



FIRINGUP

Firing Up /

Handbook

“Art is not a matter of giving people a little pleasure in their time off. It is, in the long run, a matter of holding together a civilisation.”

David Pye

[The Nature and Aesthetics of Design, 1978](#)

While every effort has been made to ensure the information given here is correct, the Crafts Council can accept no responsibility for any accidents or injury that may result.

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Editorial content: Duncan Hooson and Julia Rowntree at Clayground Collective www.claygroundcollective.org

Interesting facts with advice from Dr Javier Cuadros, Researcher on Clay Mineralogy, Natural History Museum

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The logo for Paul Hamlyn Foundation, featuring the letters "phf" in a square, followed by "Paul Hamlyn" and "Foundation" below it.

Raising the profile of ceramics in education

Firing Up was a national clay programme to 're-fire' kilns in schools and inspire learners. Running from 2010 to 2013 it provided teachers with the skills to teach ceramics in a creative and enjoyable way. It financed the maintenance of kilns, trained staff how to use them, and delivered inspiring school workshops developed by Clayground Collective and local ceramists.

The Firing Up programme was delivered to schools from eleven regional clusters with a university ceramics department at the centre. Maker led ceramic workshops were held in 63 schools which directly involved over 3500 young people aged 11-18 years.

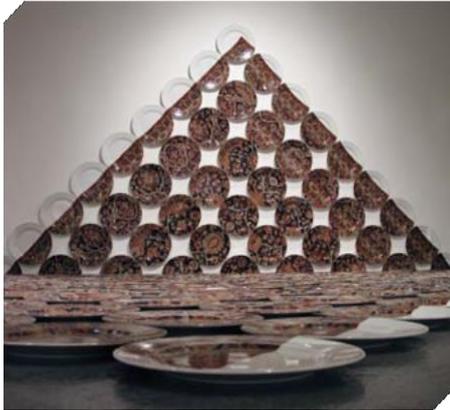
"Firing Up was a very significant scheme for the future of ceramics in schools, as it created sustainable links to ensure the continued presence of ceramics within secondary schools and HEIs across the UK." Rosy Greenlees, Executive Director, Crafts Council.

A national programme of networked learning in ceramics, Firing Up was developed by the Crafts Council through a steering group of representatives from the National Arts Learning Network, the National Society for Education in Art & Design, University of the Arts, Clayground Collective and Ofsted.

Find out more about the Crafts Council and this project at www.craftscouncil.org.uk/learn



Alexandra Engelfriet working as part of Neil Brownsword's Marl Hole project, British Ceramic Biennial. Photo: Johnny Magee, 2009



Left: Marek Cecula, The Porcelain Carpet, 2002. 3.5m x 5.50m. Porcelain and ceramic decals



Right: Eva Kwong, Swarm, 396x528x2.5cm, earthenware, stoneware, porcelain, hand-coiled, low and mid-range firing, some unglazed, some salt-glazed



Left: Ted Vogel, White Branch, Wall Piece, 2006, Earthenware, digital image, Porcelain, Slab- built, Press Moulded with Electric Oxidation, 61x46x10cm



Right: Makoto Hatori, 5-7-5, height 170cm stoneware with slip, sprayed solution of salt, wood and wire additions, fired in a gas kiln to 1380C in an oxidized atmosphere. Made at Panevezys International Ceramic Symposium in Lithuania 1998

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Introduction

Welcome! By opening this Firing Up Handbook you have joined a vibrant community of practice. Firing Up was a programme aiming to draw children and teachers into this community, to ensure that knowledge is passed from one to another as a continuum.

A fundamental premise of Firing Up was that ceramics education is important to the development of children and that as they become more engaged in the material and more skilled in its manipulation, they will value the activity more – and it will come to inform and enhance other areas of their education.

In his paper [Practically Minded](#), 2008, Dr Aric Sigman argues that: [Hands-on exploration seems critical for the development of understanding and inventiveness. The use of hands seems central to intelligence and crucial to full cognitive learning.](#) The notion of haptic engagement, of learning through touch, is nothing new, but it is refreshingly radical within a curriculum that is leery of the three-dimensional.

Clay is an egalitarian and playful material, engaging children and craftspeople alike. It can be formed, pinched, pulled and sculpted – so that this is a material only limited by creativity, as well as a material that once explored fires the imagination time after time after time.

The Firing Up programme aimed to give teachers the skill set and the ability to fire their students' imaginations through an in-depth and diverse twilight programme designed to engender the confidence and desire to further explore the subject. We are lucky to have engaged an exciting group of practitioners and crafts people who wanted to pass on their knowledge to educators students. This handbook is designed as a supplement to the twilight programme and is supported by Steve Mattison's book *The Complete Potter*, one of the most accessible and useful "how to" books on this subject.

Ceramic education specialists Clayground Collective devised a creative project, [Tags, Tabs and Traces](#), to provide an adventurous context for skills acquisition and development. The project is outlined here, together with pointers for research, materials, equipment and technical skills for its realisation. You may wish to copy pages as an aide mémoire in your workshop or for posting next to the kiln. This handbook has been conceived to be clear and easy to use, something you can reference very easily and, even more important, understand.

So I would like to encourage you to put your pen down and put your apron on, for you are about to engage with a material for which the term [getting your hands dirty](#) was invented – and we all know how rewarding that is.

Anthony Quinn
Course Leader, BA Ceramic Design – Central Saint Martins

HOW TO USE THIS BOOK

The aim of this handbook is to provide an introduction to working with clay in schools. It is to be used in conjunction with [The Complete Potter](#) by Steve Mattison. Ceramic education specialists Clayground Collective have devised the creative project [Tacs, Tabs and Traces](#) to provide an adventurous context for skills acquisition and development. The project is outlined here, together with pointers for research, materials, equipment and technical skills for its realisation. Further updates to the text and worksheets will be available from the Craft Council's Craft Action Network website: www.craft-action.org.uk/

“An active ceramics department in my comprehensive in Stoke has inspired my whole life and career.”

