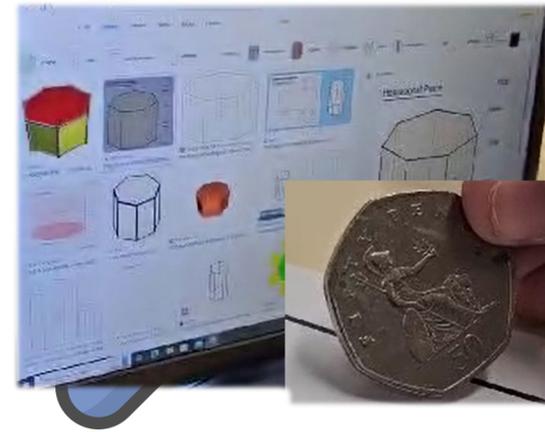
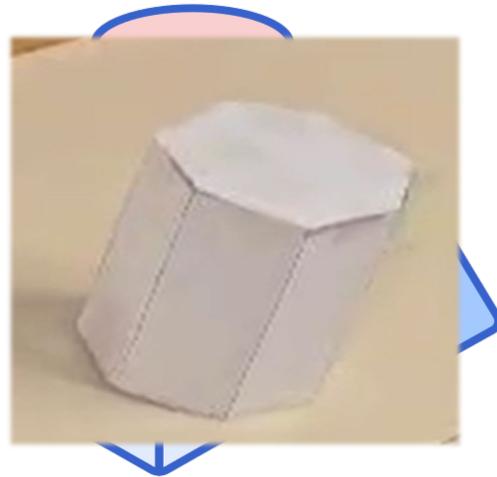
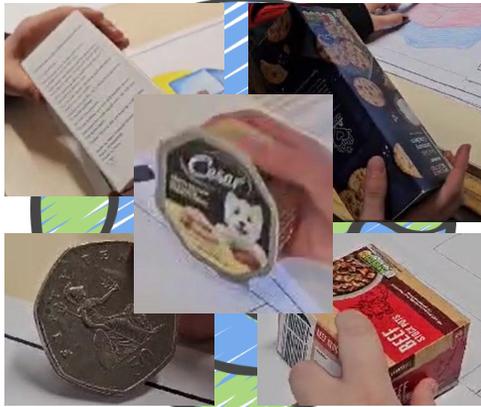
“Teachers are advised to use CAD as a teaching and learning tool, as well as a design and communication tool, by exploring common constructions and geometric principles through this medium.”

Information note on Junior Cycle examinations in a range of subjects, page 34

Pedagogical Approaches



Oide





The Communicating Element



Communicating- The learning outcomes from the different strands that are associated with this element encourage students to communicate through appropriate media to relay technical information, and to design ideas and solutions to problems. Emphasis should be placed on developing the students' abilities to communicate through a range of graphical media and make decisions on the appropriateness of specific media relative to specific stages of a design process.



What role did effective task design play in students engaging with the communication element during today's session?



Personal Reflection Moment



5 minutes

- Three points you took from today's discussions
- Two actions you will take on return to your subject department
- One way that you will measure your progress





SKETCH IT Workshops

Sketch It

Oide Creativity and Oide Technology Subjects, in collaboration with retired Technologies teacher and artist **Jim O'Farrell**, present a one-day elective workshop, open to post-primary teachers from all subject disciplines.

This workshop offers participants an opportunity to:

- explore techniques to enhance visual communication and observational skills
- investigate and experiment with shape and form using a range of sketching techniques
- reflect and collaborate to develop personal sketching efficacy.

