




Maths and Me: 2nd Class – Short-Term Plan Unit 6 Shape (November: Weeks 3&4)

Strand(s) > Strand Unit(s)	Shape and Space > Shape.
Learning Outcome(s)	Through appropriately playful and engaging learning experiences children should be able to examine, categorise and model 3-D and 2-D shapes

Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	Shape Collections: Creates collections or families of shapes based on common properties (U&C); Conjectures and justifies about whether an unfamiliar shape belongs to a certain category (R)		D Notice & Wonder L1 D Think-Pair-Share L1, 3, 5–8 D Reason & Respond L1–8 D Write-Hide-Show L1–2, 4, 6–7 C Build it; Sketch it; Write it L1 C Sorting Shapes L2 C Sensory ('Feely') Bag L2 C Making 2-D Shapes L3 C Making 2-D Shapes with Geoboards L3 C Drawing 2-D Shapes L3 C Sorting 2-D Shapes L4 D Concept Cartoon L5, 7 C Quartering the Square L5 D Would This Work? L5 C Shape Stations L5, 8 C Sorting 3-D Shapes L6 C Roll, Stack or Slide? L6 C Drawing Around 3-D Shapes L7 C Recording Faces, Edges and Vertices L7	Intuitive Assessment: responding to emerging misconceptions
2	Properties of 2-D Shapes: Recognises and names 2-D shapes, including hexagon, parallelogram (U&C); Describes the key differences and similarities of 2-D shapes according to their properties (C)			
3	2-D Shapes: Sides and Vertices (Corners): Describes the key differences and similarities between 2-D shapes according to their sides and vertices (C); Models 2-D shapes using materials or through drawings (U&C)			
4	Classifying 2-D Shapes: Represents classification of 2-D shapes according to common properties using tables or diagrams (C)			Planned Interactions: responding to insights gleaned from children's responses to learning experiences
5	Shapes in Shapes: Combines and partitions 2-D shapes (A&PS); Solves problems requiring the greatest or least number of 2-D shapes needed to compose a larger 2-D shape in a variety of ways (A&PS); Solves tasks and problems involving technology/virtual manipulatives (A&PS)			
6	Classifying 3-D Shapes: Recognises and names 3-D shapes, including pyramid (U&C); Analyses the relationships between properties and capabilities in families of shapes (U&C)			
7	3-D Shapes: Faces, Edges and Vertices: Describes the key differences and similarities of 3-D shapes according to their faces, edges and vertices (C)			Assessment Events: information gathered from completion of the unit assessment in the Progress Assessment Booklet pages 14–15
8	Constructing and Deconstructing 3-D Shapes: Dissects and/or constructs 3-D shapes using modelling materials (U&C)			
9	Review and Reflect: Reviews and reflects on learning (U&C)		Print resources Pupil's Book pages 38–44 Home/School Links Book pages 16–17 PCMs 23, 24	

Key: Elements: (U&C) Understanding and Connecting; (C) Communicating; (R) Reasoning; (A&PS) Applying and Problem-Solving. **CM:** Cuntas Mfósúil; please tick when you have completed the focus of learning. **Learning Experiences:** C concrete activity; D digital activity; P activity based on printed materials, followed by lesson numbers.

Additional information for planning

 Progression Continua	See '2nd Class <i>Maths and Me</i> Progression Continua Overview' for a detailed breakdown of how all progression continua are covered.
 Maths Language	See '2nd Class <i>Maths and Me</i> Maths Language Overview', individual lesson plans and Unit 6 Maths Language Cards.
 Equipment	See '2nd Class <i>Maths and Me</i> Maths Equipment Overview' and individual lesson plans.
Inclusive Practices	<ul style="list-style-type: none"> ● See Let's Strengthen and Let's Deepen suggestions throughout lesson plans. ● See Unit 6 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.) ● See Unit 6 Let's Strengthen PCMs. ● See Unit 6 Let's Deepen PCM.
Integration	See individual lesson plans.

Background and rationale

- Shapes is the first Shape and Space unit in *Maths and Me* for 2nd Class. It is designed to revise and develop the content of Shape in *Maths and Me* for 1st Class, as well as prepare the children for applying their understanding to Transformation, Spatial Awareness and Location, which are combined as Unit 9 Location and Transformation.
- Faces: Traditionally in Ireland, and in Irish textbooks, a cylinder was recorded as having three faces. However, this is not mathematically correct, as strictly speaking a face is flat and is a 2-D shape, so therefore a cylinder has in fact only two faces (both circles) and one curved surface. While it may be argued that a cylinder has a third face, i.e. the rectangular shape you see when you disassemble the net of the 3-D object, in this disassembled state it is no longer a cylinder, since it can no longer roll – a specific property of the cylinder. Similarly, a sphere has no faces and only one continuous curved surface.
- Another way to think about the faces of 3-D objects is to consider the number and shape of the resulting outlines of tracing around, or printing, each surface of the 3-D object. It is only possible to trace around the opposite ends/bases of the cylinder, since only these are flat, and thus it has only two faces, both of which are circular in shape. Similarly, it is only possible to trace around one surface on a cone, which therefore means it has only one face (a circle) and one curved surface.
- Edges: Edges are specific to 3-D shapes and therefore should not be used to describe the outsides of 2-D shapes, which are sides. When considering edges, how many edges does a cylinder have? Officially none, because an edge is where two flat faces meet, whereas the faces on a cylinder are on opposite sides and do not touch/meet. However, that leaves the problem of how to describe the place where each face meets the curved surface. In *Maths and Me*, as typically occurs in primary textbooks in other countries, there is a distinction made between straight edges (which are in fact true edges) and curved edges (which strictly speaking are not edges).
- Vertices (corners): A vertex is formed where two or more straight edges or straight sides meet. Therefore, a cone does not have a vertex; instead, its tip can be referred to as a point (or an apex in older classes).

