NCCA

Developing Maths Eyes in the classroom

Maths Eyes is an evolving concept that is now being used in primary and post-primary schools, adult education centres and communities in Ireland and internationally. Mathematics that surrounds people in their everyday lives, for the most part, remains 'invisible'. Teachers and parents who develop their Maths Eyes are able to see this 'invisible' mathematics and can pinpoint appropriate starting points for introducing mathematical knowledge and skills that are relevant to the lives of children.

Maths Eyes works on the premise that if individuals are supported to look at familiar things through a 'maths lens' and begin to see that mathematics is all around them, they can build confidence in their own ability to use mathematics. Maths Eyes can be used to make connections across and between 'big ideas' to develop a profound understanding of mathematics. Viewing the world from a mathematical perspective involves having number sense, an ability to recognise connections and interdependencies, cause-and-effect relationships, and the ability to construct visual images and to understand, communicate and link mathematical knowledge and skills to real-world contexts. This resource will help you and your pupils to develop their Maths Eyes.

What is Maths Eyes?

- A way to see the maths that surrounds us in school, at home, in the garden, on the street, in the park or in any other real-world settings
- A new way of looking at familiar things
- Developing communication by providing opportunities to talk about maths
- Identifing fun problems to solve
- Developing understanding
- Seeing how things are connected

Resource: For more information on the Maths Eyes concept check out the video on the home page of the Maths Eyes website (www.haveyougotmathseyes.com)

Why is it important to develop and have Maths Eyes?

- Having Maths Eyes provides excellent opportunities for linking home and school.
- Having Maths Eyes promotes the usefulness of mathematics.
- Having Maths Eyes builds confidence in mathematics.
- When teachers have Maths Eyes they can identify real-world starting points for mathematics teaching and learning that are relevant to the social, cultural and educational context of their learners.
- Having Maths Eyes means children become more confident in their own proficiency in mathematics and begin to regard themselves as a 'maths person'.
- Having Maths Eyes encourages the use of the real-world as a starting point for the relevant exploration in the maths world.

Maths Eyes lenses

In the same way that contact or glass lenses help some individuals to see more clearly, using 'Maths Eyes lenses' can help us to see different types of mathematics that surround us. When an individual first develops their Maths Eyes they usually see the mathematics that is associated with measure or number e.g., prices in the shop, bus and car registrations, bar codes, speed signs, etc. before seeing other types of mathematics. However, by changing the lens that you look through it is possible to see the other types of real-world mathematics that surround us. What you might see using different lenses is outlined in the table below.

Table 1: Maths Eyes lenses

Shape and Space	The range of shapes used in nature and real-world contexts.
Number	Our use of number sense, estimation, strategies for counting - even how we share a cake or pizza with family and friends!
Measures	Measurements, time and money in the world around us.
Data and Chance	News reports or media include charts and tables that need to be interpreted (e.g., sports or league tables, survey results, etc.).
Algebra	Patterns surround us, road markings and signs, the way trees or shrubs are planted, patio, fence and gate designs, GAA or rugby scores.

Developing Your Maths Eyes

Look at the pictures below and see what you can see using different Maths Eyes lenses.

Example 1: Fence

- Using the **Shape and Space** lens you might have seen squares, rectangles, lines, parallel lines.
- Using the **Number** lens you might have seen the total number of rectangles and the number of each different coloured rectangles.
- Using the **Measure** lens you might have considered how to measure the height of the fence and what units you might use.
- Using the **Data and Chance** lens you might have considered if there is more of one colour.
- Using the **Algebra** lens you might think about whether or not there is a pattern in the distribution of the colours in the picture.

Example 2: Welly Boots

- Using the **Shape and Space** lens you might have seen semi-circles, rectangles, circles, irregular shapes. What is different about the adult and the children's boots? Are they all the same shape?
- Using the **Number** lens you might have seen the total number of boots and the number of different sized boots. You might have thought about the number of leaves overall or the number of leaves on the boots.
- Using the **Measure** lens you might have considered if the pink and blue boots are the same sizes and what sizes they might be.
- Using the **Data and Chance** lens you might have thought whether there are more types of dinosaurs than types of owls.
- Using the **Algebra** lens you might have considered if the pattern on both boots in a pair is the same or a mirror image. You might have thought 2 flowery boots + 2 pink boots + 2 blue boots + 2 black boots = All the welly boots.

Maths problem pictures

- Maths problem pictures provide an excellent opportunity to get learners to see the world around them through new Maths Eyes. The process should not be rushed, nor should the mathematics be introduced too quickly. Give children time to develop their Maths Eyes rather than see the picture through your eyes.
- The pictures are intended to stimulate discussion on topics such as pattern, interpretation, decision, shape, measurement, number, etc. Initial 'prompt' questions can be very useful to encourage children to engage their Maths Eyes. Such questions should be very general and appropriate to any category of photograph. Follow-up questions can be used to guide the focus onto a particular aspect of the image. Make sure you ask questions that are appropriate to the learner(s) to help them develop confidence.