Duncan Hooson
Clayground Collective

Torbjørn Kvasbø working as part of Neil Brownsword's [Marl Hole](#) project, British Ceramic Biennial. Four makers spent a week at Ibstock Brick Ltd, the largest brick clay quarry in Europe.
Photo: 2009 Johnny Magee



What is clay?

Clay is found in abundance all around the world, and has played a precious role in human cultures from the earliest times to today. Many legends relate that life itself emerged from clay: beliefs backed up by recent scientific findings. Clay minerals are known to catalyse life's basic building blocks.

Legends of the Shilluk people of Sudan describe clay as the substance from which the earth is fashioned, with the variation in clay colours accounting for different peoples and character. Ancient Egyptians revered the potter god Khnum, who breathed life into men and women made from clay. The Bible says Adam was created from the Earth and returned to it, while Jewish folklore tells of the lumpen Golem, made from mud.

Clay has its origins in the igneous rock formed by volcanic eruption, which is broken down into fine particles over time by ice, water and weather. It is often found in riverbeds, or dug from pits in areas where clays have been laid down over millennia.

Clay is more than one thing: its different mineral components, and their balance, determine its handling properties, texture, colour and final appearance. Clay minerals include kaolinite, bentonite, illite and montmorillonite. The colour derives from variation in mineral oxide content, such as iron (red) or copper (greenish). Some clays can be dug and used with little further preparation; others require blending.

Clay's various special characteristics determine the many purposes to which it is put, including teacups and sanitary ware, heat shields in space, medicines, cosmetics and toothpaste – even high-performance textiles and nano-technologies. It is the everyday stuff of ceramists, designers, scientists, builders and manufacturers.

Importantly for ceramists, clay becomes malleable, or plastic, when mixed with water, and is rendered durable through exposure to high temperature.

THE CLAY BODY

Whatever material is chosen for making, it is called the clay 'body'. Two clay bodies are commonly used when learning ceramic skills: earthenware and stoneware.

These terms refer both to the type of body and the temperature at which it is fired. Earthenware is often red from high iron content: it is fired at a relatively low temperature, has high porosity and requires glazing to be waterproof. Stoneware is fired at a higher temperature when it becomes hard and non-porous. A vast range of clay is available through commercial suppliers. Recommendations can be found on the Firing Up shopping list (see inside back cover).

Drying is an important part of the ceramic process. Known as 'greenware' until fired, clay becomes harder and more fragile as it dries. Once bone dry, it is ready to fire at low temperature, in what is known as a 'bisque' or 'biscuit' firing. A second firing, known as the 'glaze' firing, produces the finished piece, with a glass-like coating. Glaze is a suspension of minerals in water. When fired at high temperature both the glaze and the clay body become vitrified, and transform into their original glass- and stone-like qualities.

"I first used clay in school, and made some jigsaws from it. The ability to change shape, to mould and to create something unique, three dimensional and functional that had the ability to last was amazing for me. It opened up a whole new world that I am still exploring, and will be for many, many years."

CJ o'Neil
Artist



1 Clay with high iron content on a road near Chipata, North East Zambia. Photo: Joanna Still

2 Ceramist Shazieh Gorji collects plastic bentonite clay from the bed of the Hingol River, Baluchistan (Pakistan). Note the drier, more brittle clay on the bank. www.shaziegorji.blogspot.com

3 In many areas, clay can be found underfoot by digging down less than a metre: students at Oak Lodge School for the Deaf prospect for clay in their playground as part of a cross-curricular project. Photo: Clayground Collective

4 Neil Brownsword, [Marl Hole](#): a five-day residency with international artists to animate a commercial clay pit at Ibstock Brick's Gorsty Quarry, Newcastle-Under-Lyme, British Ceramics Biennial, Stoke-on-Trent, 2009. Photo: Johnny Magee



Clay is used as a natural sealant, as it is virtually impermeable to water once saturated. It is used at the core of dams and in landfills to prevent toxic seepage. It is also used in nuclear waste repositories.

Ceramic process: materials, water and temperature

TIME SCALE	STAGE	DETAILS
	Order clay, glaze, tools and materials from supplier	Sanded buff clay (see shopping list) fired at 1120°C is recommended for this project
GREENWARE Drying time ranging from 2 days to an indefinite period, depending on clay thickness, atmosphere and wrapping	soft clay	If using a newly opened bag, the clay will not contain air, so will not require further preparation
	Wedge/knead/prepare	
	Select technique/make	Pinch, coil, slab or model
	Store unfinished work well wrapped in plastic	Add surface texture and join elements while clay is soft but firm
	Drying stages	
	Leather hard	When at leather or firm cheese-like consistency, clay should be kept under plastic to slow rapid evaporation. Techniques to be used at this stage: slip decoration, carving, surface finishing or 'fettling'
	Bone dry	If cold to the touch, work needs further drying. At bone-dry stage, work is very fragile and brittle
	Pack kiln	Be careful to avoid touching the thermocoupler sticking into the kiln. This reads the temperature for the controller.
BISQUE Firing and cooling average time: 2.5 days	First firing (bisque or biscuit) 1000°C	Make sure bisque ware is dust-free before applying glaze by wiping with a damp sponge.
	Unpack kiln	
GLAZED WARE once glaze is applied, ware can be fired immediately or stored indefinitely	Glaze application	Choose appropriate method of glazing: dipping, pouring, sponging or brushing. <u>Always glaze the inside of the object first and wipe bases clear of glaze</u>
	Glaze tests if required	
	Pack kiln	
	Glaze and glaze test firing	NB A high earthenware temperature (1120°C) is to be used for this project
	Earthenware range (e/w) 1000°–1200°C Stoneware range (s/w) 1200°–1350°C	
	Unpack kiln	NB: only open kiln when controller reads below 150°C. Beware! Work will still be hot
	Use of ceramic transfers, enamels and lustres require a third firing at 720°–900°C	Always check the exact temperature needs of each product
	Critique	
	Record results, exhibit	Celebrate!

organising and equipping the art room for clay

Inspirational clay studies can be started with the simplest of equipment and resources...