Date / Times	Venue
Saturday 11 th November 2023 10:15 a.m. - 3:30 p.m.	Kildare Education Support Centre, Friary Road, Kildare Town, Co Kildare, R51 KN66
Saturday 25 th November 2023 10:15 a.m. - 3:30 p.m.	Donegal Education Support Centre, Floor 2/3, Pier 1, Quay Street, Donegal Town, Co. Donegal
Saturday 2 nd December 2023 10:15 a.m. - 3:30 p.m.	Tralee Education Support Centre, Dromthacker, Tralee, Co. Kerry, V92 HK52
Saturday 24 th February 2024 10:15 a.m. - 3:30 p.m.	Navan Education Support Centre, Athlumney, Navan, Co. Meath, C15 RK03
Saturday 9 th March 2024 10:15 a.m. - 3:30 p.m.	Dublin West Education Support Centre, Old Blessington Rd, Tallaght, Dublin 24, D24 PX58
Saturday 13 th April 2024 10:15 a.m. - 3:30 p.m.	Galway Education Support Centre, Cluain Mhuire, Wellpark, Galway, H91 R284
Saturday 20 th April 2024 10:15 a.m. - 3:30 p.m.	Laois Education Support Centre, Block Rd, Kilminchy, Portlaoise, Co. Laois, R32 CP26



