

Maths and Me: 1st Class – Short-Term Plan, Unit 9: Location and Transformation (January: Weeks 3&4)

Strand(s) > Strand Unit(s)		Shape and Space > Spatial Awareness and Location; Transformation.		
Learning Outcome(s)		Through appropriately playful and engaging learning experiences children should be able to use spatial knowledge for the purposes of orientation and navigation; visualise and model location using symbolic co-ordinates; understand that shapes and line segments can be reflected, rotated and translated.		
Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	Left and Right: Describes direction [to the right/left] (U&C); Recognises that some directions are relative to current position and orientation [for example: right/left] (R); Solves problems and plays games involving simple maps or grids (A&PS); Creates a set of simple instructions to direct movement for a given purpose (A&PS)		D Notice & Wonder L1– 2, 5–6 D Reason & Respond L1– 2, 4–6 P C Show Me the Way to Go Home! L1 D Think-Pair-Share L2, 5–6 C Game: It's a Knockout! L2–3 C Full, Half and Quarter Turns L2 C Game: It's a Knockout Again! L2 P C Tom Crean: The Brave Explorer L3 C Game: I Spy L3 D C Monty Wants to Go Home! L3 C Classroom Maps L3 C Stations L4–5	Intuitive Assessment: responding to emerging misconceptions
2	Turns: Describes amount of turn [whole, half and quarter turns] (U&C); Relates clockwise movements to the clock face (R)			
3	Directions: Associates the cardinal directions [North, South, East and West] with the appropriate directions in relation to the classroom and school environment (U&C); Records movement from one location to another using a simple map (C); Visualises the result of following a sequence of directions on a map or plan (R)			Planned Interactions: responding to insights gleaned from children's responses to learning experiences
4	Symmetry: Recognises and identifies known shapes when reflected (U&C); Understands and uses the term reflect to describe relevant shape movements (C); Identifies lines of symmetry and reflected lines or shapes in images or illustrations (A&PS)			
5	Moving Shapes: Recognises and identifies known shapes repeated or rotated (U&C); Selects appropriate materials/digital tools to draw and label shape movements; Explores position and shape with a range of pentominoes (A&PS)		Print resources Pupil's Book pages 61–66 Home/School Links Book pages 23–24 PCMs 37, 38	Assessment Events: information gathered from completion of the unit assessment in the Progress Assessment Booklet pages 18–19
6	Tessellations: Identifies shapes and combinations of shapes that tessellate in the environment (U&C); Makes predictions and explains in simple terms why some shapes tessellate (for example, referring to right angles or other familiar properties) (R)			
7	Review and Reflect: Reviews and reflects on learning (U&C)			

Key: Elements: (U&C) Understanding and Connecting; (C) Communicating; (R) Reasoning; (A&PS) Applying and Problem-Solving. **CM: Cuntas Míosúil:** 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 '1st Class <i>Maths and Me</i> Progression Continua Overview' for a detailed breakdown of how all progression continua are covered.
 Maths Language	See '1st Class <i>Maths and Me</i> Maths Language Overview', individual lesson plans and Unit 9 Maths Language Cards.
 Equipment	See '1st Class <i>Maths and Me</i> Maths Equipment Overview' and individual lesson plans.
Inclusive Practices	● See Let's Strengthen and Let's Deepen suggestions throughout lesson plans. ● See Unit 9 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.) ● See Unit 9 Let's Strengthen PCM. ● See Unit 9 Let's Deepen PCM.
Integration	See individual lesson plans.

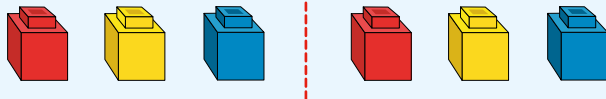
Background and rationale

- Location and Transformation is the second Shape and Space unit in *Maths and Me*. It is a combined unit exploring the topics of Spatial Awareness and Location and Transformation.
- The children will build on their knowledge of moving, comparing, dissecting and combining shapes from Senior Infants to further explore movement, and are introduced to the terms 'turn', 'slide' and 'flip'.
- The emphasis is on playful, engaging activities using, for example, digital stimuli, games, puzzles, stories and station work.
- The local and natural environments are intrinsic to this unit, e.g. the cardinal points (north, south, east and west) are explored in the context of the classroom and school.
- The children are introduced to grids and, building on their experience in Senior Infants, create drawings and plans, devise and record movement, and give directions using key directional language.
- Turns: While the primary focus in this unit is on full, half and quarter turns, you may challenge the children to also explore the effects of three quarter turns.
- The progression continua for levels d, e, f, g, and h refers to two specific types of symmetry: line symmetry, introduced at level d, and rotational symmetry, not formally explored until level g. Therefore, in *Maths and Me* for Senior Infants to 2nd Class, the children explore line symmetry only. As line symmetry is also referred to as 'reflective/mirror' symmetry, *Maths and Me* uses the term 'mirror symmetry', both to help create a distinction between the children's understanding of this type of symmetry and their later understanding of rotational symmetry, and to emphasise the importance of incorporating the use of mirrors as an essential piece of equipment when exploring this concept.

