Curiosity, Creativity and Confidence

Maths Training Early Level
Throughout Early Maths training we refer to key messages from WORDS UP. We would encourage you to visit the [Highland Literacy Blog](#) to access further information / training.

If you have not yet accessed the Words Up training materials please do so before moving on.

These key messages support language development across the curriculum.
Discuss any positive impacts that previous maths training sessions have had on your practice.

- What have you noticed?
- Share something you are really pleased about.

Review any group targets set.

- Did you manage to implement the target?
- What went well?
- What do you still need help with?
1. This set of slides is part of a wider toolkit for staff working in Early Level Settings and Primary 1.
2. These slides focus on 'CURIOSITY, CREATIVITY & CONFIDENCE' and links should be made with the learning environments both outdoors and indoors.
3. It is suggested that staff work through the slides together. Suggested time is approximately 60 minutes. Please work through the activities in order.
Aims for this session

1. Develop practitioner confidence to encourage open-ended enquiry.
2. Making and testing predictions and developing the understanding of concepts.
3. Practitioner confidence to support children to lead and extend their own learning.
4. Identify an aspect of practice to develop.
5. Recognise the links between positive relationships and children’s confidence, curiosity and creativity within maths.
'Scotland has a maths problem. Too many of us are happy to label ourselves as "no good with numbers." This attitude is deep-rooted and is holding our country back educationally and economically.'


With a partner or in a small group please discuss the following:

- Do you agree/disagree with the above statement? Explain.
- Have you heard adults say this? Discuss the impact this could have on children and their attitudes towards maths.
Curiosity, Creativity and Confidence are vital skills for the future. Watch this short clip about creativity from the Lego Foundation with Julia Fenby and Alan Armstrong from Education Scotland.

https://twitter.com/i/status/1237307605346914304

Further reading - see ‘Scotland: Developing a Shared Language and Understanding of Creativity.’
In the early years, we see creativity happen naturally as children engage, explore and adapt their play.

Watch this short clip from Dylan Williams discussing creativity.

Discuss: how you promote creativity in your setting / classroom?
We all know that positive and negative experiences can impact the way we feel. Discuss the following:

● Did you have a favourite subject in school?
● What made this subject enjoyable for you?
● Perhaps you remember a subject that you disliked?
● Why did you dislike this subject - share your ideas with others.
Jo Boaler is a Professor of Education at Stanford University. Much of her work is related to promoting equity in the classroom.

To find out more about growth mindsets watch this short (4 minutes) video.

Image from pixabay.com
Maths is everywhere!

How do you ensure children are engaging with mathematical experiences on a daily basis? Look at the pictures and discuss the maths opportunities.

Image: Obsdale Primary
Where’s the maths in play?

- The more experiences the children have, the stronger the connections in their learning.

- Through play, the foundations of maths and connections are formed and these experiences need to be regular, not necessarily ‘at the table’.

- The adults in the setting provide and extend the MATHS language.

- Children learn by practicing, repeating and revisiting through play.
Making predictions...

Making and testing predictions - developing their understanding of concepts.

- Ensure you have a variety of resources available outdoors and indoors.
- Encourage children to compare, sort, order, describe.
- Engage children in their own questions to support their creativity & critical thinking.
- Encourage ‘trial & error’ to explore their ideas and develop problem solving approaches.
EXAMPLE: One rubber duck sinks and the rest float.

Why does this happen?

Child examines all the ducks and tries to make them float.

One duck has a hole!
Making predictions... looks like...

Consider your setting/classroom. What does it look like when a child is making and testing predictions and developing the understanding of concepts?

A child engaging in the same activity over and over.

Delight when something new is discovered.

Frustration - when it just doesn't work.

Messy and not always very organised!
What do you have in your setting to get children curious about maths?

Do you encourage children to create and explore their own questions as you play and talk together?

How do you ensure maths is happening throughout the setting?
Think about your setting and the interests the children have. Consider these statements/questions ... how do they support and encourage the children's thinking.

REFER TO WORDS UP KEY MESSAGES for further guidance.

How could we make it better?

I wonder how we could find out?

Nearly... let's have another go!

What would happen if we...?
Read and discuss the following statements from *Realising the Ambition: Being Me*

‘Confidence can be described as a set of beliefs that we can do for ourselves, or as part of a group, that are worth doing. It includes being able to keep going even when things are difficult at first, as well as having a realistic sense of when help is needed.’

‘Curiosity, as well as creativity, is an innate part of being human. It is the urge to learn and develop, to see what is around the corner, in the box or what happens next.’

Realising the Ambition; Being Me (p24), Education Scotland

https://education.gov.scot/media/3bjpr3wa/realisingtheambition.pdf
Young children are **curious** and love making discoveries.

As practitioners, we need to be skilled in adding value to the learning - it is important that we know when and where this is appropriate. *We need to observe and consider what impact our interaction will have.*

As the adult, it is important to model ‘resilience’ - This demonstrates that mistakes are okay and we can continue! Learning is happening all the time.

Ooops I made a mistake. It’s okay, we can try again.
CURIOSITY & RESILIENCE

- Discuss how adults can model making mistakes in settings.

- Some children learn to develop a fear of making mistakes. This fear can hold them back from future learning as they come to believe that they have failed, instead of seeing it as an opportunity to learn. Sometimes this means they take an easy option and don’t challenge themselves.

