Play pedagogy in upper primary/early secondary within the context of STEM – 13/01/21

Let's get the conversation started…

In your mind what are the characteristics of an excellent lesson? How does it look and feel for the participants?

Post your ideas and thoughts in the chat

Wee reminders:

- Mute your microphone unless you are speaking
- Post comments, questions and thoughts into the chat window - every so often we will pause to catch up with Qs so just pop them in when you think of them!

Twitter: #STEMNorth #STEMnation

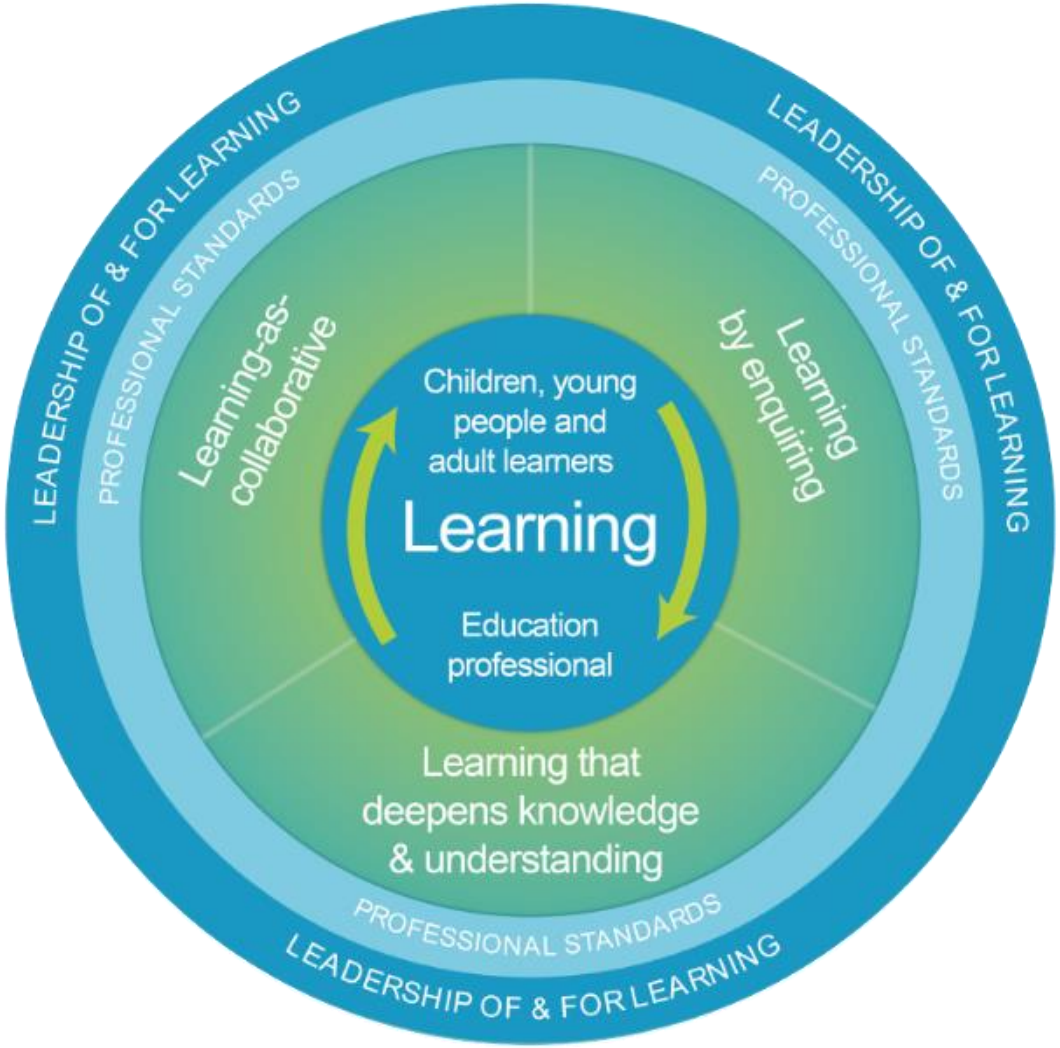
Play pedagogy in STEM

Aim

- To explore play pedagogy in **upper primary/early secondary** within the context of STEM

Session outline

- Why is play important?
- Characteristics of play
- How do we create opportunities for play?
- What might this look like in STEM – structured to free play?
- Sharing practice – what have you tried or want to try?



