

STEAM DESIGN

Anthony Campagna

Ezra Davis

Paul DePlacido

Miyabi Gaskell



Project scope

- ◆ Design Museum's "Designer, Maker, User" exhibition
- ◆ Educational resources for students ages seven to fourteen
- ◆ Resources link to the STEAM disciplines

Educational materials

- ◆ Teacher packs
 - Key stage 3
 - Key stage 2

- ◆ Museum visit material
 - Pre-visit
 - During-visit
 - Post-visit

Methodology

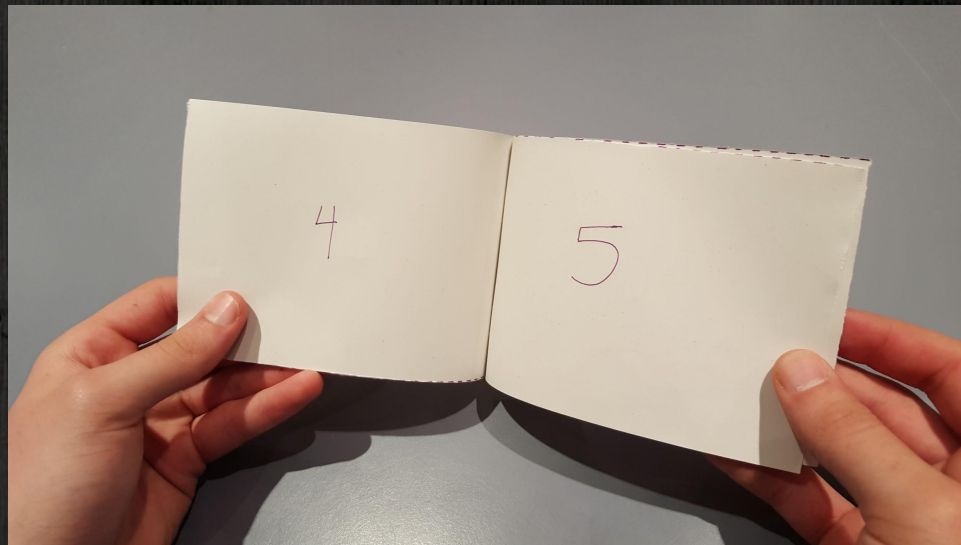
- ◆ Identify traits of teaching tools that teachers prefer
- ◆ Create museum visit materials and teacher packs based on the Design Museum's new exhibition
- ◆ Assess the lesson plan via a pilot programme, analyse the results, and adjust the material

Preferred traits of teaching tools

- ◆ 50-60 minute lessons
- ◆ Hands-on activities
- ◆ High and low achieving activities
- ◆ Little museum visit preparation or follow up

Visit material

- ◆ Pre-visit lesson plan
- ◆ During-visit booklet
- ◆ Post-visit discussion questions



Lesson plan example

Learning outcomes:

- Students will be able to create improvements and personalise objects within the room
- Students will develop collaboration and teamwork skills
- Students will be able to identify the proper tools to fix objects
- Students will develop observational skills

the
DESIGN
MUSEUM

Links to the curriculum:

- Science - materials, chemistry, and biology
- Design and technology
- Engineering

Materials:

- Paper/construction paper (3 sheets per pair)
- Tape/Glue (1 roll/stick per pair)
- Cardboard (1 - 2 boxes per pair)
- Scissors (1 per pair)
- Coloured pens/pencils/markers

Lesson plan:

Introduction (20 minutes)

Script/designer corner:

Originally from Ireland, designer Jane Ni Dhulchaointigh (pronounced nih-goo-oh-hin-tic) came up with the idea for Sugru while she was studying for her masters degree at the Royal College of Arts in London. She was tired of buying and replacing her things and wanted to improve and repair what she already owned. Using her experience as a previous chemistry major, she created the original Sugru prototype in 2003. After assembling a team of specialists and being awarded a grant for her project, she worked through the recession of the early 2000s to officially launch Sugru in 2009. Today, Sugru is sold at retailers all around the world. The name Sugru comes from the Irish word for 'play'.

Created using silicone technology, Sugru has the texture of play-doh and sticks to almost any material, including glass, plastics, fabrics, and wood. After it is exposed to air for thirty minutes, it begins to harden. After twenty-four hours it turns into rubbery, durable silicone. When it hardens, it is flexible and can withstand most types of weather and extreme temperatures as well as electricity. Once its use is finished, Sugru can be removed using sharp objects, such as knives.