The theme of this unit is **The World Around Us**.

Common misconceptions and difficulties

- The children may confuse left and right when describing turns, particularly when the orientation of the object is different from their own orientation.
- The children may not immediately grasp that a left or right turn is not a movement forwards or backwards. The turn must be made first, followed by the movement forwards or backwards.
- The children may struggle to visualise and identify half and quarter turns. (Making a turn requires the ability to visualise yourself from above as you turn a fraction of a circle, clockwise or anti-clockwise. It may help for the children to initially use a cut-out, with obvious front, back and sides, that can be physically turned.)
- They may create a duplicate/repeat image (see below) when trying to create a mirror image.

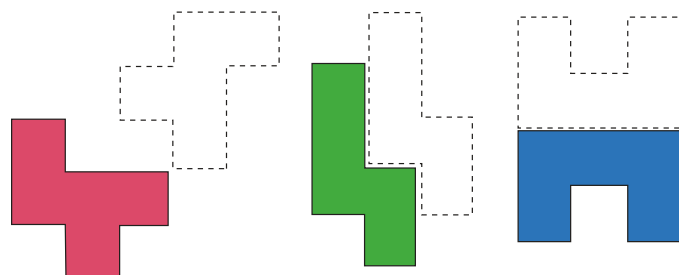


- Children may struggle to recognise that the colour and type of object that is closest to the line of symmetry on one side should also be closest to the line of symmetry on the other side, i.e. that things that were to the left of the first half will now be to the right of the second half, and vice versa.
- Some children may struggle to flexibly visualise position, direction and the effects of movement and transformation on shapes and objects. Therefore, experiences with concrete materials and equipment are vital and should be enabled as much and as often as possible.

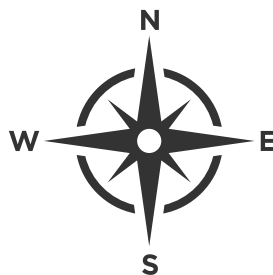
The Unit 9 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

Mathematical models and representations

- Grids
- Directional icons and symbols, including turns
- Cardinal points/directions
- Classroom maps
- Representations of tessellations
- Analogue clocks
- 2-D shapes
- Pattern blocks
- Pegboards
- Pentominoes
- Pattern tiles



Pentominoes



Cardinal points

Teaching tip

The following manipulative printables are available to support the unit: Blank Grid, Compass, Cardinal Directions (North, South, East and West), Analogue Clock Face and Hands, 2-D Shapes, Number Shapes, and Pentominoes. Click on the resources icon on the *Maths and Me* book cover on edcolearning.ie

Day 1, Lesson 1

Left and Right

Focus of learning (with Elements)

- Describes direction [to the right/left] (U&C)
- Recognises that some directions are relative to current position and orientation [for example: right/left] (R)
- Solves problems and plays games involving simple maps or grids (A&PS)
- Creates a set of simple instructions to direct movement for a given purpose (A&PS)
- Deduces and identifies where, in a series of steps, the wrong direction may have been taken (R)

Learning experiences

- D** Digital activity: Left and Right **MAM Routines: Notice & Wonder; Reason & Respond**
- P** **C** Concrete activity: Show Me the Way to Go Home!
- P** Pupil's Book page 61: Left and Right

Equipment

- Small-world figures (e.g. cars, animals, houses)
- Other figures or blocks to represent houses, etc.
- PCM 37

Maths language

- left, right, in, out, facing, turn, same, different, straight, direction, bottom, towards, top, forwards

Warm-up

- D** Digital activity: Left and Right
MAM Routine: Notice & Wonder

Display the poster and ask:

- What do you notice?
- What do you wonder?
- What do you think this lesson is about?

Record the children's responses to the questions on the 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.

Let's strengthen

The children could wear wristbands for left and right prompts (see the Unit 9 Let's Strengthen Suggestions for Teachers and PCM 41: Left and Right Wristbands).

Main event

- D** Digital activity: Left and Right
MAM Routine: Reason & Respond

Display the poster again and click to play or ask the following questions. Ask the children to give reasons for their answers.

- Look at the hands. What is the L telling you?
- Can you put your left hand on your MWB and draw an L?
- Look at the shoes. What colour shoe is on the left/right?
- Touch your partner's left shoe with your right hand.
- Touch your partner's right shoe with your left hand.