Jim O'Farrell, a Limerick native and former Technologies teacher, is renowned for his art capturing the essence of the city and Irish landscapes. His work ranges from local commissions like 'Glimpses of Old Limerick' a series of pen and ink drawings of significant Limerick buildings to international projects in India. He has also designed a stained-glass window in St. Nicholas's Church, Limerick, and his work has been featured in the Sunday Independent.

Spaces are limited. A waiting list will apply. Register on www.creativity.oide.ie

We strive to host inclusive, accessible events that enable all individuals to engage fully. To request an accommodation or for enquiries about accessibility, please contact creativity@oide.ie

www.oide.ie
@Oide_Creativity



Oide



SKETCH IT
registration form



In this session, we...



Explored how the communication element provides opportunities to enrich learning in the Graphics classroom



Considered how a variety of graphical media can be used to communicate an understanding of geometry



Oide

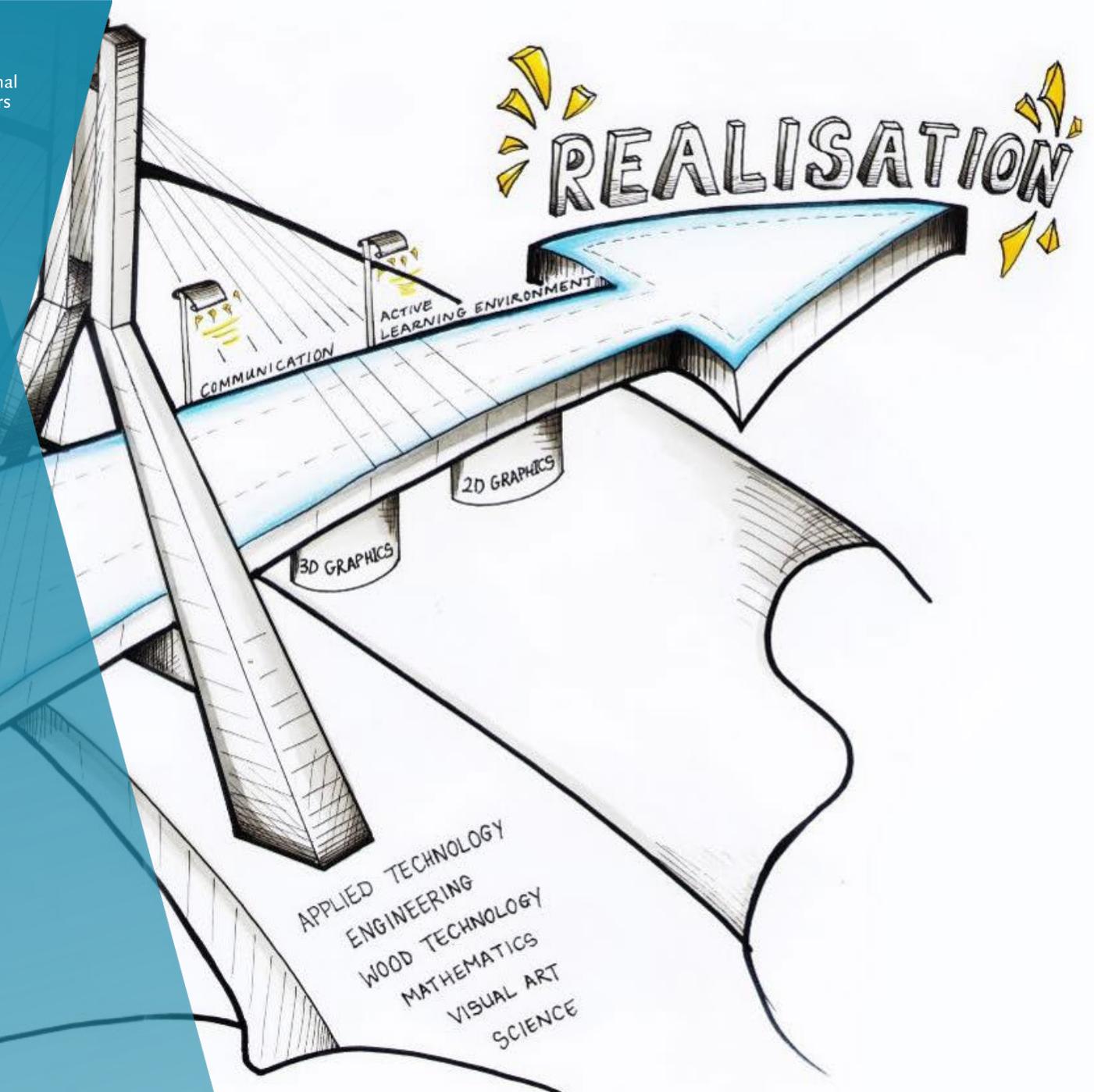
Tacú leis an bhFoghlaim
Ghairmiúil i measc Ceannairí
Scoile agus Múinteoirí