ITEM	DETAILS	FURTHER INFORMATION
storage containers for clay	Large plastic boxes or dustbins with lids	These can be placed on dollies (wheeled trolleys) for ease of movement
Four separate shelving areas for greenware		
1) work in progress	1) work in progress wrapped in plastic	Any sealed shelving is best, wood, metal, slatted or solid. As simple or grand as budget allows
2) leather-hard to bone-dry work prior to bisque firing	2) thick or complex work needs to be loosely covered in plastic and dried slowly	
3) bisque ware	3) bisque ware should be kept clean and dust-free	
4) glazed objects waiting glaze firing	4) avoid touching surface once glazed, and ensure bases are wiped prior to placing in kiln	
sturdy bench for wedging and kneading clay	One wedging bench for the whole studio is enough	Wood is ideal. Clay may stick to other materials, making wedging and kneading more difficult
Plaster block or 'batt' for reclaiming clay	<u>Caution! Plaster and clay are incompatible. Even small pieces of plaster in clay may cause damage to finished work.</u>	Concrete paving slabs will do, but will dry the clay more slowly
water source	A sink is best but buckets will do Avoid putting waste clay down the sink	If clay is spoiled for any reason and cannot be recycled, leave to settle in a bucket with water. Pour off surplus water and throw clay away in general waste
wooden boards of various sizes	Use as a base on which to work and store objects	Laminated boards are best; solid wood will often warp
buckets, small bowls, and sponges	Damp sponges are better for student use. Bowls of water are easily spilt while working	Choose bowls and containers of the simplest design. Complicated rims make for demanding cleaning
Plastic aprons	These can be the disposable type on a roll. Plastic, kitchen-style aprons are preferable for greater sustainability	Non-disposable plastic aprons should be regularly wiped to reduce dust
bucket and mop for clearing up	<u>Sweeping must be avoided!</u> Clay dust is made up of silica, dangerous if repeatedly inhaled. Sweeping stirs up this dust. Cleaners should be alerted too	Make friends with the cleaner and school keeper for help with cleaning and storage

storing and recycling clay

For best results and greatest enjoyment it is essential for clay to be at the correct consistency – soft and plastic. Too soft and it will be too sticky and difficult to handle; too hard and it will crumble and crack.

Waste clay is inevitable, but clay is one of nature's reusable resources and one of its great characteristics is that it can be reclaimed. Until fired, water can be added, and once the clay has broken down it can be partially dried and re-used.

STORING AND DRYING

- Make sure that clay does not dry out by preventing evaporation during storage, preparation and making.
- Close bags after use. Adding small amounts of water into the bag can help to keep clay moist.
- After using clay, unwanted soft pieces are best broken down into small lumps. A small amount of water added on top will refresh the clay. This will need to be well wedged before re-use.
- If the clay is leather-hard and crumbles easily it is best to dry it out completely and follow the recycling procedure.

RECYCLING

- Fully dried out clay is easier to reclaim.
- Put clay pieces for recycling into a bin and fill with water until clay is covered. After a few days, the clay will disintegrate and settle leaving water on top.
- Remove excess water and take clay out to lay it on a plaster block or 'batt' to a depth of around 5cm.
- After 1–2 days, depending on humidity and temperature of the art room, the clay will be dry enough to turn over for drying on the other side.
- When the clay has stiffened and comes away easily from the plaster batt it can be wedged to be put back into plastic bags.
- Keep an eye on how clay is drying. If it is drying too quickly on the top and sides, cover the clay with plastic and let the plaster absorb the water from underneath.

TOOLS AND EQUIPMENT

Good studio practice is making sure that all tools and equipment are well washed after every session.

Very little outlay is needed for the essential items for preparation and basic modelling:

- A wire fixed to wooden dowel toggles. These are called cheese wires, used for cutting the clay from the bag and in the wedging process. Fine nylon string is an alternative.
- Plastic or wooden modelling tools: these can be purchased; many can be made.
- Simple household knives and forks are useful for cutting and for scoring joins.
- A good range of wooden boards on which to shape objects and store.
- Enough plastic in which to wrap work. Thin sheet plastic is best.
- Kidneys – metal and rubber smoothing and scraping tools – shaped like kidneys.

WORKING WITH SLAB FORMS

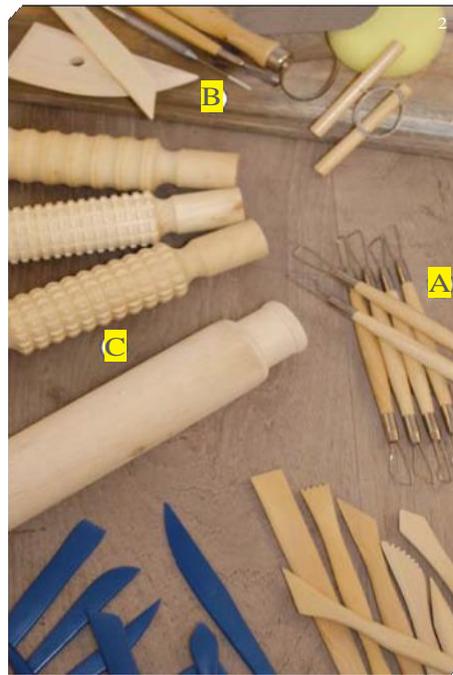
- Rolling pins. Household ones will do. Longer versions are better for larger work.
- Rolling guides. Wooden slats of the same thickness are placed either side of the clay as it is rolled out to ensure equal thickness across the slab.
- Untextured canvas or old tea towels. These are used to prevent the clay sticking to the bench. To reduce dust these should be regularly washed and dried.

COILING AND HANDBUILDING

- Turntables or banding wheels are useful to allow all sides to be worked. If budget doesn't stretch to these, a suitably sized board or even stiff cardboard can be used.