- Look at the two signs. If you wanted to go in/out, which direction would you turn?
- Look at the hands with the pointing fingers. Which colour hand is pointing left/right?
- Look at the video console. How would you use your hands on that console?
- Where would you place your right thumb? Where would you place your left thumb?
- If the console was turned upside down, what button would you press to move to the right? (The children should draw the correct button on their MWBs.)

P C Concrete activity: Show Me the Way to Go Home!

The children work in pairs. Distribute PCM 37: Show Me the Way to Go Home!, some 'characters' and some 'obstacles' (e.g. small-world figures such as cars, animals, houses) to each child. Guide the children in practising some moves:



- Put your character in the school square at the bottom of the grid. Your character should look towards the top of the grid. ('Top' is written on the grid for clarity.) We want to bring him/her to H for 'Home'.
- Move forwards one square.
- Now, turn your character to the right.
- Did your character move into a new square when I said, 'Turn right'? No, they just turned to face a new direction.
- Now, move forwards one square.
- Turn left. Remember, this is only a turn to the left, not a move.
- Now, move forwards one square.
- Are you close to H for 'Home'?
- What should happen next?
- Work together with the class to figure out the final turns and moves to get the character to 'H'.

The children take turns devising different routes and giving directions to their partner to get from 'S' to 'H' or vice versa. When ready, the children can place houses, animals, etc. in individual squares (these can also be drawn) and give directions to these or devise rules, e.g. 'Go home but you must visit the horse on the way.'

Conference with the children as they work, checking for understanding of key language and concepts such as directions (left/right) being relative to current position and orientation. Ask the children to identify and deduce where a wrong direction may have been taken.

Let's strengthen

The children may prefer to use a pre-prepared grid (see the Unit 9 Let's Strengthen PCM).

Provide directional arrows with or without words to the children for visual support (see PCM 38: Directional Prompt Cards). Some children may need support to use the correct language or directional arrow for movement from square to square and to recognise that left and right are *turns* but do not involve movement from square to square on the grid.

Let's deepen

The children might like to draw their own 4 × 4 (or larger) grid. They could include obstacles/objects for the character to avoid or collect on the way.

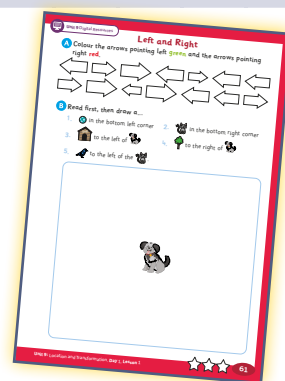
Teaching tip

The children could bring in characters and obstacles from home. Alternatively, use counters as 'characters' and cubes/small blocks of different colours as 'obstacles'.

Teaching tip

Take photos or videos to use in the warm-up for the Review and Reflect lesson.

P Pupil's Book page 61: Left and Right



Optional consolidation and extension possibilities

Maths Eyes Use PCM 39: Left or Right?

Games Bank Play 'Left Foot, Right Foot Game', using PCM 42.

STEM If a programmable bot-toy and mat(s) are available, the children work in pairs or groups, taking turns to devise and try out routes.

Investigation Station Leave blank grids, characters and obstacles on the display table for free play.

Story Read *Where's That Bone?* by Lucille Recht Penner.

Days 2 and 3, Lesson 2

Turns

Focus of learning (with Elements)

- Describes amount of turn [whole, half and quarter turns] (U&C)
- Relates clockwise movements to the clock face (R)

Learning experiences

- D** Video: Clockwise and Anti-clockwise
MAM Routines: Notice & Wonder; Reason & Respond, with Think-Pair-Share
- C** Game: It's a Knockout!
- C** Concrete activity: Full, Half and Quarter Turns
- D** Digital activity: Turns
MAM Routines: Reason & Respond, with Think-Pair-Share
- C** Game: It's a Knockout Again!
- P** Pupil's Book page 62: Turns

Equipment

- Poster printables of the MAM characters

Maths language

- clockwise, anti-clockwise, circular, whole, opposite, full turn, half turn, quarter turn, symbol

Warm-up



- D** **Video: Clockwise and Anti-clockwise**
MAM Routine: Notice & Wonder

Play the video. Ask:

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

Record the children's responses to both questions on the 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** **Video: Clockwise and Anti-clockwise**
MAM Routines: Reason & Respond, with Think-Pair-Share

Play the video again and, using Think-Pair-Share, ask:

- What is the same in this video?
- What is different in this video?

If the children do not draw attention to the clockwise and anti-clockwise nature of the movement of the various objects in the video, help them to make the connection, and introduce the vocabulary 'clockwise' and 'anti-clockwise'.