- Sugru Facts:
 - Created using silicone technology
 - Texture of play-doh
 - Sticks to glass, plastics, fabrics, and wood
 - Hardens after exposure to air, turns rubbery after 24 hours

- Flexible
 - Withstands most weather conditions
- Removable using sharp objects
- Discussion questions
 - What was the last object you remember breaking (accidentally or otherwise)?
 - How many objects do you replace in a year? What kinds of objects do you replace the most?
 - Do certain objects get replaced entirely or do you only replace a few parts at a time?
 - Do you think the replacement of objects is wasteful or efficient? Why?
- (3:26 minutes) Sugru: How is it made? <https://vimeo.com/80459596>
- Discussion questions
 - Have you ever wanted to fix an object you use so that it works better for you?
 - What object would you improve or personalise in your own style?

Improve and personalise an object (20 - 30 mins)

Together with your partner, pick an object in your classroom and create a new version of that object out of cardboard and construction paper.

Requirements:

1. You must either add or remove at least one feature that you think your chosen object should have or does not need.
 - Examples of additional features: extra drawers, an extra cover, secret compartments
 - Examples of removable features: extra padding, nails that stick out, surface area that is not often used
2. You must personalise your object so that it contains features unique to both you and your partner.
 - Examples of such features: your favourite colours, patterns, fictional characters

Key words:

- Personalisation is an aesthetic choice (decoration, colour, general appearance).
- Improvement is a functional choice (additional features, compartments, or purposes)

Instructor's Note: *These two terms are not mutually exclusive, but for the purposes of the lesson, treat them as though they are.*

Plenary (5 min)

- Ask students what features they added, removed, or replaced
 - Why did you add/remove/replace those features? Did you consider other purposes that feature might have/have had (e.g. a bar lining the bottom of the desk might be obstructive, but it supports the structure of the desk)
 - Why did you choose to remove certain features but not others?
 - What would happen if you removed certain features but not others?

Example completed activity:



Links to Design Museum Designer/Maker/User exhibition:

- The Designer/Maker/User exhibition, "Ways of Making" section, contains Sugru
- Sugru: How is it made? - <https://vimeo.com/80459596>
- Timeline of Sugru - the "Sugru Story"

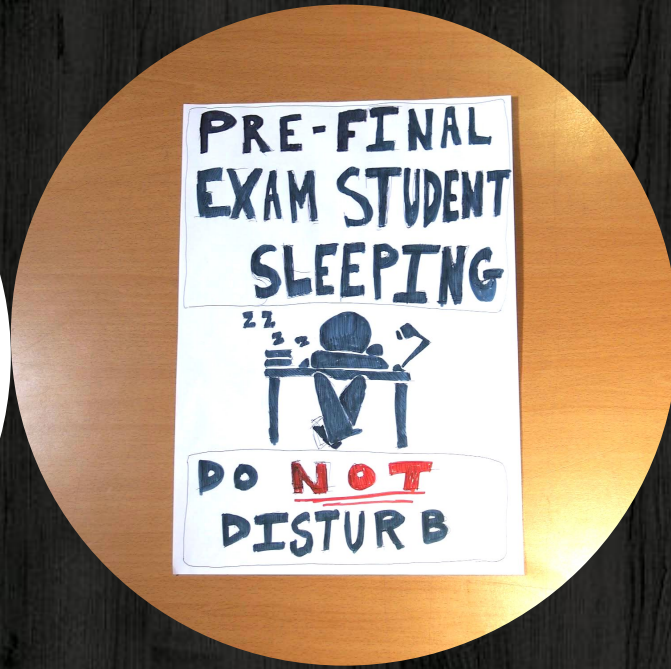
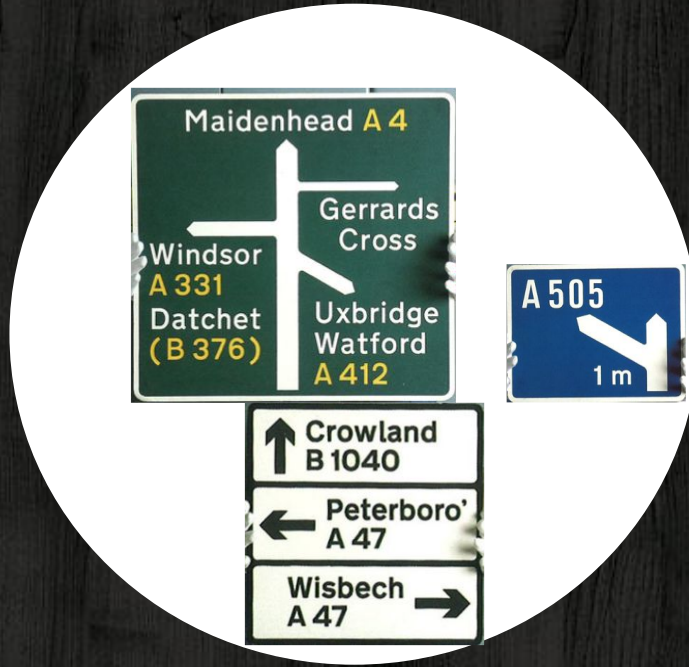
Key stage 3: Simply Sugru

