# From STEM to **STEAM**: Innovation in the Primary School Curriculum

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Part One: Critical review of STEM/STEAM from a visual arts perspective

Introduction:

- The following pages will outline a critical review of STEM education moving to STE(A)M education.
- Reasons for STEM to STE(A)M
- Benefits of STEAM
- Challenges
- DES STEM implementation policy

STEAM

Part One: Critical review of STEM/STEAM from a visual arts perspective

Overview of STEM to STEAM

- What is STEM?
- Why has STEM become more popular in recent years?
- Skills that STEM education can offer
- Researchers identifies opportunities to improve STEM by adding the 'A'
- More opportunities to create meaningful learning opportunities

INNOVATION

Part One: Critical review of STEM/STEAM from a visual arts perspective

Benefits of STEAM Education (Part One)

- Research indicates many benefits of integrating art
- Skills learned through art are transferrable
- The view that art is too different from the STEM subjects is often dismissed
- Others cite the many similarities between art and STEM, Da Vinci is a frequently used example as the 'personification of STEAM'

Part One: Critical review of STEM/STEAM from a visual arts perspective

Benefits of STEAM Education (Part Two)

Research provides an array of benefits of STEAM education, such as:
- increased levels of student motivation
- increased engagement levels
- more opportunities for collaborative work
- improved leadership skills
- provides opportunities for inclusion

Part One: Critical review of STEM/STEAM from a visual arts perspective

STEM to STEAM

STE[+a]M

Science | Technology | Engineering | [+ART] | Mathematics

Challenges of STEAM education

Despite the many benefits of STEAM education, there also remain some challenges particularly in relation to:
- the justification for the arts in education
- curriculum overload
- a gender imbalance in STEM/STEAM
- a need for more research, resources and funding for educators
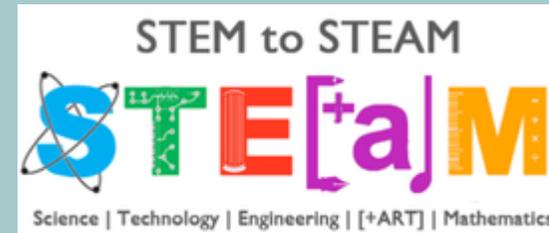
Part One: Critical review of STEM/STEAM from a visual arts perspective

DES STEM Implementation Plan:

- Highlights gender imbalance
- Emphasises the promotion of STEM for future workforces
- Briefly mentions the arts
- Will the arts in STEM be prioritised?

Part Two: Resource pack on three innovative artists

Figure 1. Hal Lasko (n.d.)

Figure 2. Rachel Sussman

Figure 3. Luke Jerram

Hal Lasko

Rachel Sussman

Luke Jerram

Exemplar 1: Looking and responding to the work of [Hal Lasko](#)

Figure 4. Hal Lasko (n.d)
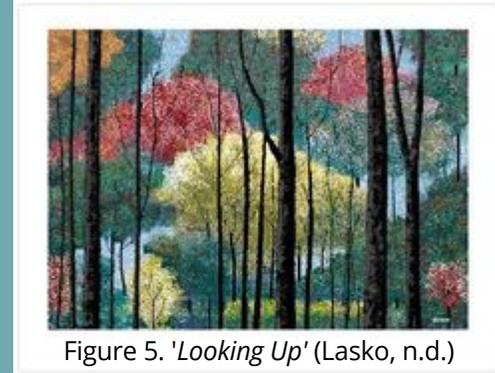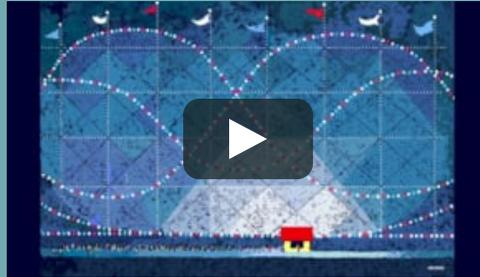
Figure 5. '*Looking Up'* (Lasko, n.d.)

- Hal Lasko was an American WWII veteran and a graphic designer who enjoyed painting, but suffering from partial blindness later in life prohibited him from continuing to paint.

- In his 80's he began using the Microsoft 'Paint' software to create digital paintings.

- Lasko's artwork has elements of [Pointillism](#) through his use of pixels.

- His work shows innovation through his use of a seemingly outdated and overly simplistic software in order to painstakingly create very detailed and sophisticated works.

- He continued to work for most of his life despite his visual impairment.