The overarching theme of **The City** provides a meaningful context for shape, and encourages the children to develop their Maths Eyes, as they appreciate and make connections with the shapes in their environments.

Common misconceptions and difficulties

- The children may confuse and/or misname 2-D and 3-D shapes, generally and specifically. For example: confuse circle and sphere because the drawn representation of a sphere is a circle; confuse cube with cuboid as they sound similar; confuse cylinder with sphere as they both start with a soft 'c' sound, etc.
- The children may incorrectly assume that a rotated version of the shape is a different shape, e.g. that a rotated square is now a 'diamond', a rotated triangle is now an 'arrow'.
- They may confuse key language (e.g. faces, vertices).
- They may miscount the number of edges, sides, vertices or faces.
- They may incorrectly assume that all same-sided shapes must look the same, i.e. that all hexagons must look like a regular hexagon, rather than understanding that any six-sided shape is a hexagon.
- They may incorrectly assume that all the surfaces of any 3-D shape are faces, when a face is strictly a flat surface (i.e. they may not appreciate that a sphere has no faces, only one curved surface, and a cylinder has two faces and one curved surface).
- They may confuse straight edges with curved edges.
- They may struggle to recognise that categories of shapes often have subsets of shapes within them. For example: squares also belonging to rectangles (i.e. a square has all the properties of a rectangle, as well as its four sides being the same length); and squares and rectangles also belonging to parallelograms.
- For the children to be able to flexibly visualise shapes, they must get plenty of experience manipulating the physical representations. Therefore, experiences with concrete materials and equipment are vital and should happen as often as possible.
- The children may also benefit from the Unit 6 Let's Strengthen PCM: 2-D Shape Reference Guide and the Unit 6 Let's Strengthen PCM: 3-D Shape Reference Guide. These guides to the basic shapes include their names, features and representations in various orientations. The children can use these PCMs to help them identify specific shapes and should keep them handy throughout the entire unit. As the children gain confidence, encourage them to become less reliant on the reference guides.

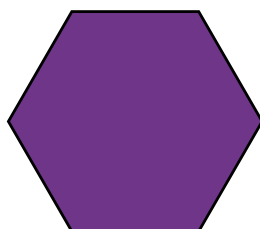
The Unit 6 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

Mathematical models and representations

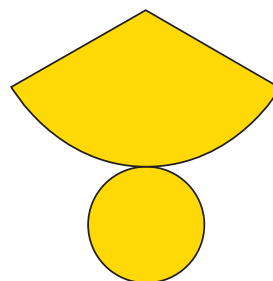
- Physical and pictorial representations of 2-D and 3-D shapes
- Various construction materials from which shapes can be made
- Sorting Circles and Carroll Diagrams



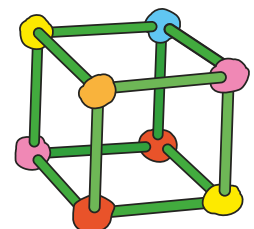
Parallelogram



Hexagon



*Net (2-D) of cone
(3-D shape)*



*Cube constructed from
sticks and play dough*

Teaching tip

A 2-D Shapes and Nets of 3-D Shapes manipulative printable is available to support this unit. Click on the resources icon on the *Maths and Me* book cover on edcolearning.ie

Day 1, Lesson 1

Shape Collections

Focus of learning (with Elements)

- Creates collections or families of shapes based on common properties (U&C)
- Conjectures and justifies about whether an unfamiliar shape belongs to a certain category (R)

Learning experiences

- D** Digital activity: The City
MAM Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond, with Write-Hide-Show
- C** Sorting activity: Sorting 2-D and 3-D Shapes
MAM Routine: Build it; Sketch it; Write it
- C** Concrete activity: Build a City
MAM Routine: Build it; Sketch it; Write it

Equipment

- 2-D and 3-D equipment, including wooden building blocks, magnetic blocks, polydrons, tangrams, pattern blocks, geostrips, found materials from classroom/home, etc.
- Blank cards (optional)

Maths language

- Enable the children to use their own maths language for describing shapes.

Warm-up

- D** Digital activity: The City **MAM Routines: Notice & Wonder, with Think-Pair-Share**

Display the poster and, using Think-Pair-Share, ask:

- What do you notice?
- What do you wonder?

Record the children's responses to both questions on the class board. Allow the children the opportunity to respond to (agree/disagree with or query) others' responses, but do not confirm or reject any of the ideas. Note any 'wonderings' that could become the basis for a subsequent maths investigation.

Main event

- D** Digital activity: The City **MAM Routines: Reason & Respond, with Write-Hide-Show**

Display the poster. Tell the children to use Write-Hide-Show on their MWBs to respond to the questions below. Ask them to give reasons for their responses. Click to play or ask:

- What do you think this unit is about?
- Are there things that are the same or similar in the poster?
- How are they the same?
- How are they different?
- What maths words do you think of when looking at this poster? (The children do not need to be able to name all the 2-D and 3-D shapes. The purpose is to find out what they know already.)
- Could those maths words be used to describe things in our classroom or school?