Supporting the Professional
Learning of School Leaders
and Teachers

Graphics

PLE 2023/2024

Session 2





Feedback

Please take a few moments to give us your feedback on today's PLE session

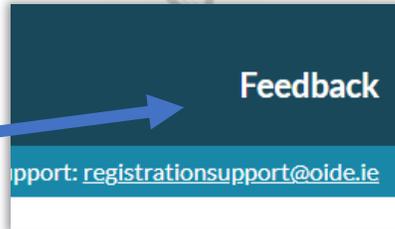
Your feedback helps us evaluate the day and guides us in designing future events



Click or scan the QR code to access the feedback form for today's session

OR

<https://registration.oide.ie/>



Feedback
Support: registrationsupport@oide.ie



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**Students as
active agents in
their learning**



In this session, we will...



Collaboratively plan a unit of learning that is active and student centred

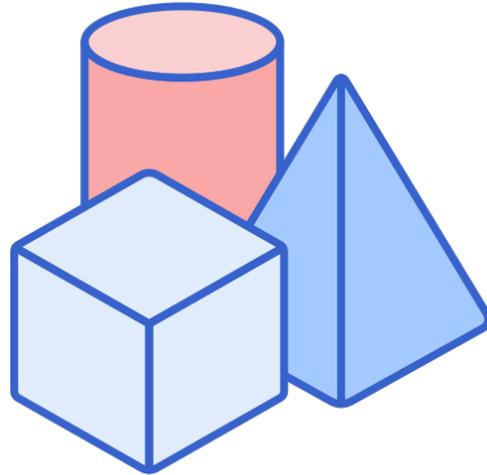
Pedagogical Approaches



Oide



Real world



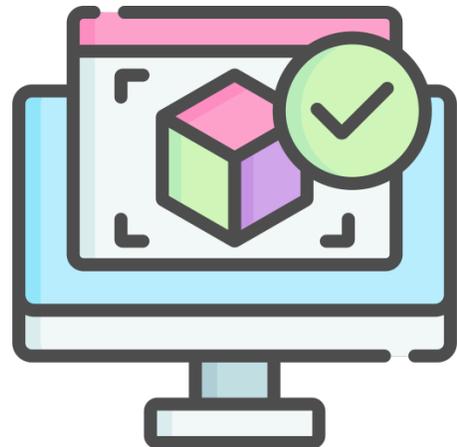
3D - models



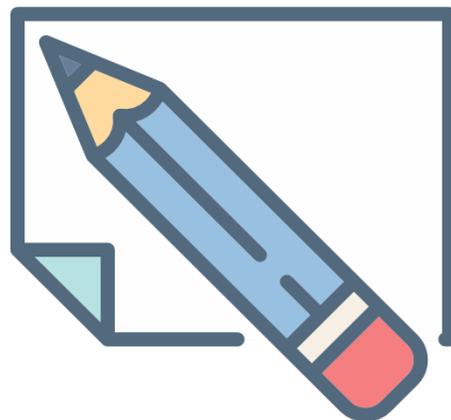
Research



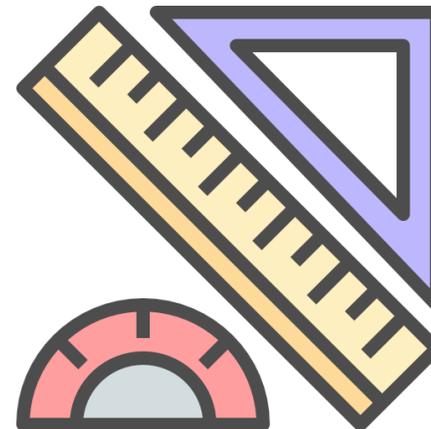
3D -> 2D -> 3D



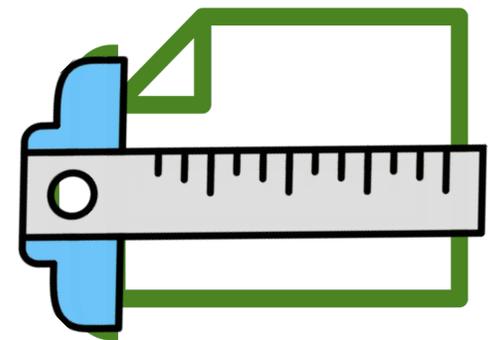
CAD



Sketching



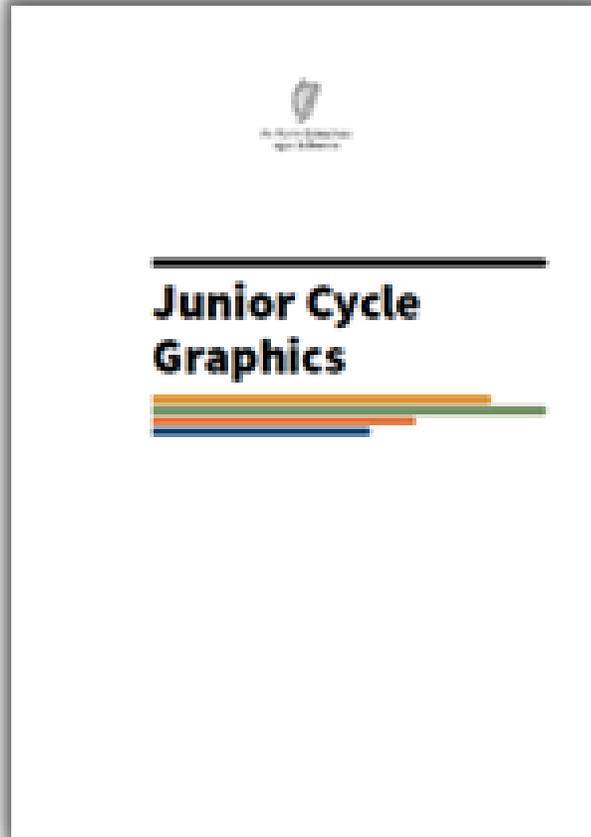
Accuracy



2D solutions



Graphics Specification



Throughout the course, students will explore the geometric world to gain an appreciation of the importance of graphics in the world around them.