(About Hal Lasko, n.d)

Making digital art inspired by Lasko

Making digital art is very accessible by using programmes or apps such as:

8-Bit Art   https://sketchbook.com/   http://tayasui.com/sketches/

Once children feel confident using tablets to draw, animation can be another element of digital art creation.
Apps such as https://toontastic.withgoogle.com/ are very user friendly, while https://bookcreator.com/ has the option of creating comics that could incorporate digital illustrations.

Microsoft paint is also an option to use on a desktop. This video provides some inspiration for a digital art lesson.

Many popular children's illustrators are using digital art to create their work.
https://www.illustratorsireland.com/ provides some excellent examples of Irish artists. Rachel Corcoran and Conor M O'Brien are two suggested examples.

Figure 6. *'Hagrid and Norbet'* (O'Brien, 2017)

Exemplar 2: Responding to the work of [Rachel Sussman](#)
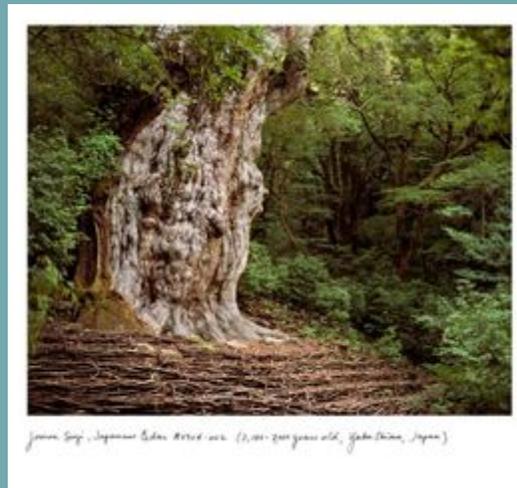
Figure 7. *Japenese Cedar* (Sussman, n.d.)

- Rachel Sussman is an American contemporary artist who combined her photography with the study of ancient organisms for her book 'The Oldest Living Things in the World'.

- She works closely with scientists and biologists and her work carries messages connected to the passage of time, highlighting both the resilience and fragility of the natural world.

- Her work carries an environmental message too as it asks the audience to consider the impact we have on the natural environment.

(Sussman, n.d.)

Combining Science and Art inspired by Sussman

- E-portfolios such as Seesaw are useful for children to record natural found objects and plants they find.

- Experimentation with images the children take using apps such as Snapseed and Prisma.

- Children can put themselves in photos using a green screen app such as Do Ink.

Figure 8. '*La Llareta*' (Sussman, n.d.)

Opportunites for links between art and science over history by looking at figures such as Maria Sibylla Merian and other artists such as John James Audubon provide interesting starting points for some observational drawing.
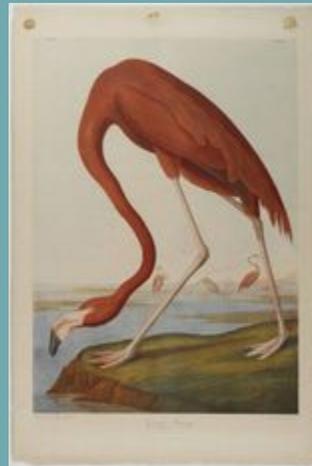
Figure 9. '*An American Flamingo*' (Audubon, c.1861)

- Sussman's work research opportunities to look at how photography connects us to the natural world.
 - The National Geographic Kids website provides a good starting point.
- Some renowned photographers such Paul Nicklen or Ami Vitale who recently collaborated on a VR experience of Kenya are also interesting starting points for art lessons.

Exemplar 3: Responding to the work of [Luke Jerram](#)

Figure 10. '*Museum of the Moon*' (Jerram, n.d.)

- Luke Jerram is a British contemporary artist whose work is very much based on themes about science. Jerram is very interested in human perception. He is also colourblind.

- His work mostly involves installations work, most notably his 'Gaia' Earth instalment piece and his 'Museum of the Moon'

- His work creates a venue for people to gather in, and some of his previous work is community based, providing spaces for people to interact with the artwork and with other people

- The work provides opportunities to explore art with an environmental message, as well as exploring the functions of public spaces.

Exemplar 3: Creating constructions or installations inspired by Luke Jerram

Figure 11. *'The Impossible Garden'* (Jerram, 2018)

Jerram's variety of installations and concepts provide an ideal starting point for a design project that incorporates art, science and engineering. Construction a small scale model of an installation that be carried out; it could adhere to certain criteria such as have an auditory element or optical illusion.

Figure 12. *'Han River Pavillion'* (Jerram, 2018).

As a lot of Jerram's work focuses on human perception, looking at his work first would effectively lead into using VR apps. Google Expeditions is an ideal app to begin with in the classroom. Hologo is also very effective, while Google Arts and Culture has a feature that places life-sized artworks in front of you.

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