- Could those maths words be used to describe things in our homes?
- Could those maths words be used to describe things in our local area?
- Can you name any of the shapes in this poster?
- Are there any shapes you cannot name?

Take note of any children who may use shape names incorrectly, especially if confusing a 2-D shape with a 3-D shape (e.g. a circle and a sphere, because the drawn representation of a sphere is a circle).

- C** Sorting activity: Sorting 2-D and 3-D Shapes
MAM Routine: Build it; Sketch it; Write it

Distribute sets of the available 2-D and 3-D shapes to every group. Each group sorts the shapes into different collections, according to their own criteria. Provide blank cards for each group to label



their collections. Alternatively, they can record how they sorted in their maths journals.

Teaching tip

At an appropriate time, do a Gallery Walk. Each group walks slowly around the class to look at how the other groups sorted their shapes.

Allow plenty of time for the children to examine and discuss the shapes. Then ask:

- Are there any shapes here that remind you of shapes in the poster? Explain why.

The children then record what they did and why (e.g. by drawing and labelling). Depending on how they have sorted and labelled the collections, ask probing questions. Say/ask:

- Why did you choose to put these shapes together?
- Put on your Maths Eyes. Can you find objects in the classroom that also belong in these collections?
- Could this shape have been put in a different collection?

Using an unfamiliar shape such as a parallelogram from a tangram set, or a hexagon from pattern blocks, ask:

- Could this shape go with another collection? Explain why.

Let's deepen

Challenge some children to name the unfamiliar shapes.

C Concrete activity: Build a City

MAM Routine: Build it; Sketch it; Write it

In groups, the children use their sets of 2-D and 3-D shapes to build a city scene. They could also include other 2-D and 3-D representations found around the classroom, such as a lunch box, Pringles container, etc. Also ask the children to sketch an image to record what they created, or to use a device to record it as a digital image.

Let's deepen

Challenge the children to annotate their sketch or digital image with the names of some of the shapes they know.

Optional consolidation and extension possibilities

Integration Geography: The city and human environments. Gaeilge: Ag Siopadóireacht; Sa bhaile mór. STEM: Designing and making structures. Engineering: Construction. Visual Arts: Printing, drawing shapes.

Shape Display Include examples of physical 2-D and 3-D shapes, images sourced in print/online, and appropriate labels (see Unit 6 Maths Language Cards). The children could contribute samples of their own work/constructions from this and subsequent lessons, and label them. The children could also source examples of real objects from home to add to the display.

STEM project Design and Make a City Street: Based on the design-and-make process of explore, plan, make and evaluate, Lesson 1 could become part of the 'explore' phase, in which the children are exploring the various shapes and imagining them as buildings.

Story Read *Captain Invincible and the Space Shapes* by Stuart J. Murphy. Captain Invincible will need to use his 2-D and 3-D shapes to return to Earth safely. A reading of the story is available at: edco.ie/zbru

Review and Reflect Use the Prompt Questions Poster.



Day 2, Lesson 2

Properties of 2-D Shapes

Focus of learning (with Elements)

- Recognises and names 2-D shapes, including hexagon and parallelogram (U&C)
- Describes the key differences and similarities of 2-D shapes according to their properties (C)

Learning experiences

- D** Digital activity: Which One Doesn't Belong? – Shapes (1) **MAM Routine: Reason & Respond**
- C** Sorting activity: Sorting Shapes
- D** Video: Naming 2-D Shapes **MAM Routines: Reason & Respond, with Write-Hide-Show**
- C** Concrete activity: Sensory ('Feely') Bag
- P** Pupil's Book page 38: Properties of 2-D Shapes

Equipment

- 2-D and 3-D equipment, including wooden building blocks, magnetic blocks, attribute shapes/blocks, cardboard 2-D shapes, polydrons, tangrams, pattern blocks, geostrips, found materials from classroom/home, etc.
- Blank cards (optional)

Maths language

- 2-D shape, circle, triangle, square, rectangle, semi-circle, oval, hexagon, parallelogram, regular shape

Warm-up

- D** Digital activity: Which One Doesn't Belong? – Shapes (1) **MAM Routine: Reason & Respond**

Play the slideshow and ask the children to suggest reasons why each of the shapes does not belong.

Main event

C Sorting activity: Sorting Shapes

Distribute sets of all 2-D and 3-D shapes to each group. Begin by asking the children to make just two collections out of the shapes. Ask:

- How might we label these two groups? (2-D shapes and 3-D shapes)

Next, ask the children to move the 3-D shapes aside and make smaller collections out of the 2-D shapes only. Ask the following questions:

- Why do these shapes belong together?
- How are they the same? How are they different?
- Why do these shapes not belong together?
- What name would you give to each collection and why? (Provide names, if not suggested.)
- Could I put this triangle in with the squares? Explain why.
- Could I put this square in with the rectangles? Explain why.



- Apart from using shape names, what other ways could you sort the shapes? (Examples: colours, corners/no corners, straight sides/no straight sides, number of sides/corners.)

- D** Video: Naming 2-D Shapes **MAM Routines: Reason & Respond, with Write-Hide-Show**

Play the video and ask the children to respond to the questions on their MWBs.

C Concrete activity: Sensory ('Feely') Bag

For this activity, use any flatter 2-D shapes that may be available in the classroom (e.g. the thin attribute shapes, tangrams, polydron pieces, cardboard 2-D shapes).

