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

Supporting the Development of Maths Eyes at Home and in the Community

Introduction

Everyone uses mathematics in their daily life but they sometimes don't call it mathematics. For most people, the mathematics that surrounds them remains invisible, with people underestimating their mathematical abilities because they often consider the mathematics they can do as 'common sense' and the tasks they can't do as 'mathematics'. Developing Maths Eyes helps everyone to see the mathematics in their everyday lives. This support material aims to equip parents with ideas and resources to help support the development of Maths Eyes in children's homes and communities.

Having Maths Eyes provides a platform for parents and children to share maths in their everyday life whether they are shopping, walking, driving or at sports events. Maths Eyes resources provide parents with opportunities to talk to their children about mathematics that are not related solely to homework. It can help to build confidence in mathematics in both parents and children. Everyone has Maths Eyes, they just need to be opened.

For parents, developing and using Maths Eyes can:

- show them they can engage with real-world maths even if they felt they were not good at 'school maths'.
- emphasise to them the importance of viewing maths in a positive way, as they could inadvertently pass on negative feelings about mathematics to their children.
- encourage them to open their own Maths Eyes using the tools and hints in this pack, which in turn can help their children to develop their Maths Eyes.
- emphasise to them the importance of seeing the maths in the world they live in and how useful it can be to acknowledge it and use it.

Linking with mathematics in school

This resource will help parents play a key role in supporting and developing their children's mathematics in school. Developing and using Maths Eyes gives real opportunities to develop Understanding and Connecting; Communicating; Reasoning; Applying and Problem-Solving, the four key elements that underpin children's learning of mathematics in school. Developing your children's Maths Eyes is best achieved by using different lenses which link to the strands in the primary school mathematics curriculum (see Table 1)

Table 1: Maths Eyes Lenses

Shape and Space	This lens enables you to see the variety of shapes used in 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	Our lives are surrounded by more and more data. 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.

Contexts to develop and use Maths Eyes

Using Maths Trails

A useful way to develop Maths Eyes is to look at familiar things or places and see them in new ways. Parents can be encouraged to pick a place to explore with Maths Eyes (e.g., a room, a street).

Starting with the Space and Shape lens, what can you see? Keep a note of all the things you see. Repeat using the number lens. Now try other lenses.

Now think of questions you might ask to help others to see what you can see.

Congratulations you have done your first Maths Trail!

Resource: There are some good examples of Maths Trails on the Maths Eyes website
http://www.haveyougotmathseyes.com/developing-maths-trails/

A **Maths Trail** can be developed around a room, a walk thorugh a street, or in the park. It is fun to put together and to complete together. All is requires is coming up with some questions and having a way for those taking part to record the answers.

Everyday activities

Parents and families can also use everyday activities as mathematical learning opportunities. The following ideas and suggestions are some of the possible contexts to develop and use Maths Eyes.

1. Shopping with Maths Eyes

Shopping is a great activity to use and develop Maths Eyes.

Examples of questions that encourage the use of your Maths Eyes when shopping.

- How many different shapes can be seen as you walk through the supermarket?
- What is the cheapest/dearest brand?
- How many types of green vegetables/other can you see?
- How many different shaped packaging can the same type of product come in?
- How long do you think shopping will take? (everyone guesses)
- How much do you think the shopping will cost? (everyone guesses)
- How much money have we saved?
- What was the biggest/smallest discount we got?
- What route did we take around the supermarket? Did we have to double back?
- How many people did you meet?
- How many items you bought were made in Ireland?

More detailed investigation – using information labels in the supermarket

When in the supermarket, people make choices about what to buy. Sometimes we have the same item on sale in different sizes, but which is the best value to buy? A closer look at the information labels provided by the supermarket gives us the kind of information we need to make such decisions. Is a bigger size product always better value?

Look at the information labels when you next go shopping and check out what size you should buy to get the best value for money for some of the different products you buy regularly. Do the words 'great value' really mean it is the best value for money?

2. Looking at sport with Maths Eyes

Participating in and watching sport is a great activity to use and develop Maths Eyes.

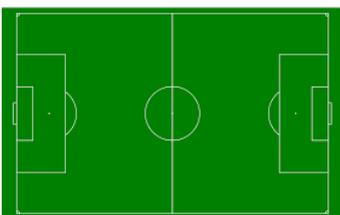Examples of the kinds of questions to ask.