https://youtu.be/DjfM9LKBBhE

Reimagining Learning

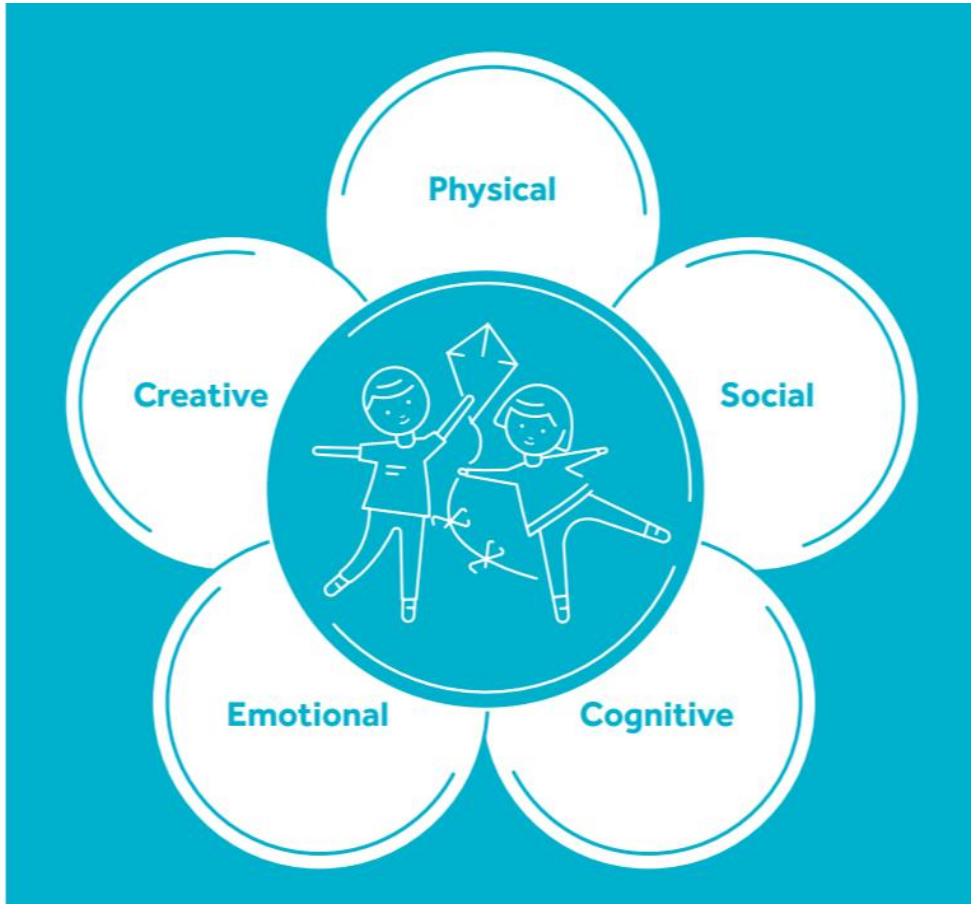
Skills for the future: Meta-skills

Timeless, higher order skills that support the development of additional skills and promote success in whatever context the future brings

Self management	Social intelligence	Innovation
Taking responsibility for your own behaviour and wellbeing	Awareness of others' feelings, needs, and concerns in order to effectively navigate and negotiate complex social relationships and environments	The ability to define and create significant positive change
Focussing The ability to manage cognitive load by filtering and sorting information in order to maintain a sense of focus in an age of information overload and constant change	**Communicating** The ability to openly and honestly share information in a way that creates mutual understanding about others' thoughts, intentions and ideas	**Curiosity** The desire to know or learn something in order to inspire new ideas and concepts
Integrity Acting in an honest and consistent manner based on a strong sense of self and personal values	**Feeling** Considering impact on other people by being able to take a range of different thoughts, feelings and perspectives into account	**Creativity** The ability to imagine and think of new ways of addressing problems, answering questions or expressing meaning
Adapting The ability and interest to continue to enlarge knowledge, understanding and skills in order to remain adaptive and resilient as circumstances change	**Collaborating** The ability to work in coordination with others to convey information and tackle problems	**Sense making** The ability to determine the deeper meaning or significance of what is being expressed and to recognise wider themes and patterns in information
Initiative Readiness to get started and act on opportunities built on a foundation of self belief	**Leading** The ability to lead others by inspiring them with a clear vision and motivating them to realise this	**Critical thinking** The ability to evaluate and draw conclusions from information in order to solve complex problems and make decisions

Why is play important?