Option 1: Place all the available shapes in a sensory bag. Unseen, one child removes a shape from the first bag and places this shape into a second bag. This second bag is passed around to the rest of the group so that each child can feel the shape. If they can identify the shape through touch, they use their MWB to write the name of the shape or draw it. After each

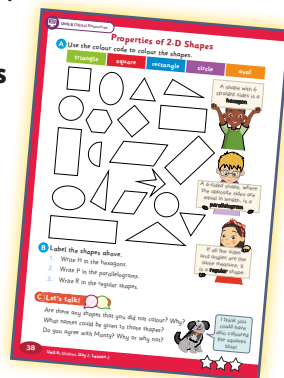


child in the group has done this, the chosen shape is revealed and the activity is repeated.

Option 2: Use only one bag, containing one of each shape. Each child is asked to pull out a specific shape, e.g. 'Can you take out a triangle?' When they have pulled out their shape, ask:

- How did you know you had the correct shape?
- What were you feeling for?

P Pupil's Book page 38:
Properties of 2-D Shapes



Note: The *Let's talk!* feature should be led by the teacher and completed as a whole-class activity to support the children in their understanding. The purpose is to introduce the children to the criteria of

the hexagon, the parallelogram and regular shapes. It is also important that the children begin to recognise that squares are also rectangles, in that they satisfy the rules of rectangles. The children might also begin to recognise that squares and rectangles are also parallelograms, since they satisfy the rules of parallelograms. (The teacher should judge if the children are ready for this concept.)

Let's strengthen

The children may benefit from the additional support of the Unit 6 Let's Strengthen PCM: 2-D Shape Reference Guide.

Let's strengthen

For consolidated learning, the children could use the Unit 6 Let's Strengthen PCMs.

Let's deepen

Challenge the children to give reasons why squares and rectangles are also parallelograms.

Optional consolidation and extension possibilities

Integration Visual Arts: Use 2-D paper shapes to create a cityscape.

STEM project Design and Make a City Street: Based on the design-and-make process of explore, plan, make and evaluate, Lessons 2–5 could become part of the 'plan' phase, in which the children draw their plans, using 2-D shapes as representations.

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Games Bank Play '2-D Gatekeeper' or '2-D Shape Headbands'.

Home/School Links Book Page 16 can be done any time after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 3, Lesson 3

2-D Shapes: Sides and Vertices (Corners)

Focus of learning (with Elements)

- Describes the key differences and similarities between 2-D shapes according to their sides and vertices (C)
- Models 2-D shapes using materials or through drawings (U&C)

Learning experiences

- D** Digital activity: Same But Different – Sides and Vertices **MAM Routines: Reason & Respond, with Think-Pair-Share**
- C** Concrete activity: Making 2-D Shapes
- C** Concrete activity: Making 2-D Shapes with Geoboards (optional)
- C** Concrete activity: Drawing 2-D Shapes
- P** Pupil's Book page 39: 2-D Shapes: Sides and Vertices (Corners)

Equipment

- Commercial equipment (if available): interlocking strips (e.g. AngLegs or geostrips); geoboards with elastic bands, construction straws, etc.
- Non-commercial equipment, e.g. art straws, drinking straws, wool/thread, pieces of uncooked spaghetti, of various lengths; poster tack, plasticine or play dough
- Scissors
- Squared paper

Maths language

- corner, vertex/vertices, (straight/curved) side, polygon

Warm-up

- D** **Digital activity: Same But Different – Sides and Vertices** **MAM Routines: Reason & Respond, with Think-Pair-Share**

Open the slideshow and present a selection of slides to the class (it is not necessary to show them all). For each slide, ask the children:

- What is the same?
- What is different?

Prompt the children to use the language of *sides*, *vertices*, *straight*, *curved* and so on, when describing the similarities and differences.

Main event

Teaching tip

While it is important to give the children ample time to construct 2-D shapes, it is not necessary to complete all the activities that follow. Choose the activities that best suit the needs of your class, depending on available resources. The activities could also be used as stations.

- C** **Concrete activity: Making 2-D Shapes**
Distribute a selection of the available equipment (suggestions listed above) to each group. Working alone or in pairs, the children use the equipment to make an example of each of the 2-D shapes they know. If a group does not make the less familiar shapes (e.g. parallelogram or hexagon), prompt them to see if they can recall these shapes from the previous day and/or share examples of these shapes made by other groups. After they have completed the task, ask:

- What shapes did you make?
- What shapes were easier/more difficult to make? Why was this?
- What parts of the shapes did you make with straws/wool? (sides)
- In what way are the sides different? (straight or curved)

- What parts of the shapes did you make with poster tack/play dough? (Where two or more straight sides/edges meet on a shape, this is a vertex or corner. 'Vertices' means more than one vertex.)
- Could you draw these shapes? What might be useful to help you draw them accurately? (ruler, pencil, squared paper, shapes to trace around, e.g. a cup for a circle)

- C** **Concrete activity: Drawing 2-D Shapes**

Ask the children to explore ways to draw 2-D shapes accurately. You could ask them to draw a cityscape with 2-D shapes, perhaps in their maths journals. Ask:

- How many vertices does the shape have? Draw the vertices as dots first.
- How many sides does the shape have? Join the dots with a ruler to draw the sides.



Teaching tip

If devices are available the children could also use various drawing programs or apps to create 2-D shapes. They could also explore this virtual geoboard app: edco.ie/kwjf



Let's strengthen

The children might benefit from the additional support of stencils and templates.