1 Front-loading electric kiln with firing capacity of 128 litres



2 Useful modelling tools; A Wire ended tools; B Kidneys and wire; C Wooden rolling pins

GLAZING

- Buckets with lids for storing glaze mixes.
- 80-mesh sieve for slip and glaze mixing.
- Washing up brush to push material through sieve.

KILN AND CLAY PREPARATION EQUIPMENT

A kiln in full working order is essential! Other large equipment is useful depending on the popularity of clay in the department. In order of usefulness, these include:

- Slab Roller – for easy production of large quantity and size of slab.
- Extruder – useful for making repeated forms such as tubes and handles.
- Pugmill – for recycling medium to large amounts of clay.

“I still have the first object I made in clay. It’s a small square pot, decorated by pushing the point of a pencil into the surface of the soft clay. It was my first experience of creating something useful for the home and I made it when I was about seven years old. Without encouraging art teachers and access to kilns in the school I would not have considered ceramics as an option when thinking about my career.”

kathleen Hills
Designer/Maker

“I fell into ceramics by accident as I had always thought of clay as being a bit old fashioned. Oh how I was proved wrong. I have been able to place digital graphic images onto the surface of clay to make contemporary vessels which stand out from the run of the mill ‘on paper’ illustration and graphic design.”

Annabel Johnson
Artist

Talcum powder is composed of a clay mineral known as talc. It is soft and smooth due to the small size of the particles and because the particle layers slide against one another when pressed laterally (try it out when you next apply talc and rub your fingers together).

tags, tabs and traces: Firing up creative project

This project is designed to be responsive to each individual school, its students, architecture, city and surroundings. It is inspired by how contemporary artists approach developing site-specific work, and to clay's ancient role in the commemoration of significant people or events.

DEFINITIONS	TAG	TAB	TRACE
explanations	A 2D personal mark	A 3D tablet or form commemorating a person or event	Evidence of personal, family or local history
Research questions	If you craft one image to communicate an idea of yourself to others, what would it be?	What and how would you like to commemorate the trace you find of personal, family or local history?	What stories from your city, school, or family history would you want remembered? (Fiction allowed!)

Tags, Tabs and Traces offers a culturally diverse approach, has potential for cross-curricular development and for celebration of student achievement.

PROJECT CONCEPT

The whole school provides a creative canvas for new routes and connections to be drawn between the school, individual students, the city and the world. Students are invited to dig into hidden histories to find remarkable characters and family traces, to inspire the form and narrative content of their artworks. These will be displayed in specific locations throughout the school.

Tags, Tabs and Traces introduces students both to clay skills and to a site-specific approach: exploring the distinctiveness of the precise location in which they are living and working. A device for locating students' individual artworks combines a map of the world, a map of the city and a plan of the school.

PROJECT BRIEF

Students are invited to create two artworks, one 2D and the other 3D: a 'tag' and a 'tablet'. They are encouraged to think as broadly as possible about

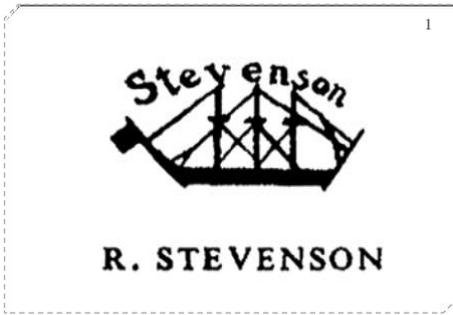
the various forms their ideas might take. Shown here as an example of a tag and a tablet are different interpretations of images and ideas to do with ships, maritime characters and events.

The tag is a personal marker to denote authorship, much as the backstamp to be found on the bottom of a plate or cup. The tag should communicate to a wide and diverse audience, rather than simply being a secret sign.

The tablet tells the narrative of a city or family history from the student's own research. The tablet should express this story in three dimensions, through form, colour and surface decoration.

The stories inspiring the tags and tablets are then pinpointed geographically on one of two maps: a map of the city or, if the story originates from elsewhere, on a map of the world.

These two transparent maps are laid over a plan of the school to indicate the display position of each student's tag and tablet. The position might be a wall, the corner of a corridor or staircase. The form of the tags and tablets should respond to the specifics of each location. All spaces should be considered for their potential: interior, exterior, upstairs, downstairs.



- 1 A ship backstamp on the reverse of a household ceramic item made by Andrew Stevenson c.1816-30
- 2 Nelson's ship in a bottle in Trafalgar Square, London. A commission for the Fourth Plinth by artist Yinka Shonibare, MBE. Photo: Clayground Collective
- 3 A recent tragic addition to the many plaques made by artist GF Watts (1817- 1904) to the memory of those who have heroically lost their lives trying to save another. Photo: Clayground Collective
- 4 A ship rounding the Cape on the front of South Africa House, Trafalgar Square, London. Photo: Clayground Collective
- 5 A pub sign near Trafalgar Square, London. Photo: Clayground Collective
- 6 A blue plaque commemorating a famous ship's commander. Photo: Clayground Collective

The project scope and scale as described is ideal, but it may be necessary to think laterally about its interpretation according to your circumstances. For example, students are asked to research specific school locations in which to site their finished artworks. The form of their artworks should be based on this location. Rather than fixing the final pieces here, it may be more practical to take photographs of that location to display alongside the finished work in the art room or elsewhere. Alternatively, the pieces might be temporarily fixed and photographed in situ for a virtual exhibition.

PROJECT TECHNIQUES

For the purposes of this project we recommend limiting the possible material options. For simplicity we suggest using a sanded buff clay body, which is a high-fired earthenware clay, colouring with slips and using a transparent or matt glaze.

“Clay is one of the fundamental building blocks of human technology; from the drinking vessels of our prehistoric ancestors to the thermal protection system that allows our space shuttles to re-enter the Earth's atmosphere. I have known clay all my life. As a boy I used it to make mud-slides in winter, and today, as a designer, it is at the heart of everything I do... There are few materials more valuable to our species than clay.”