Graphics Specification, page 4



Geometry in the World Around Us

Let's consider the geometry in the Paris 2024 Olympics



PARIS 2024



Looking in 

Finding examples:
Shown across are images which could be used in the 'Looking in' activity.

You are encouraged to capture your own images which are relevant to you and your environment.

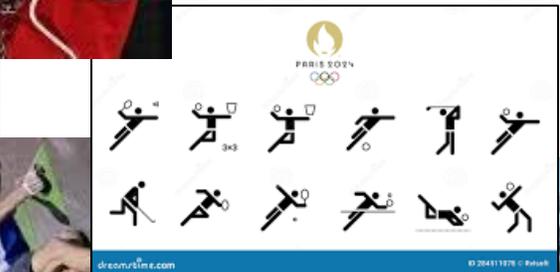
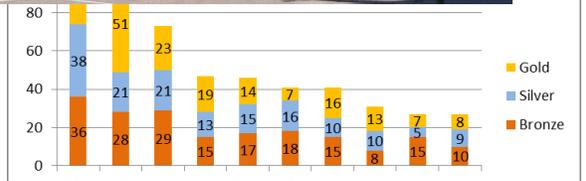
TIP:
Use your check-in sheet to help stimulate ideas for what geometry you can identify in objects.



Paris 2024 Olympics



Oide



QUICK GUIDE
OLYMPIC
HOCKEY





Looking in

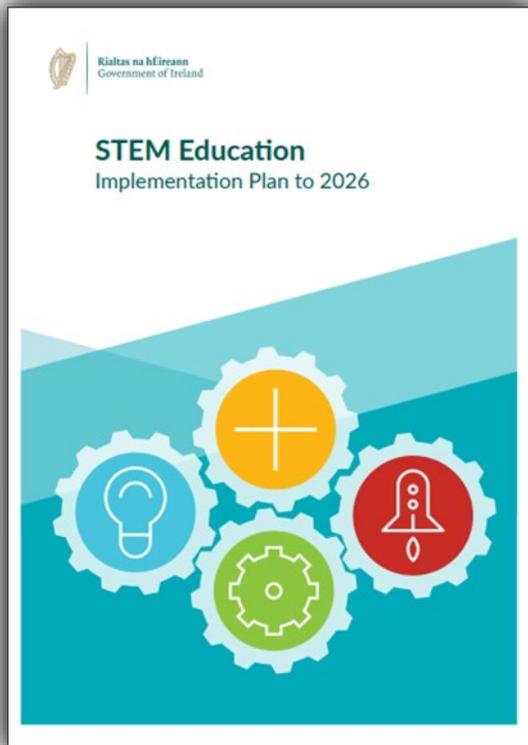


Teachers engage with students' opinions, dispositions, interests and contexts, and modify their teaching practice to build on opportunities and address any limitations that they present.

Teachers engage with students' opinions, dispositions, interests and contexts, and modify their teaching practice to build on opportunities and address any limitations that they present. **Teachers empower students to exploit these opportunities and experience success.**



STEM Education - Implementation Plan to 2026



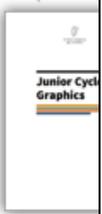
We must enable learners to become active and reflective participants by providing a range of learning and formative assessment experiences that enhances their curiosity, inquiry, creativity and problem-solving abilities.

STEM Education Implementation Plan to 2026, page 19



 Oide		Unit of Learning:	Class group:
Prior Learning:	Learning Outcomes:	Key Learning: Use the action verbs to support your thinking.	
Focus of Learning:			
How can students experience the Key Learning?		Evidence of Learning:	How can the Key Learning be assessed?
<small>Ensure assessment aligns with the chosen Learning Outcomes and their associated action verbs.</small>			

Let's collaborate to generate practical learning experiences that activate key learning



Action Verbs

Analyse: study or examine something in detail, in order to bring out its elements or structure; and relationships, and information to reach conclusions.

Apply: select and use and/or knowledge, understanding to explain a situation or real circumstances.

Appreciate: recognise or value something, or have a practical understanding of it.