Let's deepen

Challenge some children to draw accurate 2-D shapes using plain (not squared) paper.

P Pupil's Book page 39: 2-D Shapes: Sides and Vertices (Corners)



Optional consolidation and extension possibilities

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Games Bank Play '2-D Gatekeeper' or '2-D Shape Headbands'.

Review and Reflect Use the Prompt Questions Poster.

Day 4, Lesson 4

Classifying 2-D Shapes

Focus of learning (with Elements)

- Represents classification of 2-D shapes according to common properties using tables or diagrams (C)

Learning experiences

- D** Digital activity: What Am I? (2-D Shapes)
MAM Routines: Reason & Respond, with Write-Hide-Show
- D** Toolkit: Sorting Shapes *MAM Routine: Reason & Respond*
- D** Toolkit: Carroll Diagram *MAM Routine: Reason & Respond*
- C** Sorting activity: Sorting 2-D Shapes
- P** Pupil's Book page 40: Classifying 2-D Shapes

Equipment

- 2-D shapes
- Boxes, trays or hoops for sorting

Maths language

- There is no new maths language for this lesson.

Warm-up

- D Slideshow: What Am I? (2-D Shapes)**
MAM Routines: Reason & Respond, with Write-Hide-Show

Each slide contains a set of audio clues. Ask the children to listen to the clues and guess what 2-D

shape is being described. When they guess the correct answer, click the card to reveal the shape. As each clue is revealed, encourage the children to write or draw the possibilities on their MWBs and share their ideas with their partner/the class.

Main event

D Toolkit: Sorting Shapes

MAM Routine: Reason & Respond

Open the Manipulatives e-Toolkit and select the Sorting Shapes tool. Display two sorting rings and suggest (or ask the children to suggest) criteria for each one. Then, click to choose a selection of 2-D shapes. Ask:

- What shapes should go in the first sorting ring?
- What shapes should go in the second sorting ring?
- Are there any shapes that don't go in either?
- Where should this shape go? (highlight square)

D Toolkit: Carroll Diagram

MAM Routine: Reason & Respond

This can be carried out as a whole-class activity or in in stations. Ask the children to sort the shapes and to give reasons for their answers.



C Sorting activity: Sorting 2-D Shapes

Choose to do some or all of the activities below, depending on the needs of the children and the resources available.

Sorting Circles (Venn Diagrams)

Distribute 2-D shapes and sorting/hula hoops to each group. Each group sorts the shapes in their chosen way. The children write labels on their MWBs (or on blank cards) to indicate their chosen sorting criteria (e.g. straight sides, curved sides).

Development: Each group turns their MWBs/cards with chosen criteria face down so they are not visible to the other groups. Each group moves around the room (as in Gallery Walk) to view how the other groups sorted their shapes, and tries to guess the sorting labels.

Let's strengthen

Initially, the children might benefit from using only two hoops that do not overlap.

Let's deepen

Challenge some children to classify, using three hoops with an overlap in the centre.

Carroll Diagrams

Distribute 2-D shapes and two boxes/trays to each group. Each group sorts the shapes in their own chosen way. The children write labels on their MWBs (or on blank cards) to indicate their chosen sorting criteria (e.g. triangles/not triangles).

Development: Add a second set of boxes/trays to make four altogether. Now, two different sorting criteria are used each time (e.g. triangles/not triangles; and all sides equal length/all sides not equal length).

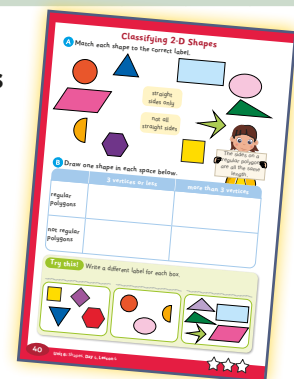
Let's strengthen

The children might benefit from using the Unit 6 Let's Strengthen PCM: 2-D Shape Reference Guide if they are unsure what sorting criteria to choose.

Let's deepen

Challenge children to use the Sorting Circles and/or the Carroll Diagram printables to record their sorting. The printables can also be pasted into their maths journals.

P Pupil's Book page 40: Classifying 2-D Shapes



Optional consolidation and extension possibilities

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Games Bank Play '2-D Gatekeeper' or '2-D Shape Headbands'.

Review and Reflect Use the Prompt Questions Poster.

Days 5 and 6, Lesson 5

Shapes in Shapes

Focus of learning (with Elements)

- Combines and partitions 2-D shapes (A&PS)
- Solves problems requiring the greatest or least number of 2-D shapes needed to compose a larger 2-D shape in a variety of ways (A&PS)
- Solves tasks and problems involving technology/virtual manipulatives (A&PS)

Learning experiences

- D** Digital activity: Which One Doesn't Belong? – Shapes (2)
MAM Routine: Reason & Respond
- D** Digital activity: Shapes in Shapes
MAM Routines: Concept Cartoon, with Think-Pair-Share
- C** Concrete activity: Quartering the Square
- D** Digital activity: The Square
MAM Routines: Would This Work? with Think-Pair-Share
- C** Shape stations: Combining and Partitioning
- P** Pupil's Book page 41: Shapes in Shapes

Equipment

- Paper squares (five or six per pair)
- Scissors
- Resources for combining and partitioning as part of shape stations
- PCM 25

Maths language

- There is no new maths language for this lesson.

