Notes for the group leader:

The aim of this resource is to start a conversation about maths ideas and art. We hope to ignite an interest and understanding of maths principles that will excite a child to question, experiment and appreciate the relevance of maths in everyday activities and engage in the language of maths and art.

There are 6 activities, each related to a different artwork and aspect of ‘maths in motion’.

At the time of writing, all the artworks are on display at Modern One and Modern Two galleries in Edinburgh. We hope you might make a visit to experience the art for yourselves.

Prompts and activities are deliberately open ended to encourage children to problem solve and use their own experiences and imaginations to play and extend the suggested activities.
Maths in motion

For first and second level (typically 6-12 years)
Mark making

Look carefully at the picture.

What does it look like to you? (There are no wrong answers.)

How do you think it was made?
Mark making

This was made by artist Alan Davie. First, he tried to empty his mind, then he let his hand move as it wished over the paper. He liked to dip a stick in ink and use it like a brush.
Now it’s your turn

You will need:
• big paper
• tape
• oil pastels or pens
• or an interactive screen
Hold your pen over the paper.
Close your eyes and take a deep breath in and out.
Empty your mind.
Keep your eyes closed. Feel the edges of your paper.
Move your pen anywhere it wants to go on the paper.
Move it fast. Move it slow.
Open your eyes. Compare with a friend.
Balance

Take a good look at this picture.

What is the person doing?

Why are they holding a long pole?

What do you think the shapes below them look like? (eg roof tops, bridges, numbers, music notes?)
Balance

Paul Klee made this picture called Tightrope Walker.

He lived during a difficult time of war.
He thought living in his world was a bit like walking on a tightrope.

Have you ever walked across a rope ladder or tight rope?
Now it’s your turn

Activity 1

Work in pairs or small groups to design a bridge. Decide what material you will use to build this, you might choose old newspapers, straws or cubes.

Try balancing different objects on your completed bridge. What is the heaviest item it can hold? (for example an eraser, a book, a potato?)
Now it’s your turn

Activity 1

What do you notice about the different bridge designs?

Which material works the best for balancing objects?

Can you adapt your design so that your bridge can hold a heavier object?
Activity 2

You will need:
• Found objects
• 4 small objects, some heavy, some light  
  e.g. cotton wool, feather, balls
• a digital timer (or count out loud)

Optional:
• balloons filled with water, paint in dipping trays
**Activity 2**

Build the tallest tower possible in 3 minutes, using whatever you find in the room.

Push or roll 4 objects off the top of your tower. Predict what will fall slowest and fastest. Count how many seconds each object takes to fall.

Extend: fill balloons with water and dip them in paint. Drop from different heights. Notice the different marks made.
Travelling

Can you spot the people in this painting?
What do you think the curved shapes are?
How many straight lines can you see? What are they?
Clue: the title of this painting is “Misty Morning”.

Travelling

The straight lines could be car headlights, driving up a windy road.

We can see 2 people in the lorry, bottom right.

How many more cars could be hiding in the picture?

How many people could be inside the hidden cars?
Travelling

The artist Roger Brown loved going on long road trips across America and looking at the landscape.

What’s the longest trip you’ve been on?

He also loved comic books and patterns.
Now it’s your turn

You will need:

• balls of different sizes (or eggs)
• a tray lined with paper
• paint in dipping trays eg one colour + black + white
Dip the balls / eggs in paint.
Roll them over the paper.
How can you change the speed they roll?
If using eggs, how fast can you make them roll without breaking?

Try using just one colour + black. Or one colour + white.

Can you make the balls mix up the colours?
Can you control the pattern?
Moving objects

Take a good look at this sculpture.

Can you guess which parts of it move?

What do you think makes them move?
Moving objects

The 2 lines at the top move in the wind.

Do you think the 2 lines could crash into each other when they move?

What do the lines point to?
Moving objects

The artist George Rickey fixed machines and aircraft during World War II.

He was interested in how everyday shapes look different when they move, as if they’re dancing.
Now it’s your turn

You will need:
• natural objects (e.g. sticks and leaves)
• string or thread
• elastic bands
• paper fasteners
• paper punch
• paper
• scissors
Now it’s your turn

Experiment with the different materials.

How can you make them move?

Can you thread leaves onto a stick so they move in the wind?

Can you make a wind turbine?
Dance shapes

Henri Matisse was a very famous French painter.

He loved colour, shapes, travel and jazz music!

Which one of his pictures do you like best?

Which one has the most unusual shapes?

Can you draw them?
Dance shapes

Henri was inspired by jazz music to make these pictures.

Listen to some jazz

How would you describe jazz?
Now it’s your turn

Activity 1

Make your own picture while listening to music.

Cut or tear coloured paper to make different shapes.

Can you make the shapes look like they’re dancing?
Activity 2

How would you make a book?
What shape would it be, how many pages would it have?
How would the pages stay together?
(concertina, folded, stapled, hole punch)

What story would you tell? Where would the words go?
Where would the illustrations go?
Slow movement

Slow movement is the title of this painting by Eileen Agar.

Take a good look at it.

What do you see? (eg the sea, a person, butterfly, pattern, circles?)

Why do you think she called it Slow movement?
Slow movement

Was the image symmetrical?

In pairs, one person look back at the left-hand side of the image and describe it to your partner so they can draw it.
Now it’s your turn

You will need:

• paper folded in half, opened out and taped down
• 2 oil pastels, soft pastels or pens of the same colour
Hold one pen (or pastel) in each hand.
Start with both hands at the fold in the middle of your paper.
Move your hands away from each other. Try to make the same shapes with both hands.
Try and use up all the space on the paper.
Is your drawing symmetrical?

Do the same again but start at the bottom of the page this time.

Add paint or tissue paper, overlap and mix colours to make symmetrical patterns.
Image credits:

1. Alan Davie, Untitled [Opus D.616], 1953 © The Estate of Alan Davie. All Rights Reserved. DACS, London 2022
2. Paul Klee, Tightrope walker, 1923 Creative Commons CC by NC
3. Roger Brown, Misty morning, 1975 © The School of the Art Institute of Chicago and the Brown family
4. George Rickey, Two lines up Excentric VI, 1977 © Estate of George Rickey. All rights reserved. Artists' Right Society (ARS), New York and DACS, London 2022.
This resource supports a range of Experiences and Outcomes, in line with the Scottish Curriculum for Excellence:

**Numeracy and Mathematics**

I have explored symmetry in my own and the wider environment and can create and recognise symmetrical pictures, patterns and shapes. MTH 1-19a

I can illustrate the lines of symmetry for a range of 2D shapes and apply my understanding to create and complete symmetrical pictures and patterns. MTH 2-19a

I have explored simple 3D objects and 2D shapes and can identify, name and describe their features using appropriate vocabulary. MTH 1-16a

Having explored a range of 3D objects and 2D shapes, I can use mathematical language to describe their properties and through investigation can discuss where and why particular shapes are used in the environment. MTH 2-16a

**Art and Design**

Inspired by a range of stimuli, I can express and communicate my ideas, thoughts and feelings through activities within art and design. EXA 1-05a / EXA 2-05a

I can respond to the work of artists and designers by discussing my thoughts and feelings. I can give and accept constructive comment on my own and others’ work. EXA 1-07a / EXA 2-07a

I can create and present work using the visual elements of line, shape, form, colour, tone, pattern and texture. EXA 1-03a

I can create and present work that shows developing skill in using the visual elements and concepts. EXA 2-03a
Special thanks to

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