Patrick morris
Designer

tags, tabs and traces: Project flow chart

Photocopy this chart and fill in the week numbers. This may be easier working backwards from any fixed dates you have already.

WEEK NO.	WHAT TO DO	HOW TO DO IT
	Organise artroom, order materials, get kiln working	With help from Firing Up team and shopping list, prime school-keeper and head teacher
	Teach basic clay techniques	Pinching, coiling, slab building, handbuilding, relief modelling
	Plan creative project	Work out timetable. Make contact with local museum
	Pose research questions to students	Ask family members, past pupils, find traces of the city's hidden stories through the web or contacts with local institutions: e.g. museum, library
	Work out timetable. Think about sources of information eg. Contact local museum, library, historical society	World and city maps to be photocopied onto tracing paper or acetate. School plan to be enlarged to fit on same size plain paper. (Outline maps of the world are downloadable from the Internet. City maps are readily available locally and each school office should have a plan.)
	Pinpoint geographic location of stories on maps	Each student should locate his/her story on the world or city map
	Superimpose maps on school plan	Transfer geographic location of stories onto school map
	Locate position of tags and tabs in school	With the school plan as guide, explore the school for eventual positioning of tags and tabs. Consider the interior/ exterior, upstairs, downstairs, wall surfaces, doorways, windows, every nook and cranny
	Decide location and appropriate making and fixing techniques for best creative interplay between story and architecture	Check health and safety issues. If permanent fixing is not possible consider creative alternatives.
	Make and fire	Templates of sites can be made with cardboard as basis for design. Encourage students to think about scale, multiple forms, suspension, wall pieces, etc
	Installation	Fixing should be considered as integral to the design
	Interpretation	How are the pieces explained to others? Students' statements
	Exhibition/ celebration	This project has potential to involve the whole school, families and other players in the city in an exhibition or guided tour of the school as gallery/museum

TAGS, TABS AND TRACES: PROJECT EXAMPLES

To choose a site for each student's artwork three maps are needed: an outline map of the world; a map of your local area; and a plan of your school. Photocopy your maps onto acetate or tracing paper and the school plan onto plain paper of the same size as in this sample. Pinpoint stories on the maps by marking the place that most closely links to each student's story on either map. Overlay this onto the school plan to find a location in the school and this is the site for that piece of work.