Warm-up

- D** Digital activity: Which One Doesn't Belong? – Shapes (2) **MAM Routine: Reason & Respond**
Play the slideshow and ask the children to suggest reasons why each of the shapes does not belong.

Main event

- D** Digital activity: Shapes in Shapes
MAM Routines: Concept Cartoon, with Think-Pair-Share
Display the Concept Cartoon and click each character to hear their thoughts. Ask the children which character(s) they agree with and why. (This is done in preparation for the concrete activity that follows.)
- C** Concrete activity: Quartering the Square
Distribute paper squares and scissors to each pair. The children investigate the characters' ideas from the Concept Cartoon to see whether or not they work. Ask the children to then try putting four quarters back together to make a different shape.
Assessment Opportunity
- D** Digital activity: The Square **MAM Routines: Would This Work?, with Build it; Sketch it; Write it**
Display the activity. Begin by asking the children to use Build it; Sketch it; Write it to model and solve the question: if this square is cut into quarters, what shapes will the quarters be? Allow time for the children to share how they did it. Then, click to see the programme characters show different ways to partition the square: do they work?
Ask the children:
 - Are these all quarters?
 - Can you prove it? Use the paper squares to explore whether or not they work.
 - Lexi made squares and rectangles. Could you also make squares and rectangles?
- C** Shape stations: Combining and Partitioning
Choose a number of stations to do in your class, depending on the physical and digital resources available. Using any of the resources, the children can make a large shape (or use an existing shape) and fill it with the least number or most number of smaller shapes.

Recommended concrete resources

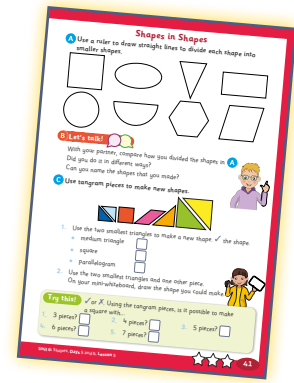
Pattern blocks, geoboards, interlocking strips (e.g. geostrips or AngLegs), tangrams, pentominoes/tetrominoes or other 2-D shapes.

Recommended digital resources

Virtual pattern blocks, geoboard, tangram or pentominoes/tetrominoes.

The children could also use PCM 25: Combining and Partitioning Shapes Stations.

P Pupil's Book page 41:
Shapes in Shapes



Optional consolidation and extension possibilities

Story Read *Grandfather Tang's Story* by Ann Tompert. Grandfather Tang arranges the tangram pieces to create a story for Little Soo. The children could also use tangram pieces to create the characters as the story is told. A reading of the story is available at: edco.ie/6mk4

Let's play! Play digital games such as Tetris.

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Review and Reflect Use the Prompt Questions Poster.

Day 7, Lesson 6

Classifying 3-D Shapes

Focus of learning (with Elements)

- Recognises and names 3-D shapes, including pyramid (U&C)
- Analyses the relationships between properties and capabilities in families of shapes (U&C)

Learning experiences

- D** Digital activity: Same But Different – Shapes (1)
MAM Routines: Reason & Respond, with Think-Pair-Share
- C** Sorting activity: Sorting 3-D Shapes
- D** Video: Naming 3-D Shapes **MAM Routine: Reason & Respond, with Write-Hide-Show**
- C** Concrete activity: Roll, Stack or Slide?
- P** Pupil's Book page 42: Classifying 3-D Shapes

Equipment

- 3-D shapes
- Boxes, trays or hoops for sorting

Maths language

- 3-D shape, cube, cuboid, sphere, cylinder, cone, pyramid, roll, stack, slide

Warm-up

- D** Digital activity: Same But Different – Shapes (1)
MAM Routines: Reason & Respond, with Think-Pair-Share

Open the slideshow and present a selection of slides to the class (it is not necessary to show them all). For each slide, ask the children:

- What is the same?
- What is different?

Prompt the children to use the shape language when describing the similarities and differences.

Main event

C Sorting activity: Sorting 3-D Shapes

Distribute sets of the available 3-D shapes to each group. Each group sorts the shapes into different collections, according to their own criteria. Ask:



- Why do these shapes belong together?
- How are they the same? How are they different?
- Why do these shapes not belong together?
- Put on your Maths Eyes. Can you find objects in the classroom that also belong in these collections?
- What name would you give each collection? Why? (Provide the names, if not suggested.)
- Could I put this shape (e.g. a cube) in with these shapes (e.g. cuboids)? Why?
- Apart from using shape names, what other ways could you sort the shapes?



D Video: Naming 3-D Shapes **MAM Routine: Reason & Respond, with Write-Hide-Show**

Play the video and ask the children to respond to the questions on their MWBs.

C Concrete activity: Roll, Stack or Slide?

You will need three sorting rings, labelled 'Roll', 'Stack' and 'Slide' to make a concrete version of a Venn diagram, and a set of 3-D shapes. Starting with the 'Roll' sorting ring, ask:

- What shapes go into this sorting ring and what should stay outside?

Add the 'Stack' sorting ring, overlapping the 'Roll' sorting ring, and ask:

- What shapes go into this sorting ring? What shapes, if any, should go in the middle? (e.g. A cone and pyramid can stack once onto another shape or surface but cannot have another item stack onto them, unlike a cube, cuboid or cylinder.)

Add the 'Slide' sorting ring, overlapping the other two sorting rings, and ask:

- What shapes go into this sorting ring? What shapes, if any, should go in the middle?
- What is it about the shapes that determines where they should go? (Point out that the cylinder is the only shape in all three hoops because it has a curved surface that can roll, and two flat faces that can slide and stack.)