- How many players are on each team?
- How big is the full panel of players for a match?
- How long does a match take?
- How does the scoring work?
- What are the chances of there being a draw?
- What distance would a single player cover in one half?
- Can you track how much your team has the ball or how long the ball is in play?
- Is the pitch level?
- Can you point out some lines of symmetry on the pitch?
- What impact does the weather have on how the players play?
- How would you work out how to calculate the amount of time a team is in their opponent's half of the pitch?
- Is the number of supporters present at a match influenced by the teams that are playing?
- What proportion of the stadium is full/empty?
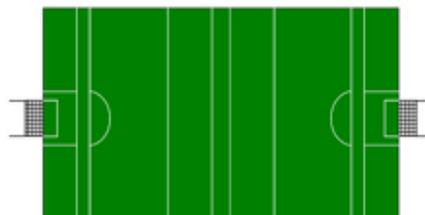- Is there a pattern to the scoring?

Playing Surfaces

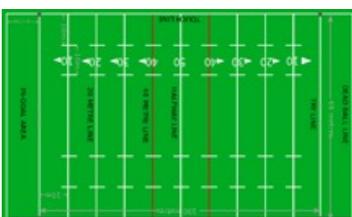Markings on sports playing surfaces (see images below) offer many opportunities to use Maths Eyes.

Soccer Pitch

GAA Pitch

Rugby Pitch

Basketball Court

Examples of some questions to ask

- What are the key dimensions?
- When might these change?
- Identify and name the shapes and lines.
- How many parallel or perpendicular lines can you see?
- Where are you most likely to score from?
- What is the furthest you can score from?

Scoring in Sport

GAA and rugby supporters are good at algebra

If you are a supporter of GAA or rugby you probably keep track of the scores during a match and from the number of goals and points (GAA) or tries, conversions, penalties or drop goals (rugby) scored. In this way, you know who is winning and what the final scores are. To work out the score you have to allocate the right number of points to goals, tries or conversions, add them together, and work out the total score. In the maths world, this kind of calculation is called algebra. Players do similar calculations when they work out tactics during a game. Many GAA games have been won in the final seconds when a player has gone for a goal rather than take an easier point to get his team ahead. Just think how Ronan O'Gara knew to attempt a drop goal in the dying minutes of the Grand Slam decider in 2009.

> **Task**
>
> Pick a number of scores in e.g., GAA, rugby or basketball matches and ask your children to figure out how many combinations of scores would give this total score.

A closer look at the algebra of scores; If two teams are playing a Gaelic football match and Team A scores 3 goals and 5 points and Team B scores 2 Goals and 8 points, which team won the match? No team won, it was a draw because Team A scored 3 goals (call these 'g') each is worth 3 points (call these 'p') so their total score is 14p (made up of 3g + 5p).

Team B scored 2 goals (g) each is worth 3 points (p) so their total score is also 14p (made up of 2g + 8p). So, using the maths world we can say that $3g + 5p = 2g + 8p$

That's algebra!!! Keep practicing your algebra when you watch your team play 😊

Other sports and activities

Nearly all sports and activites have some mathematics associated with them. Some examples are given below.

Sport/Activty	Mathematics
Walking	Distance, speed, uphill/downhill/level, wind, temperature, direction
Music	Counting, rhythm, scales, intervals, patterns, symbols, harmonies, time signatures, overtones, tone, pitch
Bird Watching	Type/size eggs or nests Equipment e.g., magnification in binoculars Speed/distance/migration (pattern) Flight pattern Formation, number, shape
Soccer/Rugby	Dimension of pitch, scores time, points ranking, relationship between teams playing and supporters attending
Playing darts	Shape, scores, scoring, combinations, patterns, doubling, tripling
Playing Board Games (e.g., ludo, draughts, chess)	Shape, number, strategy, rules, chance, types of moves

Sport provides a great source to investigate statistics and other areas of mathematics. Examples include:

- For GAA, one could examine statistics related the Ladies All-Ireland Senior Football Finals: https://en.wikipedia.org/wiki/All-Ireland_Senior_Ladies%27_Football_Championship

- In soccer, the Premier League's statictics page provides lots of opportunities to explore mathematics: https://www.premierleague.com/stats. The 'OneFootball' app provides statistics on male and female soccer players.

- In athletics, looking through the Irish records and top lists for men and women offers children a chance to examine areas within measures and data: https://www.athleticsireland.ie/competition/statistics/

- The IRFU (https://www.irishrugby.ie/ireland/men/statistics/) and Basketball Ireland (https://www.basketballireland.ie/stats-tables/) also offer a range of statistics for children to explore.

Examples of questions you might ask
- How many home wins, away wins and draws were there?
- Which teams won by the biggest margin?
- What is the average number of goals scored per team?
- What is the most frequest number of goals scored by a team?
- Which team member has the best score record?
- How is the score record calculated?
- Which year had the largest attendance at the final?
- How many metres a second do athletes run?