Play has a key role in developing, encouraging and promoting children's emotional skills, cognitive skills, physical skills, social skills and creative skills



The Lego Foundation – What we mean by Learning through play

What is play?

www.menti.com

Code **35 40 15 8**

What is play? We think we know play when we see it but what actually is play; what are the qualities or characteristics or types of play?

Mentimeter

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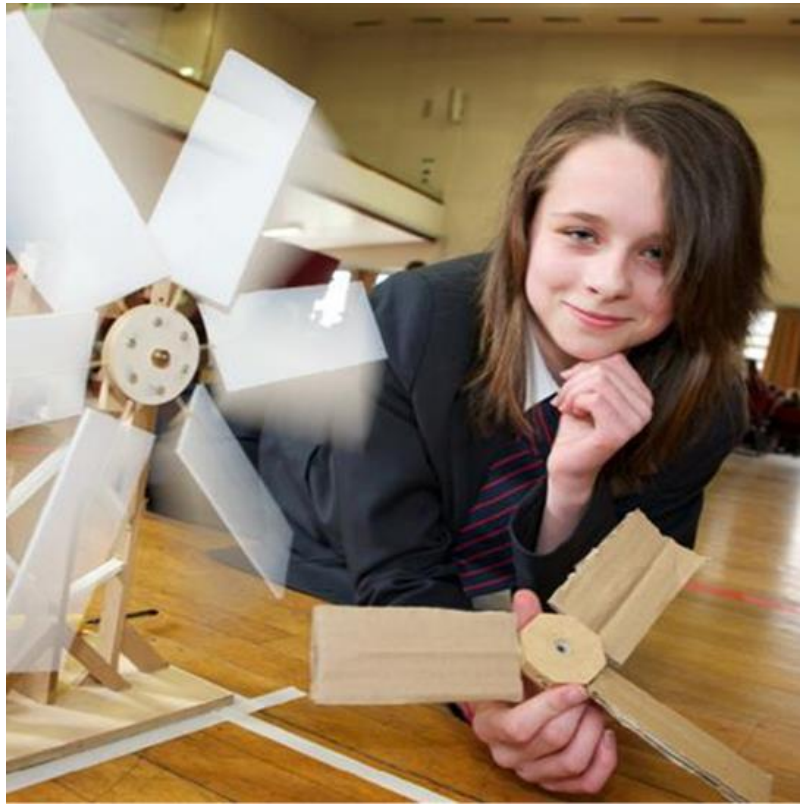
Characteristics of play

How has learning through play been applied in formal schooling, and what has been the impact on children's holistic skills?



Free Play

- During free play, the child initiates and directs play
- There is no pre-determined learning goal

Guided Play

- An adult helps to structure the activity
- The activity is centred around a learning goal.
- The child must still retain agency to direct the activity

Technologies

Engineering

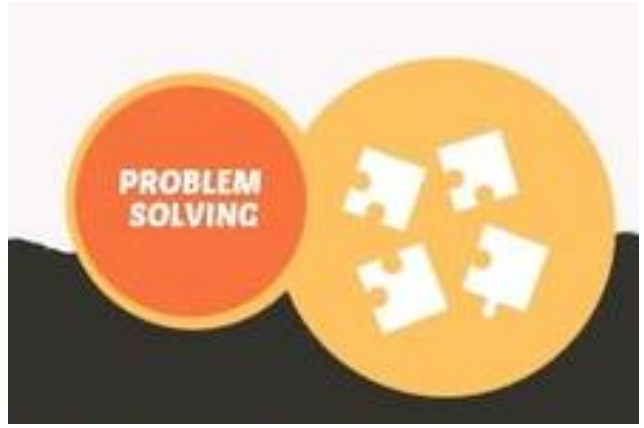
Science

Mathematics

STEM

Digital skills

Numeracy



Games to prime learning…

- Prepares children for play activities
- Promotes playing together
- Establishes comfort with the activity and trust within the space
- Focusses on the development of specific skills
- Re-establish connectedness
- Risk taking

Examples:

- Pig
- Fizz/Buzz
- Youcubed
- Solid/Liquids/Gasses
- Escape Room
- Obstacle Course
- Building games e.g. towers/bridges

Structured Play: Mini - STEM Challenge

Design and create a **structure which can be worn on your arm**, between your wrist and elbow, to **carry an item** that belongs to you (such as a phone, notepad or glasses case)