P Pupil's Book page 42: Classifying 3-D Shapes



Let's strengthen

The children might benefit from the additional support of the Unit 6 Let's Strengthen PCMs.

Optional consolidation and extension possibilities

Sensory ('Feely') Bag with 3-D shapes

Option 1 Place all the available shapes in a sensory bag. Unseen, one child removes a shape from the first bag and places this shape into a second bag. The second bag is passed around to the rest of the group so that each child can feel the shape. If they can identify the shape through touch, they use their MWB to write the name of the shape or draw it. After each child in the group has done this, the chosen shape is revealed and the activity is repeated.

Option 2 Use only one bag, containing one of each shape. Each child is asked to pull out a specific shape. Ask:

- How did you know each shape?
- What were you feeling for?

STEM project Design and Make a City Street: Based on the design-and-make process of explore, plan, make and evaluate, Lesson 6 could become part of the 'make' phase, in which the children make their models.

Story Read *Kitten Castle* by Mel Friedman. Anna has to build a castle for her cat's newborn kittens, which will cater for their various preferences (toys that roll, curved spaces, etc.). A reading of the story is available at: edco.ie/thbf

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Games Bank Play '3-D Gatekeeper' or '3-D Shape Headbands'.



Home/School Links Book Page 17 can be done any time after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 8, Lesson 7

3-D Shapes: Faces, Edges and Vertices

Focus of learning (with Elements)

- Describes the key differences and similarities of 3-D shapes according to their faces, edges and vertices (C)

Learning experiences

- D** Digital activity: What Am I? (3-D Shapes)
MAM Routines: Reason & Respond, with Write-Hide-Show
- D** Digital activities: Drawing Around Shapes (A) & (B)
MAM Routines: Concept Cartoon, with Think-Pair-Share
- C** Concrete activity: Drawing Around 3-D Shapes
- C** **P** Concrete activity: Recording Faces, Edges and Vertices
- P** Pupil's Book page 43: 3-D Shapes: Faces, Edges and Vertices

Equipment

- 3-D shapes

Maths language

- (flat) face, (straight/curved) edge, vertex/vertices, curved surface, point

Warm-up

- D** **Digital activity: What Am I? (3-D Shapes)**
MAM Routines: Reason & Respond, with Write-Hide-Show

Each slide contains a set of audio clues. Ask the children to listen to the clues and guess what 3-D

shape is being described. When they guess the correct answer, click the card to reveal the shape.

As each clue is revealed, encourage the children to write or draw the possibilities on their MWBs and share their ideas with their partner/the class.

Main event

- D** **Digital activities: Drawing Around Shapes (A) & (B)** **MAM Routines: Concept Cartoon, with Think-Pair-Share**

Display the Concept Cartoons and click each character to listen to their thoughts. Ask the children:

- What do you think?
- How can we find out who is correct?
- How do you think the characters drew these shapes?
- What part of the 3-D shape did they put down on the paper? (the face)

- C** **Concrete activity: Drawing Around 3-D Shapes**

Using 3-D shapes, the children place each shape down on paper and draw/trace around its faces to reveal the

2-D shapes. Ask:

- What 2-D shape do you think you will see when you draw around each face?
- How will you ensure that you do not leave out any of the faces?
- How will you ensure you do not draw the same face twice?

When they have completed the activity, ask:

- Were there any 3-D shapes that were difficult to draw around? Which ones and why?
- What 3-D shape could (e.g. Dara) have drawn around?
- What 3-D shape could (e.g. Lexi) have drawn around?

Let's strengthen

The children might benefit from the additional experiences of printing with 3-D shapes and/ or pushing 3-D shapes into sand/play dough to see the imprints made. Show the children how – unlike faces – the curved surfaces of 3-D shapes do not make clear prints/imprints.

C P Concrete activity: Recording Faces, Edges and Vertices

The children work in pairs using Pupil's Book page 126 and the available 3-D shapes. They examine each shape to complete the second grid on the page. Afterwards, ask:



- What shape has the most faces/curved surfaces/ edges/vertices?
- What shape has the least faces/curved surfaces/ edges/vertices?
- What strategy did you use to ensure that you did not leave out a feature or count it twice?

Let's strengthen

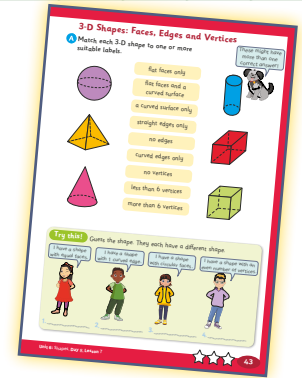
The children may find it difficult to distinguish between straight edges and curved edges. Encourage the children to slide their finger

along each edge of the 3-D shape to develop their kinaesthetic as well as visual awareness for each one.

Let's deepen

Challenge some children to complete the grid on Pupil's Book page 126 by visualising the shape, before checking their responses by examining the actual shape.

P Pupil's Book page 43: 3-D Shapes: Faces, Edges and Vertices



Let's strengthen

The children might benefit from using the information on the completed part of the grid on Pupil's Book page 126.

Optional consolidation and extension possibilities



Story Read *Math Fair Blues* by Sue Kassirer, in which a group of children make cool T-shirts for their new rock band by using 3-D shapes to print 2-D shapes. A reading of the story is available at: edco.ie/4sr5

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Games Bank Play '3-D Gatekeeper' or '3-D Shape Headbands'.