Ask the following questions:

- Can you show with one hand how the clock hand moved?
- At what number did it start?

- What numbers did the clock hand pass?
 - At what number did it end?
 - What shape did it make?
 - Stand, and face the class clock. Can you move in that circular way until you go the whole way round and are back where you began?
 - Can you now make the circular movement in the opposite direction?
 - Can you keep moving in that circular way until you go the whole way around, making a full turn?
- Repeat the questions, as needed, for other objects in the video, e.g. the ferris wheel, naming turns as 'clockwise' and 'anti-clockwise'.
- Which objects moved in both a clockwise and anti-clockwise direction?

- Which objects moved in a clockwise direction only? (cars on the roundabout and the clock hands)

Point out that it makes sense for cars to be allowed to move in one direction only when driving on the road – otherwise they would crash!

C Game: It's a Knockout!

Ask all the children to stand, facing the same focal point (e.g. the IWB). Explain that if any player moves in the wrong direction, they must sit down. Deliver instructions, increasing in rapidity and complexity.



Examples:

- Make one/two/three whole turn(s) in a clockwise/anti-clockwise direction.
- Clap your hands three times and make one/two/three whole turn(s) in an anti-clockwise direction.
- Put your hands up in the air, make one whole turn in a clockwise/anti-clockwise direction, then put your hands down and make a whole turn in the opposite direction.

Teaching tip

If space is limited, the children can work in pairs. One child stands or sits, acting as the focal point.

C Concrete activity: Full, Half and Quarter Turns

Distribute poster printables of each of the four MAM characters (four pictures in total). Place one picture at each of the four sides of the classroom. The children stand facing a common focal point (e.g. Mia). Ask/say:

- Face Mia. Turn in an anti-clockwise direction to face (name character) at $\frac{1}{2}$ turn.
- Who can you see?
- Have you made a full turn?
- Would you use 'half' or 'quarter' to describe the turn you have made?
- Experiment:** Work with a partner. Find out how many half turns make a full turn.
- Make a clockwise turn to face (name character) at $\frac{1}{4}$ turn.
- Who can you see?
- Have you made a full turn?
- Would you use half or quarter to describe the turn you have made?
- Experiment:** Work with a partner. Find out how many quarter turns make a full turn.

Continue in this manner until the children are confident in making quarter and half turns in both directions from the same starting point (i.e. Mia).

In each of the next series of steps, the children first make a prediction, then complete the action. Ask:

- Start at Mia. If you make a half turn clockwise, who will you see?
- From there, make a quarter turn anti-clockwise. Who will you see?
- From there, make a half turn clockwise. Who will you see?

D Digital activity: Turns MAM Routines: Reason & Respond, with Think-Pair-Share

Display the multiple-choice activity. Each question presents three symbols. Click to play each question and ask the children to help you select the correct answer. Encourage the children to justify their answers.

C Game: It's a Knockout Again!

Ask the children to stand, facing the same focal point (e.g. the IWB). Explain that if any player moves in the wrong direction, they must sit down. Deliver instructions, increasing in speed and complexity. Examples:

- Make a clockwise/anti-clockwise full turn.
- Make a clockwise/anti-clockwise half turn.
- Make a clockwise/anti-clockwise quarter turn.
- Be a clock hand: start at 12, stop at 6.

Teaching tip

Take photos or videos of 'It's a Knockout!' to use in the warm-up for the Review and Reflect lesson.

Let's strengthen

The children may benefit from using the following Unit 9 Maths Language Cards: [clockwise](#) and [anti-clockwise](#). These could be held like a car's steering wheel to help the children turn in the correct direction.

Let's deepen

For 'It's a Knockout!', instructions can become more complex if your class is ready. For example:

- Make an anti-clockwise full turn and a clockwise half turn.

P Pupil's Book page 62: Turns



Optional consolidation and extension possibilities

Games Bank Play 'Clocked'.

Integration PE: Play 'Duck, Duck, Goose'. You can decide before each round starts whether the direction of the chase should be clockwise or anti-clockwise. Alternatively, allow the child being chased to decide.

Maths Journal Write five words you used today. Draw a picture for each one.

Draw Use PCM 40: Turns.

Home/School Links Book Page 23 can be completed at any stage after this lesson.