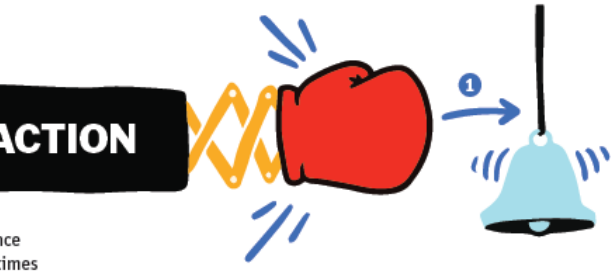
- The item must be held **at least 10 cm above your arm**
- You should be able to walk around your table with the item on the structure
- You are not allowed to tape the item on, cover the item, or strap the item in
- You are not allowed to tape anything to your skin or clothes

You have **10 minutes** to plan and create your structure

You will need **3 sheets of A4 paper, Sellotape and scissors**

Test your structure and try to **improve** it

CHAIN REACTION



A chain reaction is a sequence of sometimes simple, sometimes complex, and often whimsical contraptions. It may do two things or twenty. It may be a solo project on your kitchen table or a component of a collaborative cascade that spans a room. Chain reactions take many forms, but the important thing is, it's really not about the destination, it's about how exactly (and how absurdly) you decide to get there.

Chain Reaction to Water a Plant
The boxing glove strikes the bell (1), ringing it and waking the cat (2). Startled, the cat leaps up and off of the board, which tilts (3) and makes the ball roll toward the water cup (4). It hits the precariously balanced cup, which falls over (5) and waters the plant.

TRY IT!

Materials and Tools

The following categories of materials are useful starting points for building a chain reaction. How can you use everyday objects in surprising ways? How many different uses can you find for a single material? What can you incorporate to slow down progress from point to point and build anticipation?

Inspiring Objects

How can you use everyday objects in unexpected ways? Can you use a lid as a ramp? A spoon as a catapult? An orange as a ball?

Balloons

Dominoes

Try making dominoes out of books, pieces of wood, or packs of playing cards.

Musical Instruments *such as xylophones, tambourines, and small bells*

Funnels

Magnets

Toys with personality

Cooking utensils

Ping-Pong paddles

What other everyday objects can you find around your kitchen, garage, or local thrift store?

Tools

Scissors

Hot glue gun

Hammers, drills, screwdrivers, and box cutters can also be useful tools.

Building Upward

Are there ways to build vertical motion into your chain reaction? How can you extend the contraption above or below your work surface?

Wood scraps

Building blocks

Wooden stands

LEGO bricks: *Also great for telling a story*

Furniture and ladders

Cardboard and boxes

Objects that Roll, Bounce, or Move

Balls

Windup toys (or battery-powered ones)

Marbles

Cans

Toys with wheels

Rollerskates

Ramps and tracks: *Ramps can be made out of cardboard, pipes, books, and pieces of crown molding.*

Books

Connecting Materials

Secure your build with supplies like tape, hardware, and glue.

Clamps

Clothespins

Masking tape

Thumbtacks

Rubber bands

String

Unstructured Play: Discovery Session

DIY Tinker Table
To Inspire Young Engineers

Inquiry based learning

- Learners are completely involved in the planning – pupil participation/pupil voice