WORLD MAP

EXAMPLE 1

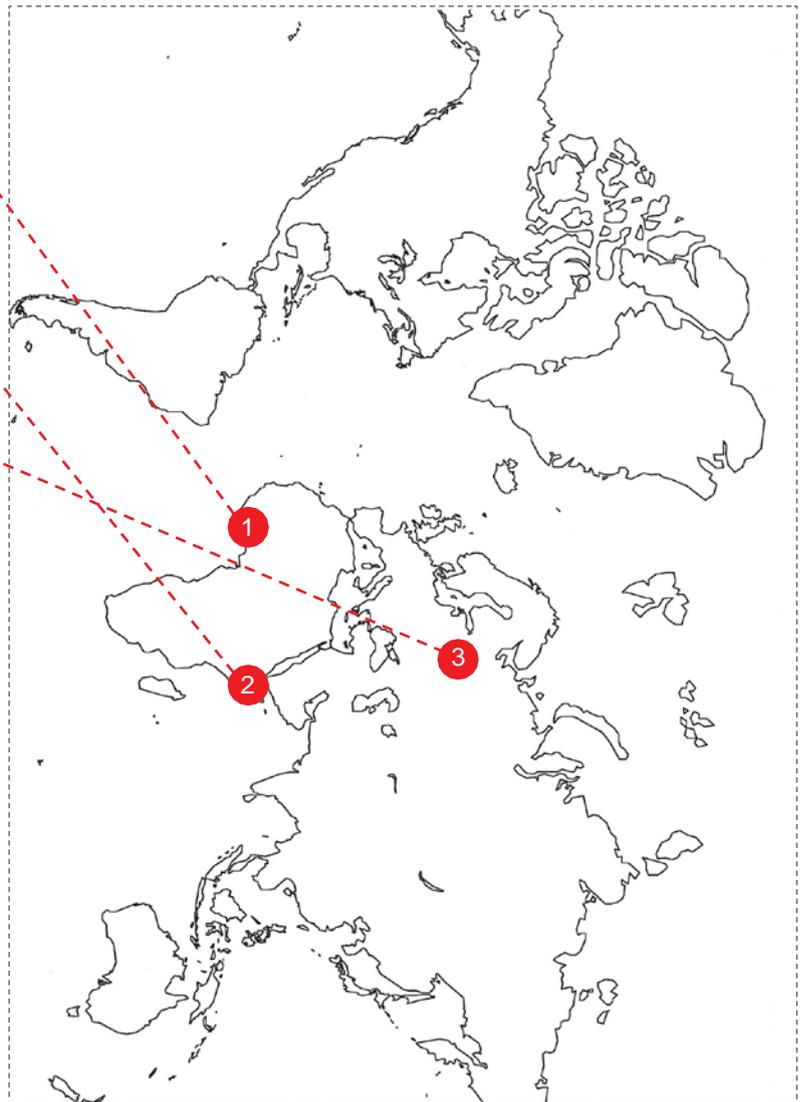
Muhammed's story – Ghana

EXAMPLE 2

Isabelle's story – Somalia

EXAMPLE 3

Maris's story – Latvia

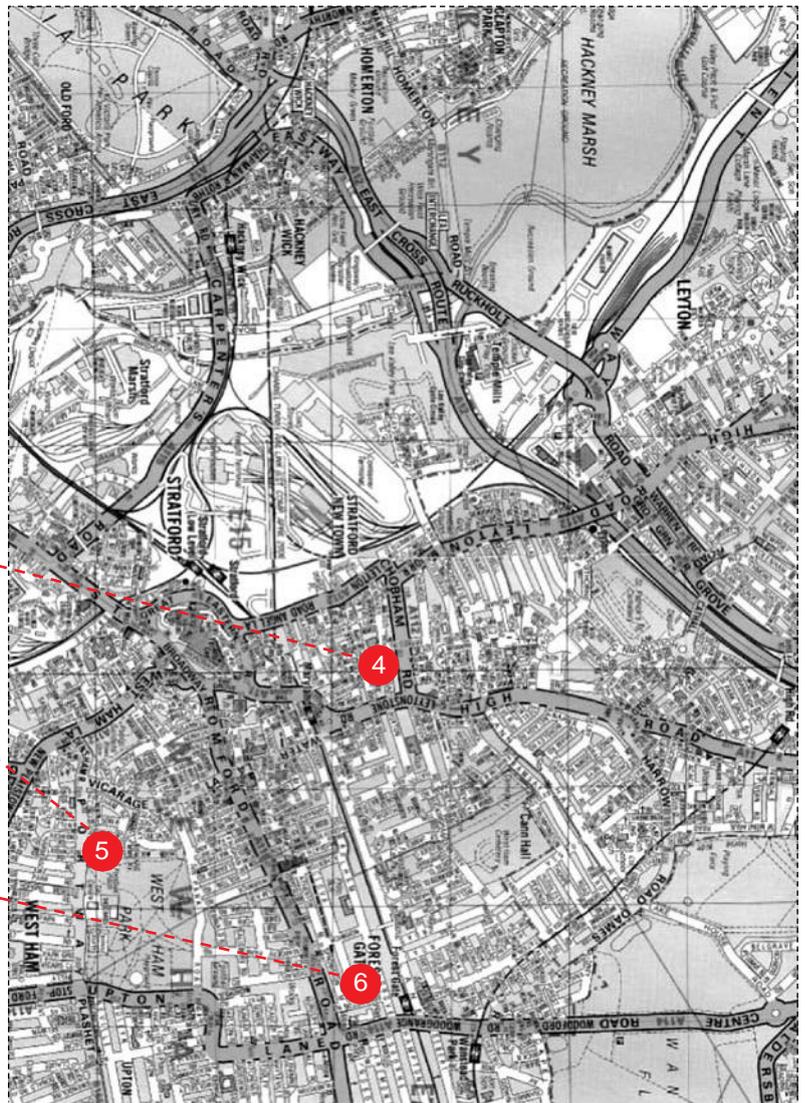


CITY MAP

EXAMPLE 4
Yusef's story – Chobham Road

EXAMPLE 5
Rohan's story – West Ham Park

EXAMPLE 6
Monica's story – Forest Gate



SCHOOL MAP

EXAMPLE 1

Muhammed's story – Ghana

Muhammed's work would be placed in the assembly hall.

EXAMPLE 2

Isabelle's story – Somalia

Isabelle's work would be positioned in class room 10.

EXAMPLE 3

Maris's story – Latvia

Maris's work will be placed in class room 16.

EXAMPLE 4

Yusef's story – Chobham Road

Yusef's work would be placed at the end of the corridor.

EXAMPLE 5

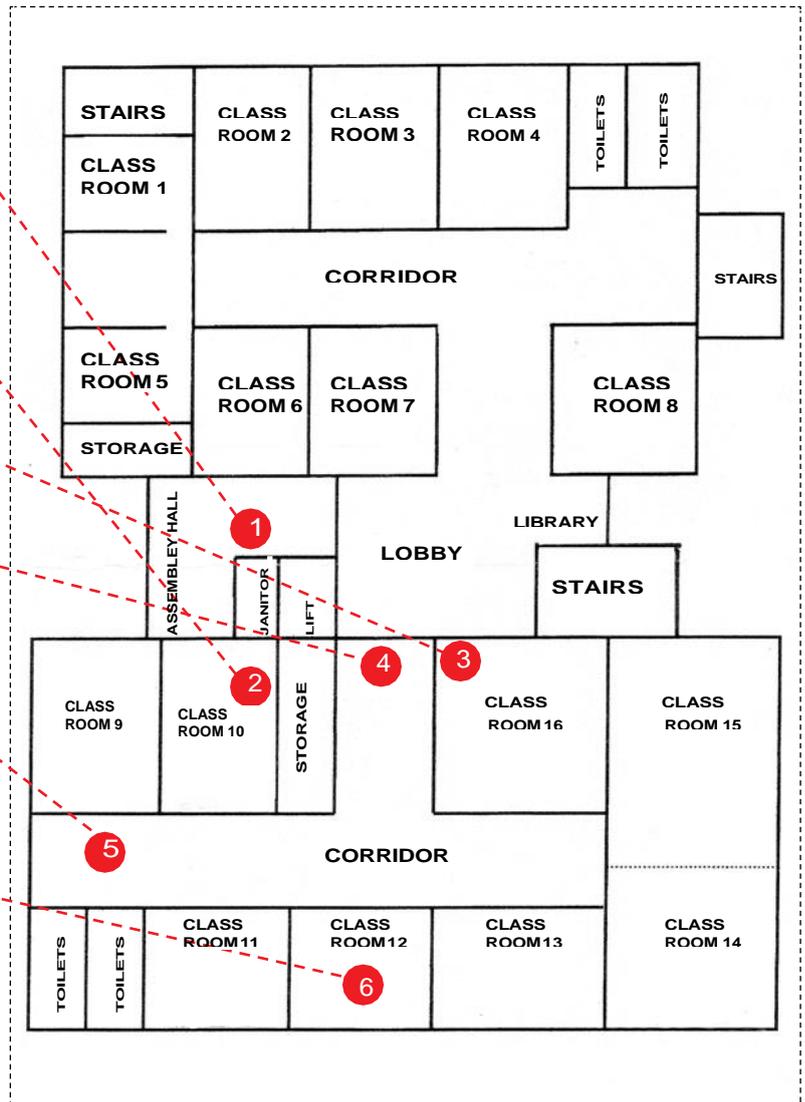
Rohan's story – West Ham Park

Rohan's work would be placed in the corridor.