Days 4 and 5, Lesson 3

Directions

Focus of learning (with Elements)

- Associates the cardinal directions [North, South, East and West] with the appropriate directions in relation to the classroom and school environment (U&C)
- Records movement from one location to another using a simple map (C)
- Visualises the result of following a sequence of directions on a map or plan (R)

Learning experiences

- P** Story: *Tom Crean: The Brave Explorer* by John and Fatti Burke
- C** Game: I Spy
- C** Game: It's a Knockout!
- D** **C** Digital activity: Monty Wants to Go Home!
- C** Concrete activity: Classroom Maps
- P** Pupil's Book page 63: Directions

Equipment

- Picture book: *Tom Crean: The Brave Explorer* by John and Fatti Burke
- Cardinal directions (North, South, East and West signs)
- PCM 38

Maths language

- south, north, beside, east, west, backwards

Teaching tip

Display the 'South' sign on the appropriate wall of the classroom in advance of the lesson, and have the other signs (North, East and West) to hand. (North, South, East and West signs are available as printables by clicking on the resources icon on the *Maths and Me* book cover on edcolearning.ie)

Warm-up

P Story: *Tom Crean: The Brave Explorer* by John and Fatti Burke

Read *Tom Crean: The Brave Explorer* by John and Fatti Burke. Afterwards, ask the children:

- Where did Tom go on Captain Scott's ship? (the South Pole)
- What was it like at the South Pole?
- Why do you think it is called the South Pole?
- Is there another pole? (the North Pole)
- What is it like at the North Pole?
- Are the North and South Poles beside each other? (opposites)
- If we were to set out for the South Pole from our classroom, in which direction should we go? (The children may already notice the 'South' sign displayed: if not, bring it to their attention.)
- Everyone, face south. In your imagination, travel all the way to the South Pole. What do you see/hear/feel?

- If south is in that direction, where should I place the 'North' sign? (Place the sign once it is established in which direction north is.)
- What do you see in the north of our classroom?
- If you were to walk north/south, leaving the classroom, what would you see once you left the classroom?
- Do you know any directions other than north and south? (If not suggested by the children, introduce the 'East' and 'West' signs.)
- We know where north and south are, so in which

direction is east? (Place the sign once it is established in which direction is east.)

- In which direction is west? What do you notice about east and west? (opposite directions)
- If you were to walk east/west, leaving the classroom, what would you see once you left the classroom?

Teaching tip

A reading of *Tom Crean: The Brave Explorer* is also available at: edco.ie/z58s



Main event

C Game: I Spy

In pairs or small groups, the children play 'I Spy', prefacing each prompt with 'In the north/south/east/west of the classroom'. This can also be played outdoors with the cardinal points marked on the ground for reference.

Let's strengthen

The children may need support for 'I Spy'. For example, instead of using an initial sound as a prompt, they could say: 'I see a ball. Is it in the north, south, east or west?'

C Game: It's a Knockout!

Ask all the children to stand, facing the same focal point (e.g. North). Explain that if a player moves in the wrong direction, they must sit down. Deliver instructions, increasing in speed. Ensure the children understand that a 'turn' does not mean moving forwards or backwards; and that a turn left or right is, in effect, a quarter turn. Examples of commands:



- Turn left/right.
- Move forwards/backwards one/two/three steps.
- Face north/south/east/west.
- Turn left/right and clap/stamp once.
- Arms up and move forwards one/two/three steps.
- Face north/south/east/west and then turn right/left.

D C Digital activity: Monty Wants to Go Home!

Display the interactive activity. Distribute PCM 38: Directional Prompt Cards to each pair. The children

work in pairs, using the cards to record the directions that Monty should follow. Examples:

- Monty wants to collect a treat.
- Monty wants to go to the shop.
- Monty wants to go home.
- Monty wants to go to the park and pass the cat on the way.
- Monty wants to go home and collect a treat on the way.
- Monty turns left, moves forwards, turns right and moves forwards again. Where is he now?
- Monty turns right, moves forwards, turns left, and moves forwards. Where is he now?

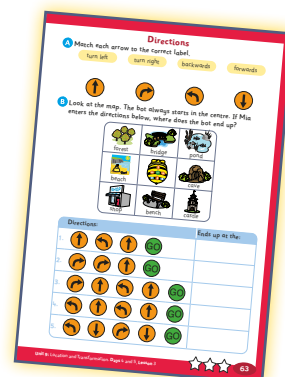
C Concrete activity: Classroom Maps

The children model and draw a classroom map, denoting the cardinal points and position and size of furniture, etc.

Let's deepen

- The children may feel confident to record the directions on their MWBs instead of using the Directional Prompt Cards.
- Some pairs will find different sequences of directions for the same instruction.

P Pupil's Book page 63: Directions



Optional consolidation and extension possibilities

Continue the Learning When directing children around the classroom (e.g. to find something) use the cardinal directions.

STEM Bot-Play: If a programmable bot toy is available, the children work in pairs to devise and follow their own sets of instructions.