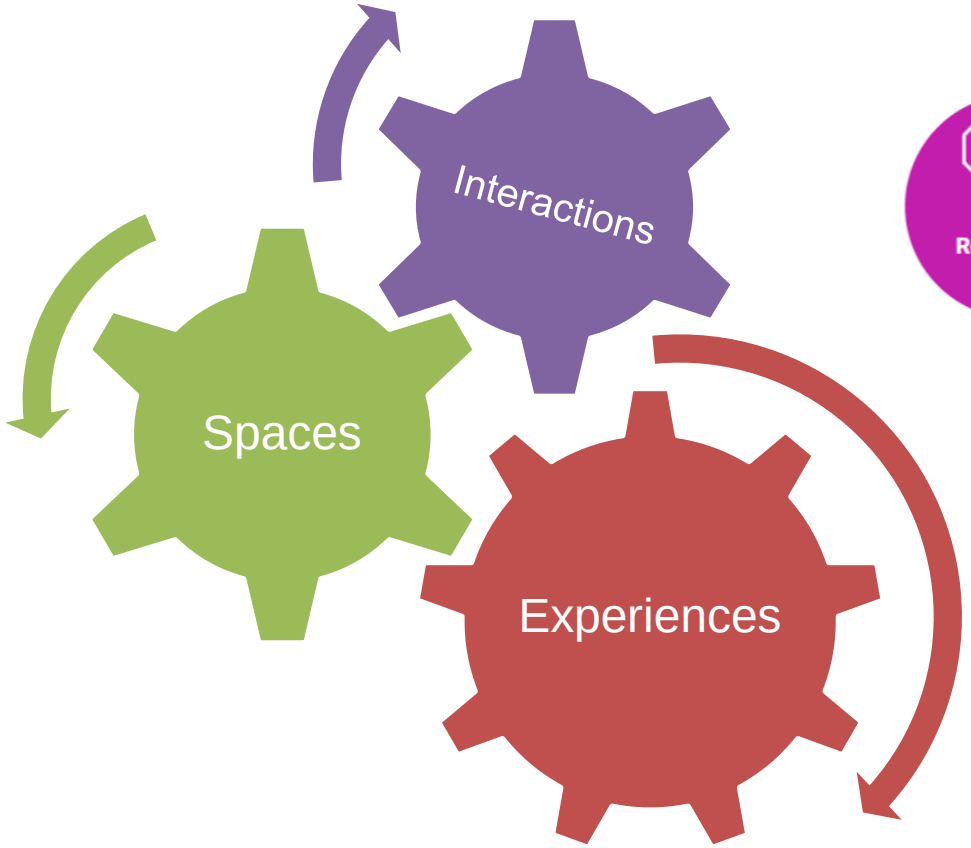
- Scientific exploration:
  - Pupils set a question
  - Experiment/make discoveries
  - Share your learning

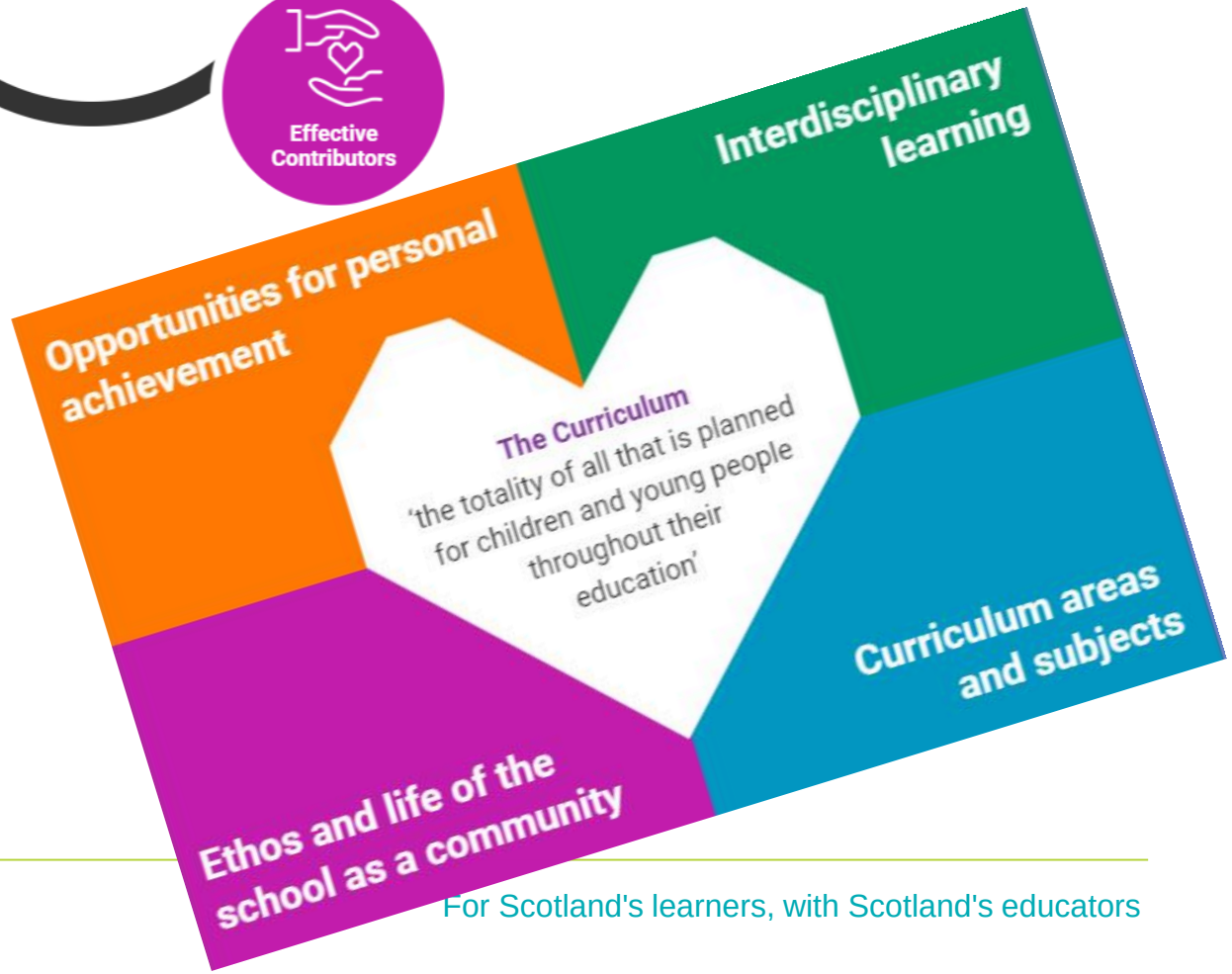
What skills are being developed during these tasks?