EXAMPLE 6

Monica's story – Forest Gate

Monica's work would be positioned in class room 12.



tags, tabs and traces: techniques

Students should explore the following range of techniques so that they can choose the most appropriate for best expression of their story and best interplay with its chosen location in the school. Design work is essential prior to choosing clay techniques.

WEDGING AND KNEADING

Wedging and kneading are different processes used to mix the clay, expel air and arrive at the desired consistency.

Remember it is important to expel all air pockets, particularly for slab work. If left, they are liable to explode in the kiln.

JOINING: SCORING AND SLURRYING

To join clay pieces, create a key on each surface and apply wet clay or slurry (slip). Any piece employing this technique will require slow drying.

PINCHING

This technique is widely used to create small, round, hollow or open forms. It is ideal if a student wishes to create multiple forms of different scale, like a honeycomb or an amalgam of organic shapes.

COILING

Coiling is the most versatile of techniques. It can be used to manipulate the clay into complex or simple shapes, such as figures or abstract forms of varying scales.

Careful control is needed as coiling proceeds. It is easy to go wider than intended, resulting in collapse of the form. Tall, wide forms require partial drying to support the coils at each stage. Remember, wet clay can't be added to dry clay. Score and slurry before adding the first coil at the start of each session.

SLAB BUILDING

Leather-hard slabs are generally used for more angular, architectural or box-like forms. Soft slabs are used to shape more fluid, organic forms. Slabs are made by rolling clay out onto cloth, with two guides to ensure an even thickness. We recommend 0.5cm to 1cm maximum. The key to good slab work is ensuring:

- no air pockets are trapped in the clay
- soft or leather-hard clay
- soft slabs are used immediately

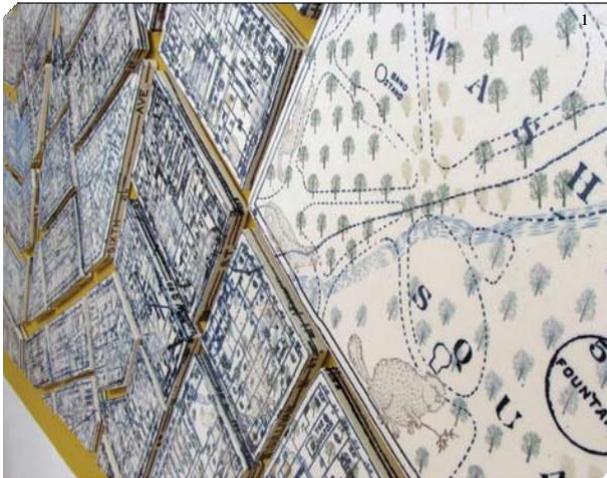
Leather-hard slabs are partially dried between sheets of newspaper (2 sheets for each layer) and the whole package wrapped in plastic to dry out over a week.

Air pockets are easy to deal with once spotted. They appear as a blister on the clay surface. Prick with a needle, open out and fill in with fresh clay from the centre outwards.

CYLINDRICAL FORMS

Cylinders can be used on their own, or as one element of a more complex structure. Using soft clay slabs, any cylindrical object can be used as a mould. Plastic drainpipe or sturdy poster tubes are ideal. These form a support while the clay is worked on.

The cylinder should be covered in newspaper prior to applying the clay slab. The mould must be taken out as soon as the clay is stable enough to remove it (at the end of the session or the school day). Otherwise the clay shrinks as it dries, and will crack.



SOLID SCULPTURE

Students may wish to work with solid blocks of clay to model figures or heads. These should be hollowed out before the leather-hard stage, to avoid air pockets inside the form and danger of explosion in the kiln. Cut the form in half using a wire, and hollow out using a wire loop-ended tool. Score and slurry the edges to re-join the two halves. Rework the surface to hide the join.

CARVING

Subtracting clay is often underused as a creative technique. Carving in wood and stone is a universally recognised creative technique. The beauty of carving in clay is that it is much simpler and can be more easily corrected.

RELIEF MODELLING

Flat tiles are created using the slab method. The relief can be built on this surface by adding thumb-nail sized pieces of clay. It is important to make sure that the surface is smooth before applying each bit.

Clay work should ideally be no more than 2cm thick. If thicker, work needs to dry for longer and requires a longer firing cycle. A close eye on the thickness of students' work is desirable for this reason.

1 Andy Brayman and Ayumi Horie, *Who Lives in Greenwich Village?* (detail of Washington Square), 2009. Slab-built porcelain, clear glaze and decals 122x244x20cm

2 Merete Rasmussen, *Twisted Grey Loop*, 2003, 26.8x30x41.5cm. Photo: John Hammond



“I was introduced to clay by a new art teacher who arrived at my school when I was about 14. The very first thing I made in clay was a figure of a Buddha, about 30 cm tall. When the kiln door was opened nearly all the other pieces in the kiln had exploded, but my Buddha sat complete and resplendent in the ruins: I was hooked on clay at that moment. What I love most about ceramics is that it is never perfect, a bit like people.”

Robin levien
Master of the Faculty of Royal Designers for Industry at the RSA

There are generally said to be four major groups of clay: kaolin, smectite, illite and chlorite.

Clay is formed by the physical alteration of rocks and minerals like sand, slate, granite or solidified lava when exposed to water.

surface and decoration

Surface should be seen as integral to the form, offering an important canvas for the communication of aspects of a design idea: for example atmosphere, emotion, narrative content, historical reference, figurative or abstract qualities.

The decorative approach might be made up of a variety of techniques combining colour and texture.

STAMPS: FOUND OR MADE

Many makers collect found objects with which to create interesting marks and texture. Students might take this approach and assemble their own collection of found objects. Each item might have significance to their story or might produce patterns that, when repeated, take on significance.

