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Arts and
Humanities
Research Council

Shaping Space
Key Stage Four
Modelling Characteristics and Materials

Content

Introduction

1

Architectural models are central to the process of making buildings, but in their finished form it is often difficult to understand how they come about. To help us find out how architectural models are made, these workshops focus on hands-on learning and learning through making. Whether you are going to respond to an architectural model by remaking part of it, by working with a material used to make them, or by thinking how it helps to model how cities work and are planned, the physical experience involved in the making or remaking process will grow your knowledge and understanding.

Moving beyond the usual emphasis on speech and writing, hands-on learning and learning through making recognise that learning happens in multiple modes: for example, through our eyes, hands, ears, and nose; through images, materials and sounds; and by working and communicating with other people. When we learn with our hands, we develop a new closeness with materials and objects, and start asking questions about how they come about and how they impact human and non-human ecosystems. These ways of learning engage the body and the senses to help us ask entirely new questions and develop new ways of thinking about the world.

These architectural model workshops and the questionnaires that accompany them are designed to engage with hands-on learning and learning through making and to gather what has been learnt through that process. Please help us grow these ways of learning by capturing your experiences, your questions, and your findings. explore creativity, problem solving to develop tacit knowledge around architectural model making.

Workshop themes

2

The V&A and Building Centre came together in 2021 to collaborate on Shaping Space, an exhibition that explored and celebrated architectural model making. Model making has been used as a way to understand and shape the world around us - as a tool for creating new, imagined spaces and as a means of remembering places lost to us. As part of the exhibition, we invite schools, from KS2 to KS5 to develop their practice of visualising and exploring the world through architectural model making. The exhibition content has now moved online and we are delighted to make our learning resources available for schools to continue to engage with and explore the fantastic models.

Key Stage Four

Key Stage Four learners will have the opportunity to develop their practical skills and deepen their knowledge and understanding of materials and processes for model making. Learners will gain experiences of working and experimenting with modern and traditional materials, including the use of environmentally sustainable materials and bioplastics.

Workshop series objectives:

- Learners to gain an understanding of why model making, in architecture and beyond, is important for design processes.
- Learners to gain an understanding of how to use new and innovative materials in architectural model making.
- Learners to explore creativity and problem solving to develop tacit knowledge around architectural model making.

Curriculum links

3

The Shaping Space school workshop series delivers a cross curricular approach to the development of tacit and embodied skills as a way to demonstrating knowledge and understanding. To do this we have carefully considered the National Curriculum aims in the development of our workshops. Learners can be expected to cover the following aspects of their Design and Technology curriculum.

KS4 Design Technology specification:

The impact of new and emerging technologies on:

- The design and organisation of the workplace including automation and the use of robotics
- Buildings and the place of work
- Tools and equipment.

The impact of resource consumption on the planet:

- Finite
- Non–finite
- Disposal of waste.

Positive and negative impacts new products have on the environment:

- Continuous improvement
- Efficient working
- Pollution
- Global warming.

Object focused learning

4

Object based learning pedagogies are often used to encourage creative practice in the classroom. When we include objects in creative activities, we provide opportunities for learners to explore different material, different techniques and the different forms that creative outputs take.

Encouraging learners to handle objects, to examine them in detail through touch and supported by sketching, remaking and disassembly we encourage learners to engage multiple modes of developing understanding.

Some of the skills object based learning encourages includes conceptualisation of complex concepts, reflective creative practice, and experimentation. Objects based learning can also encourage collaboration and communication skills.

When selecting objects educational professionals should consider what different materials and techniques the objects demonstrate, how the objects can link to other areas of the curriculum and how learners will be engaged with the objects. You can choose one object to study very carefully, supported by a remaking activity or a selection of objects that will allow for a wider conversation with learners.

Learners handling of objects should be encouraged, this will facilitate embodied learning experiences. Learners will develop an understanding of different materials and processes through touch, this will also encourage creative problem solving.


LOBUPAK
VACPAC
LEO BAKERIES

Workshop one - reverse engineering 5

Outline
Learners will be asked to consider different materials and their properties for architectural model making. This workshop will challenge learners to reverse engineer a 3D printed model to make it more environmentally sustainable. These models will be used to make moulds from in session two.

Objectives:
Learners to develop an understanding of what architectural models are and their uses.
Learners to gain an understanding of different materials used in model making, including their environmental impacts.
Learners to develop and demonstrate an understanding of making scale models independently from measurements.