Simply Sugru



- ◆ Teaches students about engineering and design
 - ◆ Students redesign a classroom object

From the Streets to the Schools



- ◆ Teaches students about civil engineering and graphic design
- ◆ Students create a sign for their school

Krazy Kettles and Trendy Teapots



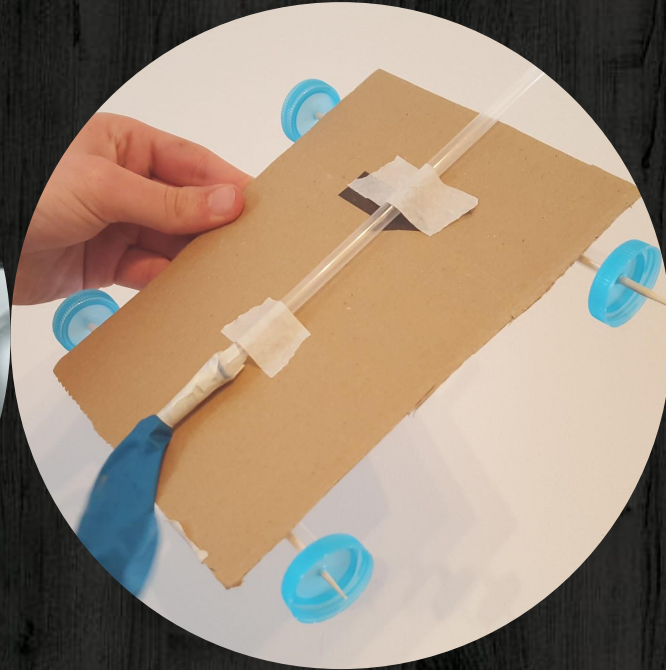
- ◆ Teaches students about materials in design
- ◆ Students create a teapot using plastic bottles

Brains and Braun: Less, but Better



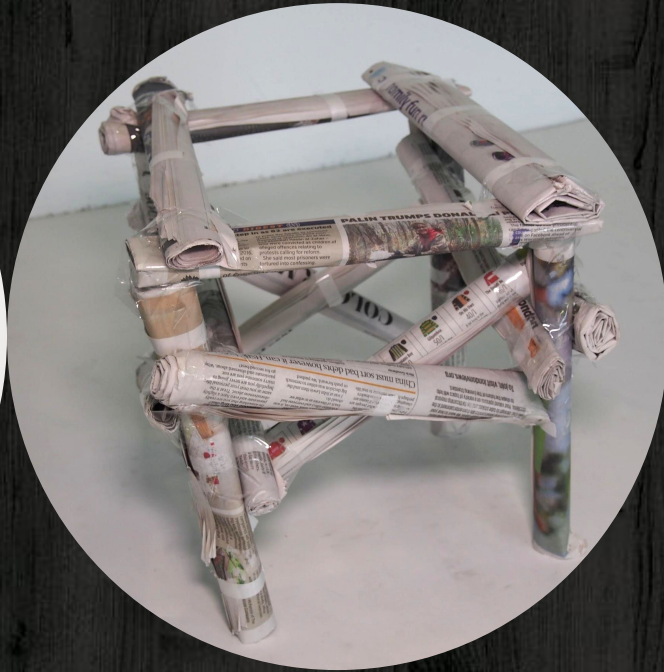
- ◆ Teaches students about industrial design and user interfaces
 - ◆ Students create a paper control scheme

The Valiant Vespa



- ◆ Teaches students about engineering and physics in vehicle design
 - ◆ Students construct a balloon vehicle