Skills being developed during these tasks:

- develop and test ideas
- problem-finding, creative problem solving and risk assessment;
- experimentation
- exploration
- creativity and innovation
- adapting
- Visualizing (imagination)
- improving
- listen
- think differently
- explore
- inquire
- observe
- respond
- present solutions
- have ideas
- select from the best
- invent

Designing your playful learning adventure…





Civil Engineer	**Town Planner**	**Environmental Consultant**
Construction Manager	**Landscape Architect**	**Public Relations Officer**

Project based learning

- Your task as a team is to plan the new town; Speybank.
- You will be presenting your plans to a Committee from the Local Authority who will choose which plan best meets the brief and will become the new Speybank.
- The plan must include :
    - How you will meet all aspects of brief outlined above
    - A layout showing the new town and all its key features
    - An approximate cost for building the key features of the town
    - A marketing strategy outlining how you will encourage people to come and live in Speybank

Opportunity to share…Tag us on Twitter @STEMEdScot

Planning and evaluation

- What will you do as a result of engaging in this professional learning activity?

- Please complete the webinar evaluation: http://bit.ly/STEMintheNorth

Play Pedagogy

- NIH – Early Level Play Pedagogy Toolkit
- Early Level Play Pedagogy Wakelet
- https://www.playscotland.org/playful-pedagogy/
- Lego Foundation – what we mean by learning through play
- https://www.legofoundation.com/media/1740/learning-through-play-school.pdf

Numeracy & Mathematics

- Education Scotland's numeracy & mathematics Professional Learning Community – a one stop shop for key documents, links and guidance. A practitioner Glow login is required for this site
- Making Maths Count final report and review report
- National thematic inspection report for numeracy & mathematics
- Supporting Numeracy at home - resources for families on Parentzone Scotland
- Numeracy & Mathematics Professional Learning Resources – published August 2020
- Improvement Hub Resources – numeracy & mathematics resources on the National Improvement hub
- Follow us on Twitter: @edscot_maths

Get involved:

- Maths Week Scotland is 28 September - 4 October 2020

Technologies & Digital

- Digilearn.scot is our digital learning community
- DigiLearnScot videos on YouTube
- Practitioner support for online remote learning
- Education Scotland’s Digital Learning and Teaching Strategy
- Technologies Professional Learning Community in Glow
- Digital Schools Award Scotland
- Glow Connect Blog
- Microsoft Educator Centre
- Google for Education Teacher Centre

Improving gender balance & equalities

- Improving gender balance and equalities 3-18 page on the National Improvement hub
- Supporting gender balance & equality – resources for families on Parentzone Scotland
- Gender Stereotypes: An Introduction Action Guide
- STEM Aspires Reports
- IGBE Wordpress
- Looking at Gender Balance in STEM subjects at School
- Ideas and Activities to Explore Unconscious Bias (Sway)

- Follow us on Twitter: @EdScotIGBE

STEM & Science

- National STEM Education & Training Strategy and Annual report
- STEM Resources page on the National Improvement hub
- Our Sciences and STEM Wakelets link to lots of useful resources for learning & teaching
- Our STEM Blog keeps you up to date with STEM news and you can follow us on Twitter: @STEMedscot and @EdScotSciences
- GLOW Sciences PLC – the Science professional learning community on GLOW
- Supporting STEM at Home – resources for families on Parentzone Scotland

Get involved:

- Young STEM Leaders programme
- British Science Week is 5-14th March 2021. This year's theme is *Innovating for the future*