Learning activity:
Learners will be challenged to recreate the architectural model House with a Catslide Roof by Charles Holland Architects, using reclaimable and recyclable materials. Learners will be asked to create models, using air drying clay and corrugated card, to predetermined dimensions. Learners to be encouraged to work independently to problem solve how to create their models.

Object Focus

6

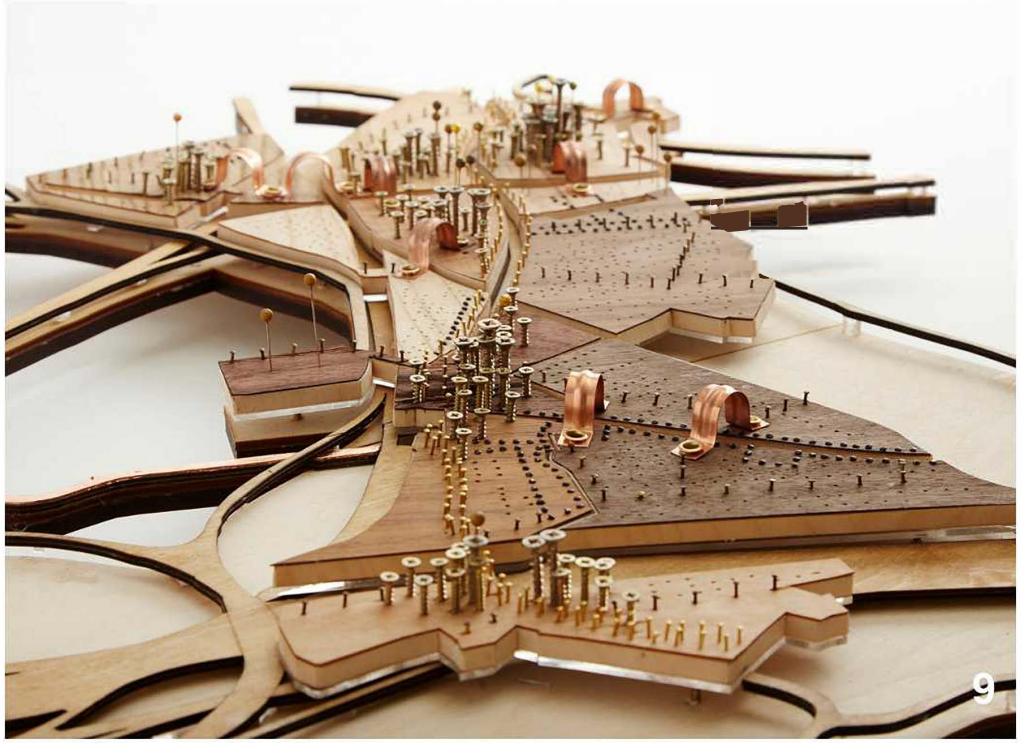
Architect Hawkins Brown developed a model for the redesign and redevelopment of Old Oak Common as part of the HS2 works in London. Historically the area is poorly connected, and the infrastructure and industry has been pushed to the city fringes.

This model represents a redesign of the infrastructure and transport links of Old Oak Common that would allow it to flourish as a community and grow economically.

The architectural model itself is unusual because of its use of commonly found construction materials, which are used to represent buildings, bridges, and trees. This model invites the viewer to consider and discuss the objects represented unusually and connect the physical world with the tools and equipment it is made with.

'The development framework describes the transformation of an industrial archipelago into a productive mixed use place in outer London.'

Hawkins Brown
Victoria Road and Old Oak Lane Development Framework
Image copyright: Fred Howarth



Workshop one - lesson plan

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Time	Activity	Materials / Equipment
30 mins	**Exploring modelling materials** What are the traditional materials for making architectural models? Can you sort them into: Biodegradable / non-biodegradable Natural / man-made Malleable / non malleable	Materials Library
1 hour 20 mins	**Making our models** Remaking an architectural model with reclaimable or recyclable materials. Learners to create individual scaled pieces from existing architectural models considering texture and surface design and dimensions	Clay Corrugated card Craft knife Rulers Cutting mat
10 mins	**Reflection and preparation** Learners to spend 10 mins discussing and reflecting on their learning throughout the day.	

Workshop two - introduction to bioplastics, moulding and casting

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Outline

Learners will be encouraged to develop an understanding of how to shape environments considering the needs of communities. Through developing models learners will test their ideas, use creativity to problems solve and apply mathematical scale to their practical work.