Integration: Geography: There are many rich opportunities for incorporation (e.g. animals of the poles, human habitats). PE: Incorporate dance routines using the vocabulary 'turn left', 'turn right', 'forwards', 'backwards'. Language: Creative writing: Create trioramas of Tom Crean's journey.

Day 6, Lesson 4

Symmetry

Focus of learning (with Elements)

- Recognises and identifies known shapes when reflected (U&C)
- Understands and uses the term *reflect* to describe relevant shape movements (C)
- Identifies lines of symmetry and reflected lines or shapes in images or illustrations (A&PS)

Learning experiences

- D** Digital activity: Symmetry and Reflection
MAM Routine: Reason & Respond
- C** Concrete activity: Stations
- P** Pupil's Book page 64: Symmetry

Equipment

- 2-D shapes
- Toothpicks
- Straws
- Pattern blocks
- Pegboards
- Small safety mirrors

Maths language

- line of symmetry, reflected, mirrored, symmetrical, non-symmetrical

Warm-up



D Digital activity: Symmetry and Reflection **MAM Routine: Reason & Respond**

Play the slideshow. For each slide, ask:

- Does every image have a line of symmetry?
- How do you know?
- How could you prove it?
- Do any images have more than one line of symmetry?
- How could you prove that?

For slides which show reflected images, also ask:

- What do we call the image we can see in the water?
- How are the images being reflected?
- Do you ever see your image reflected? Where?

For slides which show mirror images, also ask:

- What shape is mirrored?
- Is the shape changed? How?
- Can you name the changed shape?

Main event

C Concrete activity: Stations

Station 1

The children create standard 2-D shapes (square, rectangles and triangles) with toothpicks/straws and find the lines of symmetry. Also use concrete examples of the circle and oval. The children also create non-standard shapes with 4, 5 or 6 sides, with and without symmetry.



Let's strengthen

Provide standard 2-D shapes to children, if needed.

Station 2

Pattern blocks or pegboards: The children create symmetrical and non-symmetrical patterns. The children could work in pairs: Child A creates a pattern and Child B then completes the symmetry.

Station 3

Symmetry Hunt: The children go on a symmetry hunt in the classroom (or other spaces, if possible) and record their findings in their Maths Journals.

Instructions could include:

- Find objects and/or images which have only one line of symmetry.
- Find objects and/or images which have more than two lines of symmetry.
- Find objects and/or images which have shape and colour symmetry/are not symmetrical.

Station 4

Reflection and symmetry: The children experiment with small safety mirrors and a variety of small objects and shapes to deepen their understanding of symmetry. Ask/say:

- Using one object/shape, can you make two objects/shapes appear?
- Using one shape, can you make one shape appear?
- Is it different?
- How?

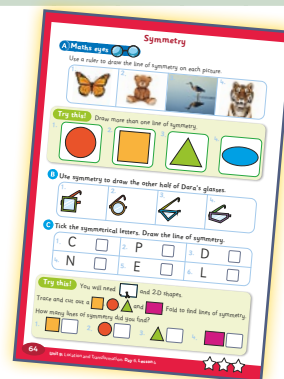
Teaching tip

Take photos or videos to use in the warm-up for the Review and Reflect lesson.

Let's deepen

Prompt the children to find/create shapes with multiple lines of symmetry in the station work.

P Pupil's Book page 64: Symmetry



Optional consolidation and extension possibilities

Integration: Art: Use printing techniques to make symmetrical art works.

Display The children bring in symmetrical objects (or photos) from home to make a Symmetry display.

Maths Eyes Go on a nature walk to discover symmetry in nature.

STEM Use blocks to make symmetrical and non-symmetrical constructions such as towers.

Home/School Links Book Page 24 can be completed at any stage after this lesson.

Day 7, Lesson 5

Moving Shapes

Focus of learning (with Elements)

- Recognises and identifies known shapes repeated or rotated (U&C)
- Selects appropriate materials/digital tools to draw and label shape movements
- Explores position and shape with a range of pentominoes (A&PS)

Learning experiences

- D** Video: Moving Shapes **MAM Routines: Notice & Wonder; Reason & Respond, with Think-Pair-Share**
- C** Concrete activity: Stations
- P** Pupil's Book page 65: Moving Shapes

Equipment

- 2-D shapes
- Pentominoes

Maths language

- repeated, trace, flip, turn, slide

Warm-up



- D** Video: Moving Shapes **MAM Routine: Notice & Wonder**

Play the video, and ask:

- What do you notice?
- What do you wonder?
- What do you think this lesson is about?

Record the children's responses to the questions on the 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** Video: Moving Shapes **MAM Routines: Reason & Respond, with Think-Pair-Share**

Provide the children with 2-D shapes, particularly the oval. The questions can be changed or tailored to reflect the children's responses to the Notice & Wonder activity. Using Reason & Respond, refine the children's thinking and check for understanding of the key concept of rotation, i.e. that turning around a rotation point does not change the size or shape of the oval.