Communicate: use verbal or other signs, symbols or messages to convey meaning or exchange information between people; interaction between sender and recipient; both work and understand.

Construct: develop information, ideas, diagrams or logical structures; factual recall but by using and putting together information.

Create: process and produce original work; the topic of what is to be created; using selected materials and/or to give something a new form.

Demonstrate: prove or show something by reasoning or illustrating with examples; practical application.

Derive: to formulate or develop something from concepts.

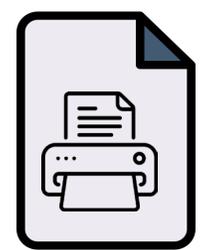
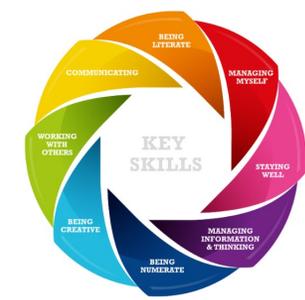
Develop: advance a process or an idea from an initial stage to a more advanced state.

Evaluate: (data) examine data to make judgements about and appraisals; determine if evidence supports or support a conclusion in an investigation; identify strengths of data in conclusions; judgements about solutions or methods.

Oide <small>Tacaí leis an bhFoghlaim</small> <small>Supporting the Professional Learning of School Leaders and Teachers</small>	Unit of Learning:	Class group:
--	--------------------------	---------------------

Prior Learning:	Learning Outcomes:	Key Learning: Use the action verbs to support your thinking.
Focus of Learning:		

How can students experience the Key Learning?	Evidence of Learning:	How can the Key Learning be assessed?
<p>Ensure assessment aligns with the chosen Learning Outcomes and their associated action verbs.</p>		





Oide

Táclú léis an bhFoghlaim Ghairmiúil i measc Ceannairí Scoile agus Múinteoirí Supporting the Professional Learning of School Leaders and Teachers

The Geometry of flags around the 2nd year Graphics both classes

Oide

Prior Learning:

Prior Learning: Basic Constructions

Key Learning:

Focus of

Intersection of (Focus of Intersection)

Learning Outcomes:

SR, OT, Conn., G.M.C.

Action Verbs Develop

How can students

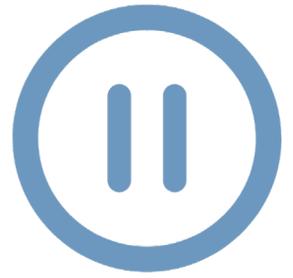
Use the action verbs to support your thinking.

essed?

Res...
Extract geom images of f'
Example Ratio?
Accurate 2D drawing
Practical identified geom
Extract geometry of flags
Evolve their own design a school flag by...

analyse a natural geometric used to representation

- motive understanding
err with acher.
ination
ometry design
solution.
Willingness to display work.



40 minutes



PARIS 2024



Graphics - Planning Tool table with columns for Strand 1, Strand 2, Strand 3, Strand 4, Strand 5, Strand 6, Strand 7, Strand 8, Strand 9, Strand 10, Strand 11, Strand 12, Strand 13, Strand 14, Strand 15, Strand 16, Strand 17, Strand 18, Strand 19, Strand 20, Strand 21, Strand 22, Strand 23, Strand 24, Strand 25, Strand 26, Strand 27, Strand 28, Strand 29, Strand 30, Strand 31, Strand 32, Strand 33, Strand 34, Strand 35, Strand 36, Strand 37, Strand 38, Strand 39, Strand 40, Strand 41, Strand 42, Strand 43, Strand 44, Strand 45, Strand 46, Strand 47, Strand 48, Strand 49, Strand 50, Strand 51, Strand 52, Strand 53, Strand 54, Strand 55, Strand 56, Strand 57, Strand 58, Strand 59, Strand 60, Strand 61, Strand 62, Strand 63, Strand 64, Strand 65, Strand 66, Strand 67, Strand 68, Strand 69, Strand 70, Strand 71, Strand 72, Strand 73, Strand 74, Strand 75, Strand 76, Strand 77, Strand 78, Strand 79, Strand 80, Strand 81, Strand 82, Strand 83, Strand 84, Strand 85, Strand 86, Strand 87, Strand 88, Strand 89, Strand 90, Strand 91, Strand 92, Strand 93, Strand 94, Strand 95, Strand 96, Strand 97, Strand 98, Strand 99, Strand 100.