Objectives:

- Learners to experiment with different forms of mould making, using traditional modelling materials
- Learners to create a bioplastic resin for pouring, adding in other composite materials to strengthen the mix
- Learners to use a polyester resin for casting
- Learners to develop an understanding of alternative materials for the production of models
- Learners to gain an understanding of environmental damage associated with architectural models.

Making activity:

Learners to experiment with the creation of agar based pourable bioplastics to create objects from moulds. Learners will first create a mould using Alginate and then create their own bio-plastic resins using an Agar-agar recipe develop by Materiom through the Institute of Making. Learners will experiment with adding colour to their resin and will pour their resin into their pre-made moulds.

Bioplastic recipes

Agar-agar is a plant-based gelatin from seaweed that acts as a polymer when combined with water and glycerol. Agar-agar is a food safe biodegradable plastic that can be poured to form films or other plastic objects and can be combined with other ingredients to create composite plastics.

agar-agar recipe
2g agar-agar
3.5ml glycerol
50ml water

- Mix all ingredients together until all the agar-agar has dissolved
- Heat until 95 degrees celcius or just below boiling point
- Pour into mould and let dry for 3-4 days.

Agar-agar cornstarch composite recipe
2g agar-agar
3.5ml glycerol
100ml water
2g corn starch

- Mix all ingredients together until all the agar-agar and corn starch has dissolved
- Heat until 95 degrees celcius or just below boiling point
- Pour into mould and let dry for 3-4 days.

Agar-agar cork composite recipe
15g agar-agar
5ml glycerol
250ml water
15ml corn starch
0.5 cup of ground cork

- Mix agar-agar, water and corn starch together. When dissolved add glycerol and cork.
- Heat until the mix thickens and bubbles.
- Pour into a mould. Drying time depends on the ventilation of the mould and the temperature and humidity of the place.

Object Focus

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Dieter Cöllen is a German Architectural model maker, specialising in the recreation of ancient buildings from a traditional modelmaking material, cork.

Cork modelling or phelloplasty has its roots in 18th century architectural modelling practice. Cork was often used as it is a lightweight and readily available material.

The original Temple of Bel stood until 2015 when ISIS destroyed most of the ancient city of Palmyra in Syria. The model is part of a project which aims to reconstruct in miniature the monuments lost to terrorism, based on archaeological surveys. Dieter is one of the very few experts who continue the ancient tradition of making models with cork, a material which mimics the porous surface of ancient stone buildings.

‘What I show is therefore a reconstruction or documentation of the respective building’

Dieter Cöllen
Temple of Bel
Image copyright:
Chris Jackson

Workshop two - lesson plan

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Time	Activity	Materials / Equipment
30 Minutes	**Preparing the moulds** Glue the model to the base of the paper cup. Prepare the algenate mixure and pour into the cup ensuring it covers your model completely. Leave until it sets	Paper cup Hot glue guns Algenate Water Jug
1 hour	**Preparing your bioplastic** Working in groups of three students to prepare the three bioplastic recipes. Before the bioplastic is heated check that the alignate has set, if it has remove it from the paper cup and remove the model. Heat the bioplastic and when ready pour into the mould	Cooker Jug Measuring spoons Saucepan Wooden spoon / spatula Glycerin Agar Agar Cork Cornstarch Water
30 mins	**Reflection** Clearing up Discussion on the benefit of bioplastics	None

Workshop three - exploring the exhibition 12

Outline

How do we use exhibitions to reinforce and expand our learning? Using the website as a source of inspiration, make models and explore properties of natural and biodegradable materials.

Objectives:

- Learners will visit the website to explore the architectural models.
- Learners will evaluate their pre-made models against those on the website
- Learners will experience and develop an understanding of working with industry standard modelling materials.

Learning Activity The Remake

Learners will view the models that have inspired their work. Students will engage in a conversation about the importance of architectural models.

Students will remake their models using industry style modelling materials to see if they can improve their model/ take on inspiration and analysis from seeing the models.

Workshop three - lesson plan

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Time	Activity	Materials / Equipment
1 hour	Tour of the **website** Explore the different materials, process and styles of architectural models. Focused discussion on how to use websites to inspire work and develop ideas. Learners to sketch model that most inspires them.	Camera Sketchbook Pencil / pen
1 hour 30 mins	Discussion on traditional model making materials and natural materials. Developing an understanding of properties of cork and its use in architectural model making. Learners are to create model from cork sheeting.	Cork sheeting Scissors Hot glue gun Rulers Pencil
30 mins	**Reflection and Celebration** Review of models, casts and bioplastics and reflection of learning over the three workshops.	None

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