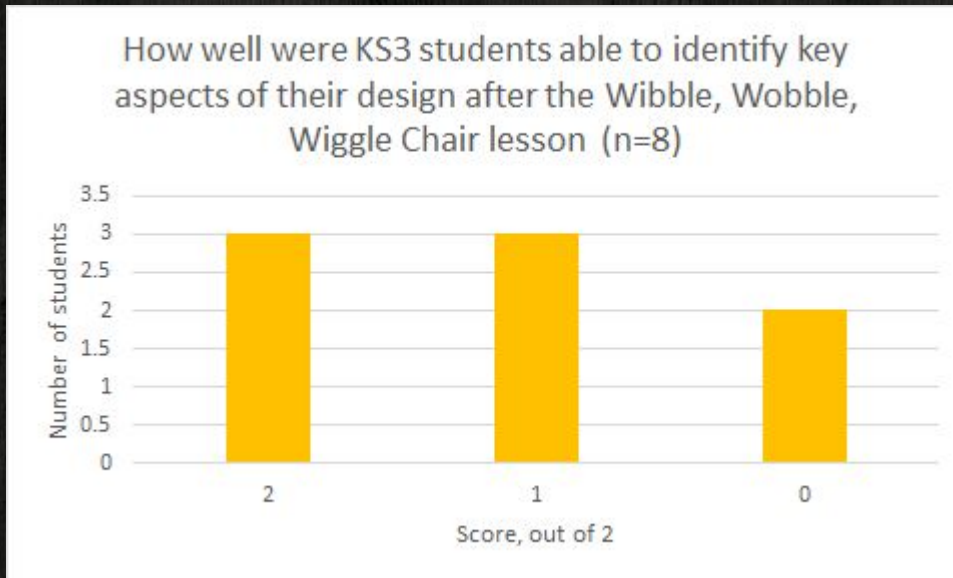
Wibble, Wobble, Wiggle Chair



- ◆ Teaches students about recycling, materials, and forces
 - ◆ Students build a newspaper chair

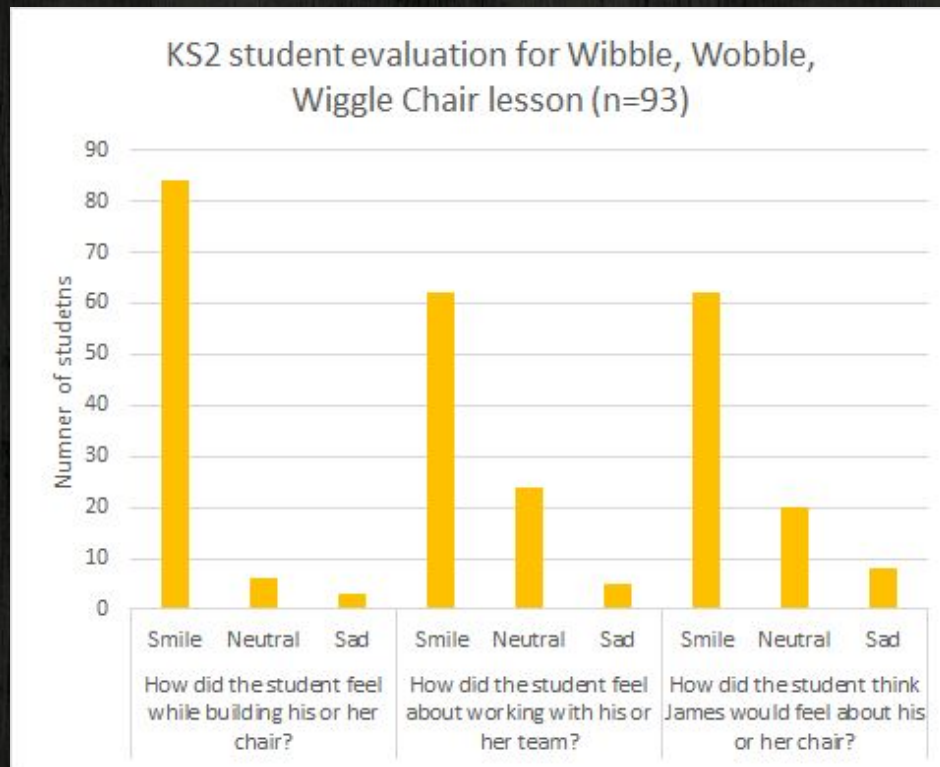
Key stage three pilot programme results

- ◆ 7 out of 8 students enjoyed lesson
- ◆ 8 out of 8 students improved designs after observation



Key stage two pilot programme results

- ◆ Adjust introduction length
- ◆ Include picture instructions





Recommendations

- ◆ Continue pilot programmes
- ◆ Create black and white worksheets
- ◆ Provide supplementary materials
- ◆ Seek accreditation (CREST and OCR)
- ◆ Add timeline to observation matrix

Acknowledgements

The Design Museum team

David Houston
Ellen Ferguson
Helen Charman
Eleanor Suggett
Alex Newson
Mark Favis

Worcester Polytechnic Institute

Prof. Joel J. Brattin
Prof. Lauren Mathews
Prof. Dominic Golding
Prof. Sarah Crowne

Questions?