Action Verbs table with columns for Evaluate, Generate, Illustrate, Interpret, Investigate, Recognise, Represent, Solve, Understand.

Student Engagement



Oide

Students as
active agents in
their learning

Inclusion of all
students





Looking at Our School 2022: A Quality Framework for Post-Primary Schools

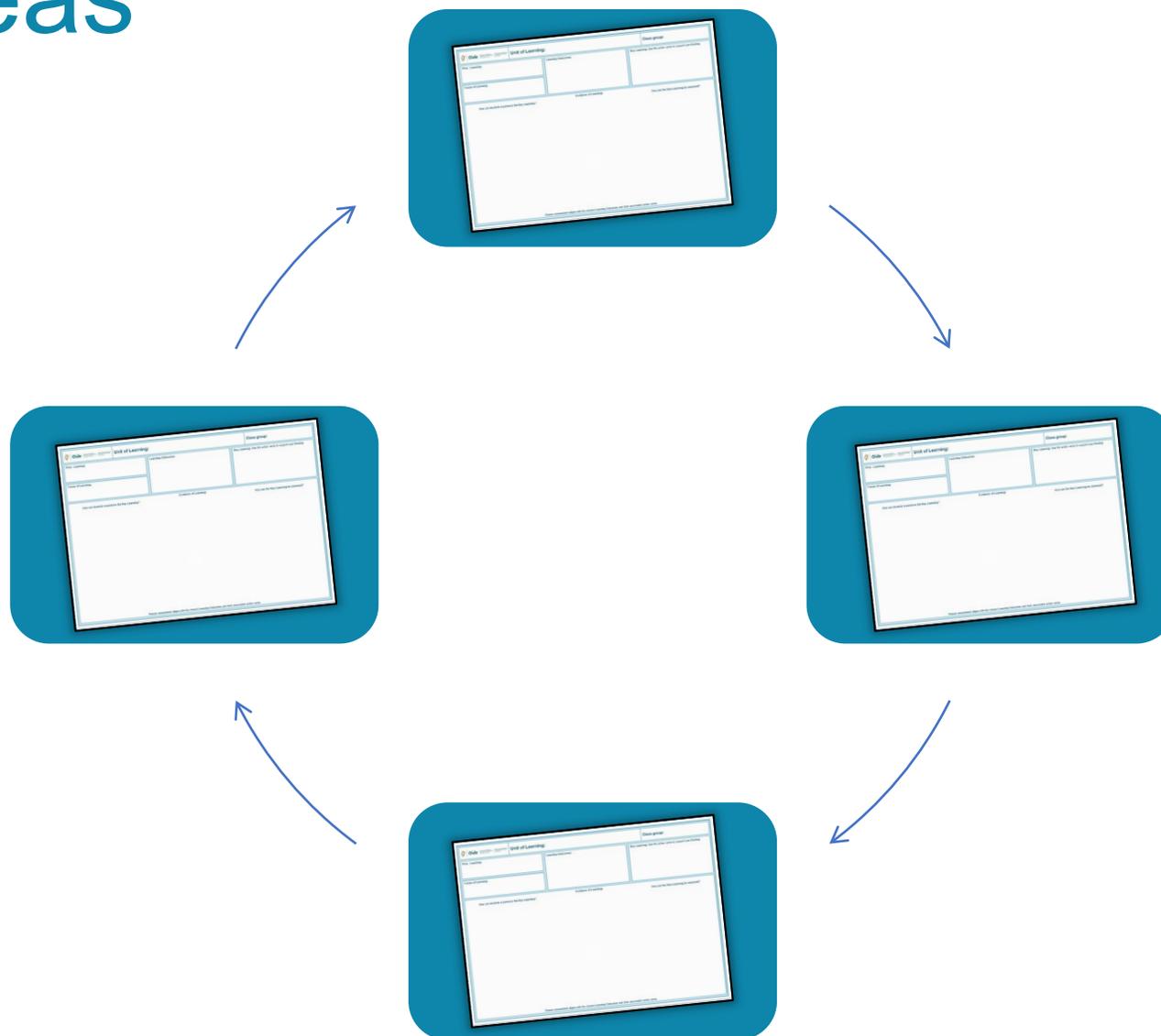
Inspectorate
August 2022



Standards	Statements of effective practice	Statements of highly effective practice
The teacher responds to individual	Teachers are aware of students' individual learning needs, interests and abilities,	Teachers are aware of students' individual learning needs, interests and abilities,
	Teachers engage with students' opinions, dispositions, interests and contexts, and modify their teaching practice to build on opportunities and address any limitations that they present.	Teachers engage with students' opinions, dispositions, interests and contexts, and modify their teaching practice to build on opportunities and address any limitations that they present. Teachers empower students to exploit these opportunities and experience success.