3. Maths Eyes in your home

Some examples of what you could ask

- What shapes can you see?
- How many shapes can you see in a room?
- What is the biggest/smallest room where you live
- What is the shape of the different rooms where you live?
- How many windows/doors are there where you live?
- What proportion of each window opens?
- How far do your doors open?
- Do all the doors open in the same direction?
- What proportion of doors lock?
- Where can you see numbers where you live?
- Do all your clocks/devices show the same time?
- How many different measuring things can you find where you live?
- What colour is most used where you live?
- How many different kinds of pattern can you see where you live?
- What types of plants or trees can you see where you live?

Developing Number Sense at Home

Many of the words we use every day relate to estimation e.g., 'almost', 'nearly or 'about'. It is this number sense that should be encouraged when you are using Maths Eyes. Where you live is a great place to develop one's number sense.

Activity

Working as a family, try to produce reasonable estimates to the questions below. Write down the main discussion points or issues you had to talk about for each challenge.

1. How far is it from the front door of where you live to the room you are sitting in now?
2. What is the weight of an egg? Is it similar for all eggs?
3. How far is it to the nearest shop from where you live?
4. How wide is a toilet roll?
5. How high is the ceiling?
6. What is the weight of a pot of water?
7. If everyone in the room lay head to toe, how far would you stretch?
8. What is the biggest rectangle where you live?
9. Estimate how many plugs there are where you live.
   (Estimations can be checked later using equipment).

Resource: Related activity 'Mix and Match' available page 32 of the Maths Eyes guide available at
http://www.haveyougotmathseyes.com/wp-content/uploads/resources/mathseyes_resource_pack.pdf

Rainy Day Maths Eyes Activities

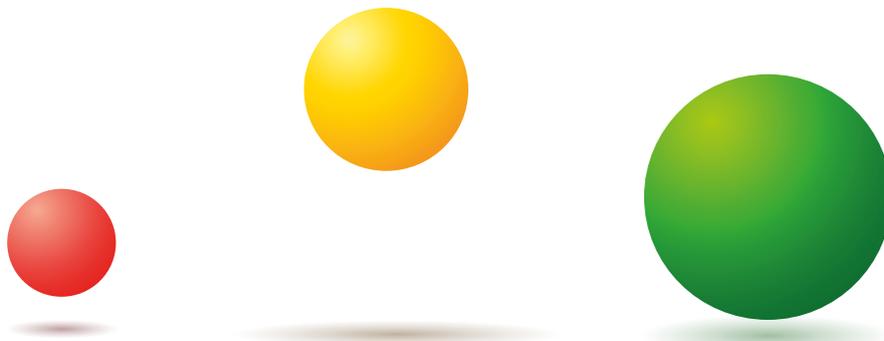**Face and Body Proportions (Exploring Measures and Shape and Space)**

Looking at your face and body through Maths Eyes

1. Ask someone in your family how far down from the top of their head they think their eyes are located i.e. is it a quarter or halfway down from the top of their head?
2. Now fold a piece of A4 paper so that it measures the same as the length from the top of the persons head to their chin. It is easier to do this exercise from the side of the head.
3. Cut any additional paper off.
4. Now hold it against the head again and put a light pencil mark on the paper to match where the eye line is.
5. Remove the paper and fold it in half, so that the line marking the top of the head meets the line marking the chin. Unfold it and you will see that the mark for the eye is halfway down. The eyes are located halfway between the top of the head and the chin.
6. Now explore other proportions e.g., how far down your face is your nose located? Your lips?
7. Explore if the following statements about your body are true or false
   - The average adult human is about 7.5 heads tall.
   - The length of your foot is about equal to the length of your forearm
     (the forearm is the part of the arm from the elbow to the wrist).
   - The length of your face is about equal to the length of your hand.

Bouncing Balls (Exploring Data and Chance)

Drop a ball from various heights onto a surface and measure the height of the bounce. Keep a note of the height you dropped the ball from and the height of the bounce so you can use these measurements to plot a graph of your findings. You can also try other surfaces and types of balls.

- Does the bounciness of the ball depend on the type of ball?
- Does the bounciness of the ball depend on the type of surface?
- Which ball and surface combination gives the highest/lowest bounce?
- Show on a graph that your findings are right.
- Write the story of your findings.

Who/What Passes by Where You Live (Exploring Number and Data and Chance)

Position yourself by a window or on the footpath near where you live.

Record the number and type of people/animals/vehicles that pass by you in either direction over 15 minutes.

- Categorise the different types of people/animal/vehicles that passed
  e.g., by age/type/colour/size/make.
- What is the most common type of people/animal/vehicles that passed by where you live?
- Work out how many you would expect to pass by in one hour.
- Do you think that the same number of people/animals/vehicles would pass by at any time of the day?
- Why do you think that? How would you investigate if what you think is true?
- Write the story of who and what passes where you live each day.

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 www.mathsweek.ie