Examples of some general prompt questions

- What do you see in this picture?
- Where do you think this picture could have been taken?
- Can you talk about what is happening in the picture?
- Can you think of a story to tell about the picture?
- Look at the picture with your Maths Eyes lenses, what can you see?
- Can you use any maths words to describe something in the picture?
- Can you think up any maths questions you might ask about this picture?

Useful question stems

- What shapes do you see...?
- What is the shape called?
- Can you see any patterns?
- Can you see any symmetry?
- Is there a quick way to...?
- How would you go about working out...?
- How do you know that...?
- What... is most used?
- How many different...?
- What does... mean?
- What colour/number/shape... do you see most of?
- Estimate how tall/long/wide the ... is?
- If I counted my steps between... and the... and you counted your steps would we get the same number? Why do you think that?
- Is there an odd or even number of...

Example 3: Hopscotch

Some questions you might ask about this picture

- What do you see in this picture?
- Could you think of a story to tell about what you see?
- How many different colours can you see?
- What colours do you see?
- What does this colour combination remind you of?
- What shapes do you see?
- What is that shape called?
- How many blue/red/yellow blocks?
- What shape do the yellow and blue blocks joined together make?
- If you added more squares, what would you add to keep the pattern?
- Where would you put any new squares you might add to the picture?
- What game could you play using these shapes?
- What does this picture remind you of?
- How would the picture have to change to play hopscotch?
- What way would you number the squares to play hopscotch?
- How do you play this game?
- How many hops do you need to get to the top?
- If I was on the first blue square how many steps would I take to get to...?
- If you hop up to the top and back again – how many hops altogether?
- Can you find a line of symmetry in this picture?
- Why do the shapes at the top of the picture appear narrower than the bottom?
- Can you think up some maths problems based on this picture to help your family and friends develop their Maths Eyes?
- You could have some fun playing a game of hopscotch...

Resource: There are other examples of pictures and associated questions in the Maths Eyes resource pack available at http://www.haveyougotmathseyes.com/wp-content/uploads/resources/mathseyes_resource_pack.pdf

Matching Maths Eyes Posters with Taglines

A Tagline is a prompt that will encourage people looking at the picture to develop and use their Maths Eyes. The best taglines are short and engaging and do not read like traditional maths textbook problems. Taglines can be used to stimulate problem solving and reasoning. Taglines should be fun! Each picture can have many different taglines which reflect a single or multiple maths lenses.

Below is a number of Maths Eyes posters. Can you match the taglines to the correct poster in the table below?

1. How many benches wide is the weir?
2. A circle or a polygon?
3. Is a diamond a square?
4. Fitting circles into rectangles
5. What are the factors of this number?
6. GAA and rugby supporters are good at algebra
7. How we use maths in baking

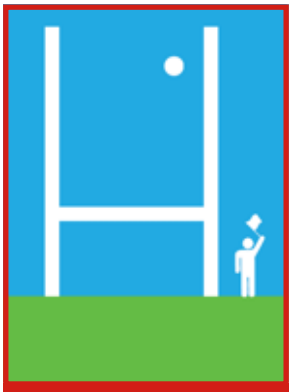
Picture 1

Picture 2

Picture 3

Picture 4

Picture 5



Picture 6

Picture 7

Picture H: Combination Lock

Developing Your Own Taglines

There are many possible taglines for each picture. Use different Maths Eyes lenses and think of different taglines. The best taglines will get people looking at each picture to see the mathematics that you see with your Maths Eyes. The taglines can stimulate problem solving, reasoning and should be fun.

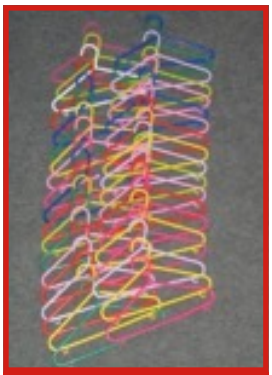
Look at the pictures below and develop your taglines for each one.

Picture A: Light Switches

Picture B: Railings

Picture G: Shower

Picture F: Windmill



Picture E: Hangers

Picture C: Silage Bales

Picture D: Dartboard

Making Your Own Maths Eyes Posters

When you are out and about, take photographs/drawings of what can be seen with Maths Eyes. Once you are home look at these photographs/drawings and create a suitable tagline to encourage other family and friends to see the picture through their Maths Eyes.

Linking with home and the community

Parents and communities can also be supported in developing their Maths Eyes.
Please see the support material 'Supporting the Development of Maths Eyes at Home and in the Community' which is designed to help children and their parents have fun with Maths Eyes.

Useful Resources

The Maths Eyes website contains lots of more information and examples of practical ideas to develop and use your Maths Eyes www.haveyougotmathseyes.com

Ireland's Maths Week website also provides an array of useful resources, including ways for parents, communities and schools to use their Maths Eyes in the annual Maths Eyes project competition.