Using Think-Pair-Share, ask:

- What shape was used in the video?
- How did the artist create the flower?
- How many times do you see the oval repeated?
- How would you describe how the shape moved?
- Did the oval itself change in size or shape? (It simply moved.)

- How did the two dots on the oval help?
- Revoice and/or refine opinions that use the vocabulary 'clockwise', 'turn', 'moved from 12 o'clock to 3 o'clock'. Ask:
- What point on the oval did not move?
 - Why not?
- Revoice and/or refine explanations that focus on one dot not moving and introduce the concept of a central point (i.e. the point of rotation). Ask/say:
- Work with your partner. Use the oval. Decide where the two dots are. Trace, turn, and trace again on your MWB.
 - Choose another shape, trace, flip/turn/slide and trace again.
 - What has changed? What has stayed the same?

C Concrete activity: Stations**Station 1****Turn and Trace Art**

The children choose a shape to cut out, turn (around a central point) and trace to create some artwork.

Station 2**Turn and Trace Art**

The children choose shapes, including pentominoes, which they cut out, trace, turn and trace to create geometric art.

Station 3**Flip and Trace Art**

The children choose shapes, including pentominoes, which they cut out, trace, flip and trace to create geometric art.

Station 4**Slide and Trace Art**

The children choose shapes, including pentominoes, which they cut out, trace, slide and trace to create geometric art.

Conference as the children work to check for understanding of key concepts (rotation, point of rotation, slide, flip, turn repeat of shape) and key language (*central point*, *clockwise*, *anti-clockwise*).

Teaching tip

It can be more difficult to identify how a regular shape (e.g. circle, equilateral triangle, square) was moved than an irregular shape.

Teaching tip

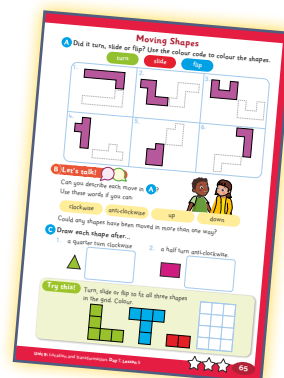
Take photos or videos to use in the warm-up for the Review and Reflect lesson.

Let's strengthen

Enable the children to work with just one/a few shape(s).

Let's deepen

- Some children will work with all shapes and may choose to explore different points of rotation.
- Some children could also write instructions for rotations involving two or more steps.
- When creating the artwork, some children might like to incorporate pattern and dilated shapes.

P Pupil's Book page 65: Moving Shapes**Optional consolidation and extension possibilities**

Display Include objects such as a windmill, an analogue clock and a toy helicopter in the display. You may allow the children to bring similar objects from home so that they can further explore rotation.

STEM Read *On Earth* by G. Brian Karas, or listen to a reading at: edco.ie/kvnw

Integration PE: Teach dance moves that involve rotation (clockwise/anti-clockwise), left, right, backwards and forwards.

Investigation Station Provide pattern blocks for the children to create further flipping/sliding/turning artworks.

Integration Language: Play 'It's a Knockout' as Gaeilge, pre-teaching the vocabulary.

My Maths Fact File Page 127 of the Pupil's Book can be completed at any stage after this lesson.

Days 8 and 9, Lesson 6

Tessellations

Focus of learning (with Elements)

- Identifies shapes and combinations of shapes that tessellate in the environment (U&C)
- Makes predictions and explains in simple terms why some shapes tessellate (for example, referring to right angles or other familiar properties) (R)

Learning experiences

- D** Video: Tessellations **MAM Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond**
- P** Pupil's Book page 66: Tessellations

Equipment

- 2-D shapes
- Pattern tiles
- Pentominoes
- Playing cards
- Coins

Maths language

- overlap, tessellate, surface, pattern

Warm-up



- D** Video: Tessellations **MAM Routines: Notice & Wonder, with Think-Pair-Share**

Play the video. Using Think-Pair-Share, ask:

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

Record the children's responses to both questions on the 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** Video: Tessellations
MAM Routine: Reason & Respond

The children need 2-D shapes, pattern tiles, pentominoes, playing cards and coins. The questions can be changed or tailored to reflect the children's responses to the Notice & Wonder activity. Using Reason & Respond, refine the children's thinking and check for understanding of the key concepts of tessellation. Revoice to further embed concepts and to offer the children an opportunity to explain and justify a concept.