Let's deepen The Unit 6 Let's Deepen PCM: Shape can be done any time after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 9, Lesson 8

Constructing and Deconstructing 3-D Shapes

Focus of learning (with Elements)

- Dissects and/or constructs 3-D shapes using modelling materials (U&C)

Learning experiences

- D** Digital activity: Same But Different – Shapes (2) **MAM Routines: Reason & Respond, with Think-Pair-Share**
- C** Shape Stations: Constructing and Deconstructing 3-D Shapes
- P** Pupil's Book page 44: Constructing and Deconstructing 3-D Shapes

Equipment

- 3-D building equipment, including magnetic blocks, polydrons, K'NEX, found materials from the classroom/ home
- Straws, matchsticks and/or pieces of uncooked spaghetti
- Modelling material, such as clay, play dough or plasticine
- PCM 24

Maths language

- There is no new maths language for this lesson.

Warm-up

D Digital activity: Same But Different – Shapes (2)

MAM Routines: Reason & Respond, with Think-Pair-Share

Open the slideshow and present a selection of slides to the class (it is not necessary to show them all). For each slide, ask the children:

- What is the same?
- What is different?

Prompt the children to use the language of *faces*, *curved surfaces*, *edges* and *vertices* when describing the similarities and differences.

Main event

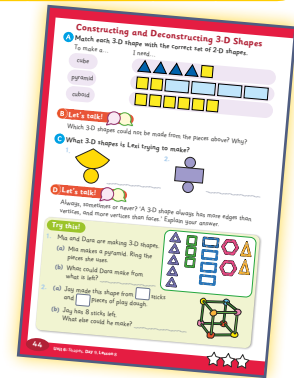
C Shape Stations: Constructing and Deconstructing 3-D Shapes

Choose a number of stations to do in your class, depending on the resources available. Distribute a copy of PCM 23:



Constructing and Deconstructing 3-D Shapes Stations to each child. At each station/resource, ask the children to make 3-D shapes. If time allows, the children rotate between the various stations.

P Pupil's Book page 44: Constructing and Deconstructing 3-D Shapes



Let's strengthen

Some children might benefit from using magnetic blocks only, because they are often easier to construct with.

Optional consolidation and extension possibilities

Story Read *Charlie Piechart and the Case of the Missing Hat* by Eric Comstock and Marilyn Sadler. When a purple, sparkly cone-shaped princess hat goes missing, Charlie and his dog companion, Watson, must search for geometric clues that might lead to the missing hat.

Shape Display The children could contribute samples of their own work/constructions from this lesson and label them.

Games Bank Play '3-D Gatekeeper' or '3-D Shape Headbands'.

Review and Reflect Use the Prompt Questions Poster.

Day 10, Lesson 9

Review and Reflect

Focus of learning (with Elements)

- Reviews and reflects on learning (U&C)

Warm-up

Carry out a warm-up activity of your choice from one of the lessons in this unit.

Main event

Use this menu of activity ideas to choose how best to structure this last lesson of the unit to suit your needs and the needs of your class.

<p>Let's talk!</p> <p>Use Think-Pair-Share to review the unit.</p> <p>The children record what they know in their maths journals (e.g. using a concept map).</p> <p>Individual children could present examples of their own drawings/work/constructions to the class, and talk about what they have learned.</p>	<p>Let's create!</p> <p>STEM project: Design and Make a City Street: Use this lesson to allow the children more time to complete their projects. Or this lesson could become part of the 'evaluation' phase of the design-and-make process, in which the children evaluate their project and the models they created.</p>
<p>Maths language</p> <p>Call out a random 2-D or 3-D shape and ask the children to sketch it on their MWBs. Ask/say:</p> <ul style="list-style-type: none"> ● Tell me something you know to be true about this shape, using some of these words: <i>vertex/vertices, surface, face, side, edge, curved, straight, point.</i> ● Tell me something you know to be false about this shape. <p>Complete the My Maths Fact File on Pupil's Book page 126.</p> <p>Use the Maths Language Cards for this unit to revise the key terms. For example: If the image and text are cut apart, can the children match them?</p>	<p>Maths strategies and models</p> <p>Ask the children to give examples of the strategies (e.g. examining and using the concrete shapes, using Venn diagrams and Carroll diagrams to sort and classify shapes) that they used in this unit.</p>
<p>Progress Assessment Booklet</p> <p>Complete Questions 24–25 on pages 14–15</p> <p>Alternatively, these can be left to do as part of a bigger review during the next review week.</p>	<p>Maths eyes</p> <p>Go for a walk through the school and/or local area, looking for 2-D and 3-D shapes. How are they similar to/different from those looked at during this unit? Are there any buildings that are made up of more than one 3-D shape? Ask the children to make drawings or take photos to record their findings in a display when back in the classroom.</p>
<p>Let's strengthen</p> <p>Identify children who might benefit from extra practice with some of the key concepts or skills in this unit. Consult the Unit 6 Let's Strengthen Suggestions for Teachers and/or use the Unit 6 Let's Strengthen PCMs.</p>	<p>Let's deepen</p> <p>Select one of the Cognitively Challenging Tasks on the Unit 6 Let's Deepen PCM (this could be displayed on the class board) and encourage the children to work together in groups to model solutions for the task. Alternatively, each group could choose their own preferred task to solve.</p>