	Students take pride in their learning and follow the guidance they receive to improve it.	Students have a sense of ownership of their learning, take pride in it, and take responsibility for improving it.



Share Ideas



Feedback



Oide

Please take a few moments to give us your feedback on today's PLE session

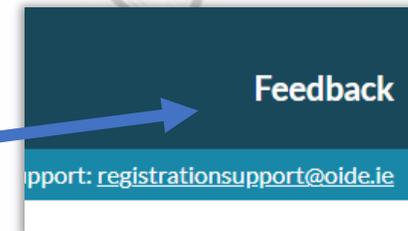
Your feedback helps us evaluate the day and guides us in designing future events



Click or scan the QR code to access the feedback form for today's session

OR

<https://registration.oide.ie/>





In this session, we...



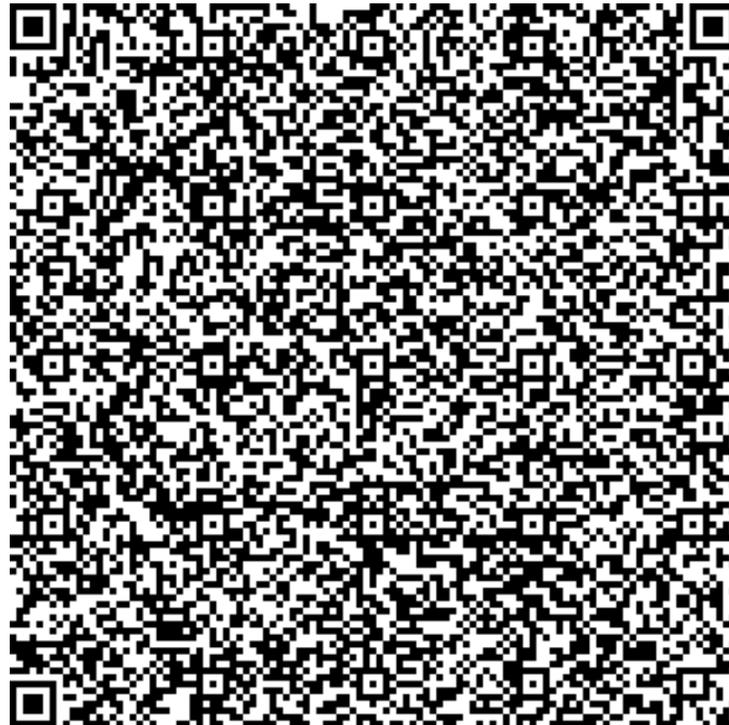
Collaboratively planned a unit of learning that is active and student centred



Oide

Travel Claim link

Tralee EC 23/01/2024





Oide

Tacú leis an bhFoghlaim
Ghairmiúil i measc Ceannairí
Scoile agus Múinteoirí

Supporting the Professional
Learning of School Leaders
and Teachers

Graphics Thank You

PLE 2023/24