Part 1: Tessellations in Nature

Play the first part of the video, which shows examples of tessellations in nature. (Pause the video when the image of the Giant's Causeway is shown.) Ask:

- What shape did you notice in the honeycomb/ pineapple/fish scales/turtle shell/Giant's Causeway/wood/sunflower?
- Was the exact shape repeated all over the surface of the honeycomb, etc?

- What other shapes did you notice?
- Were there gaps between the shapes?
- Did the shapes overlap?
- Did the shape change in size?
- Do you know the word for fitting shapes together in a tight pattern? (tessellation)
- Using the shapes you have, can you make a similar tessellation?

Part 2: Human-made Tessellations

Play the next part of the video, which shows more examples of tessellations. (Pause the video when the image of the boy in the check shirt is shown.) Explain to the children that these tessellations are not from nature: they have been made by people. Ask:

- Was the exact shape repeated all over the surface of the floor?
- Did you notice a pattern?
- Were there gaps between the shapes?
- Did the shapes overlap?

- Where did the shapes meet? (e.g. their sides) Why?
- Was colour important?
- Do you remember the word for fitting shapes together in a tight pattern?
- Using the shapes you have, can you make a similar tessellation?
- Do you think the human-made patterns are better examples of tessellation than those in nature? Why?

Part 3: Artistic Tessellations

Play the final part of the video, which shows some examples of artistic tessellations. Ask:

- What shapes were being used as tiles?
- Did they fit tightly together?
- Did the shapes overlap?
- Where did the shapes meet?
- If there were gaps, what did the artist do?
- Using the shapes you have, can you make a similar tessellation?
- Make your own artistic tessellation using just one shape/two different shapes.



Teaching tip

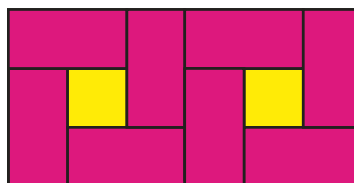
Take photos or videos of the children's tessellations and the children at work to use in the warm-up for the Review and Reflect lesson.

Let's strengthen

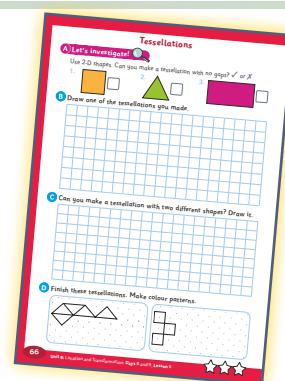
The children may need support to grasp that true tessellations do not have gaps and do not overlap. At first, the children may be ready to work with simple tessellations only.

Let's deepen

Some children will work with combinations of more than two shapes and may create shapes from four or five shapes to tessellate (e.g. tessellation and colour patterns).



P Pupil's Book page 66: Tessellations



Optional consolidation and extension possibilities

Free Play The children free-play with tessellation tiles, counters, etc.

Maths Eyes Go on a tessellation hunt around the school.

STEM Play 'Tetris'. Make tessellations with building blocks.

Day 10, Lesson 7

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.

Let's talk! Review and Reflect Poster: Use Think-Pair-Share alongside the prompt questions to review the unit. Use the photos and videos taken during the lessons to review and reflect.	Let's play! Real-life Robots The children stand facing you as you give instructions. Sample instructions: ● Take one step/jump sideways to the right/left. ● Swing your arms to the left/right. ● Put your left/right hand on your head/right knee/left knee/nose. ● Hands up/down/behind. ● Hop on your left/right foot. ● Put your left/right hand on your right/left shoulder. ● Make a full/half/quarter/three quarter turn in a clockwise/anti-clockwise direction. 'Real-life Robots' could be played using dolls, action figures or teddies. It could later be played outdoors.
Maths language Ask the children to explain the following terms (perhaps using examples or drawings on their MWBs): reflection, symmetry, clockwise, anti-clockwise, left, right, pattern, above, below, half/quarter/full turn, north, south, east, west, repeat, flip, turn, slide, tessellate. Use the Unit 9 Maths Language Cards to revise key terms. For example: If the image and text are cut apart, can the children match them? Complete the My Maths Fact File on page 127 of the Pupil's Book.	Maths Eyes Go on a nature walk looking for examples of symmetry and tessellation in particular.
Progress Assessment Booklet Complete Questions 37–40 on pages 18–19. Alternatively, these can be left to do as part of a bigger review during the next review week.	Let's create Bring Maths and Art together by creating art through tessellations. Show the artistic tessellations from the tessellation animation to inspire the children. Search online for further tessellation art ideas.
Let's strengthen Identify children who might benefit from extra practice with some of the key concepts or skills in this unit. Use the Unit 9 Let's Strengthen PCM. Consult the Unit 9 Let's Strengthen Suggestions for Teachers.	Let's deepen Use the Unit 9 Let's Deepen PCM.

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