- Mistakes are a natural part of learning.
This video from Carterhatch nursery/reception school discusses the importance of interactions and how these can support confidence.
Block play can be used to promote creativity, curiosity & confidence. Watch this short video about block play.

What resources do you have in your setting, classroom or outdoor space that could be used in a similar way to the blocks in the video?
Children are natural scientists - think how often they ask the “Why?” question!

Explorify is a website that has been inspired by children’s creativity. It has many video links and different activities. You can use these resources to start with - but they will soon spark other similar questions in your own setting. Begin to notice how many times these activities lend themselves to mathematics and the development of mathematical language.
CURIOSITY AND STEM - AN EASY PARTNERSHIP

https://explorify.wellcome.ac.uk/

Take some time to explore the website. How could you use this website in your setting/classroom?

How would you engage learners, in a similar activity, in your own setting?

What events and activities that naturally occur, during your day, might spark off similar discussions?
Science Enquiry - 5 elements

Science activities are rich in mathematical language and outcomes. Children are naturally curious about the world around them. Participating in many science enquiries helps to embed mathematical skills and place them in a context.

- Pattern Seeking
- Fair Tests
- Observations over Time
- Sorting and Classifying
- Research

DISCUSS

Are these science skills?
Are these technology skills?
Are these engineering skills?
Are these maths skills?
PATTERN SEEKING

Observing and recording natural phenomena, carrying out surveys or collecting data from secondary sources.

Then looking to identify patterns in the data.
Some suggestions - pattern seeking

- Do taller plants grow from bigger seeds?
- Do tall people have bigger feet?
- Are older children in our class taller?
- Do bigger musical instruments make deeper sounds?

Can you think of any others? When have you previously found and explored patterns with the children? How could you display this information?
FAIR TESTS

Observing or measuring the effect of changing one variable whilst keeping other potential variables constant.

Changing one thing and keeping everything else the same. How do you support this in play?
SOME SUGGESTIONS - FAIR TESTS

- How does the temperature of water affect the rate at which jelly dissolves? *How would we know?*
- Which paper towel soaks up the most water? *How would we know?*
- What is the best size of material to make a parachute?

Can you think of any others? What questions have the children in your setting come up with that could / have been used for fair testing?
Observations over time

Making careful observations of objects or events and how they change over time.

*Easy to see where the maths links are with this one!*
Some suggestions - Observations over time

What happens to ice and snow when it's heated up?

How does exercise affect our hearts?

How do shadows change during the day?

Can you think of any others? What questions have the children in your setting come up with that could / have been used for observations over time?
SORTING AND CLASSIFYING

Identifying features that allow things to be organised into distinct groups.

Recognise things as part of a specific group and name them.
Some Suggestions - Sorting and Classifying

How might we sort the cars / teddies / leaves / sticks / stones?

Use simple keys to identify plants and wildlife.

Can you think of any others? What questions have the children in your setting come up with that could / have been used for sorting and classifying?

What mathematical opportunities are there for displaying the information you find? Simple ideas such as creating a venn diagram.
SORTING AND CLASSIFYING

What kind of BIG is it?

Watch this short video from ERIKSON INSTITUTE.

Work with a partner and try the activity - note the different types of discussions you have as you sort and classify the objects.
Creativity is a vital skill for the future...

Creativity is a process which generates ideas that have value to the individual. It involves looking at familiar things with a fresh eye, examining problems with an open mind, making connections, learning from mistakes and using imagination to explore new possibilities.

Education Scotland - Creativity across Learning 3-18
Read and discuss the following:

‘Creativity is about much more than expressive arts, it is the ability to wonder about things, to see them or use them differently. Creativity is vital for all learning. Think about the creativity involved in the everyday problems we face. Consider the pace of change in our world and how we need to ensure our children are equipped with the right skills for their future. The foundations are built from the child’s earliest years. Creativity is crucial within science, technology, engineering and mathematical learning (STEM). It is also essential to language and literacy development.’

Realising the ambition: being me, (p 24). Education Scotland

https://education.gov.scot/media/3bjpr3wa/realisingtheambition.pdf
Fostering a love of maths & learning

- Explore questions, sensitively
- Encourage creativity and problem solving in maths
- Add the narrative and support children to make connections and help them communicate their ideas.
- Learn to be curious with them
- Engage in the play - listen actively
Reflective questions

Reflect and discuss ways you would like to improve opportunities to develop creativity, curiosity and confidence for your learners.

Making Maths Count report (2016) notes that children and young people need to develop 'skills of mathematical reasoning, resilience and understanding of key concepts'.

Based on your reflections set a target with your colleagues.

Agree a date to revisit this target and discuss progress made.
YOU CUBED has some interesting information about parent/adult impact and how we can support - please note some of the information is aimed towards older children. One of the top tips is to play games & puzzles. 
https://www.youcubed.org/resources/parents-beliefs-math-change-childrens-achievement


'Mathematical Problem Solving in the Early Years: Developing Opportunities, Strategies and Confidence. By Sue Gifford https://nrich.maths.org/12166

https://nrich.maths.org/early-years

https://education.gov.scot/media/3bjpr3wa/realisingtheambition.pdf


https://earlymath.erikson.edu/series/focus-on-play/
Thank you

This training has been produced and put together using a wide variety of resources and information but also draws on work by:

- James McTaggart - Early Years Educational Psychologist
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