Stamps can also be made from clay or plaster. For this project clay stamps are recommended, as plaster use and carving is hazardous when working with a large number of students.

TOOLS: FOUND OR MADE

Makers create their own tools, often using discarded bits of plastic, wood or packing strip. Or they remodel existing, purchased tools. Students may decide to make or customise their own to achieve the desired design.

Plaster and clay are not compatible. Although plaster is often used in the professional workshop, and for reclaiming clay in the artroom, it is not generally recommended for use in class. If any small amounts of plaster get into clay this can cause breakages when fired.

Did you know that clay is commonly used in our everyday lives, even though you might not notice? In your bathroom, when you use the toilet and wash your hands in the basin; when you clean your teeth, toothpaste contains clay; and cosmetic products like foundation and powders contain clay – and so does deodorant...



Above: Halima Cassell, 2008, carving heavily grogged clay for a large sculpture, *Sacred Conversation*

Opposite: David Hicks, *Still Life*, 2008. Handbuilt earthenware, unglazed, 183x122x35.5cm



The clay body itself provides the starting point for consideration of colour. Objects might be simply fired so that the natural clay is the only colour to feature, as seen in bricks and the traditional ceramics of many cultures.

SLIPS

Slips are liquid clays coloured with oxides and commercial stains. Coloured slips can be purchased ready-mixed from suppliers. These offer the simplest, most versatile and cheapest method of colour application. They are even cheaper if mixed at school.

Remember slip is liquid clay and needs to bond with the clay surface so that it will not peel off or fracture when glazed. Wet clay cannot be added to dry clay.

SLIP APPLICATION

The best time to apply slip is when the clay is firm (leather-hard) but not dry. If too wet and fresh, the surface will not absorb enough slip. For a fully opaque layer and the strongest colour, 2–3 coats are required. Each coat needs to be touch-dry before the next is applied. Slips can also be used thinly to build up a semi-translucent surface much like watercolour. Or an exciting range of slip techniques can be used, from sgraffito to stencils to sponging.

Slips are applied at greenware stage only!

VELVET UNDERGLAZES

These colours are more expensive than slips but offer a greater colour range. Colours like bright red, orange and violet are easily available in this form. Due to cost, they are best used sparingly to highlight certain areas rather than for extensive coverage.

These colours can be used at both greenware and bisque stages offering further design choices after slip application.

TRANSFERS, ENAMELS AND LUSTRES

These decorative products are applied onto the glazed surface. They require a third firing at 720°–900°C depending on the instructions given for each specific product or combination.

GLAZES AND GLAZE MATERIAL

Glazing means adding a coat of glass-like material to the bisque surface of the ceramic item to add or enhance colour and texture, to waterproof and render more durable.

Glazes are formulated from a wide range of natural materials held in suspension in water.

The chemistry and creativity of glaze experimentation can be the work of a lifetime. Knowledge advances with each new generation of ceramists.

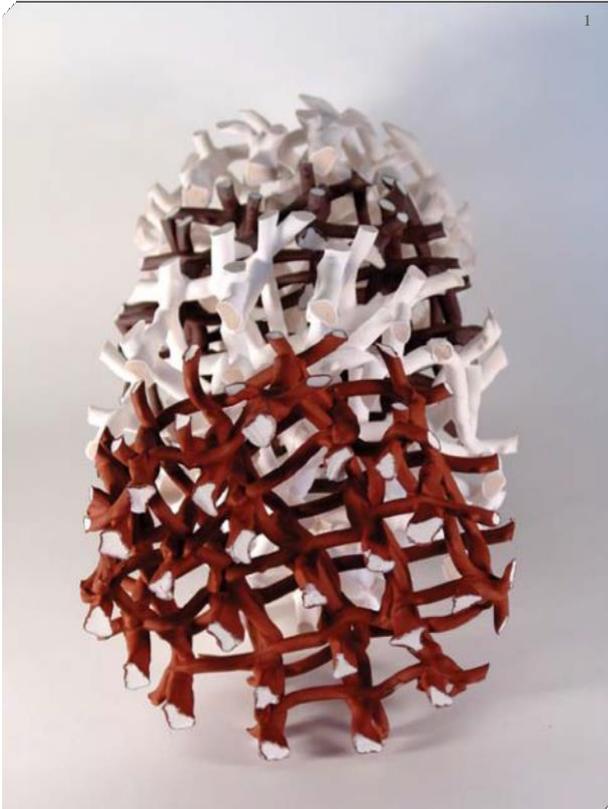
See shopping list for specification of glazes for high-fired earthenware (clay body and approach recommended for this project).

GLAZE MIXING

Matt and shiny transparent glazes can be purchased ready-mixed in either powder or liquid form.

The consistency of liquid glaze is very important. Recall or imagine how it feels to dip your hand into different liquids: water, milk, single or double cream. The glazes to be used in this project should be the consistency of single cream. If too thin, the glaze will feel more like water or milk and, when fired, will appear patchy. Too thick, it will feel like double cream or thick yoghurt and will appear white and opaque.

- 1 Hans Borgonjon: Microtubuli X 4, 2008. Earthenware & porcelain: extruded tubes, handbuilt with slip, 61x61 x190,5cm
- 2 Kate Malone, Siamese Twins, 1998. Double vase in the form of two gourds fused at the hip. 34x28x28cm, T-material clay, crystalline stoneware glazes, handbuilt, press moulding coiling. Photo: Kate Malone



For the purposes of this project Tags, Tabs and Traces, two simple glazes are recommended – matt and shiny transparent – to enhance colour approaches explored in the previous section.

Did you know that celebrity culture depends on clay? When you open Hello Magazine, or Heat, or Vogue, or the Sunday colour supplements, the pages are covered in a thin layer of clay. Its absorbent properties are required to soak up the colour ink for those glossy pictures and to reflect the images back to us from a smooth surface.

“Clay is a miraculous material, I have always marvelled at how this squidgy muddy material can be transformed into the most refined pieces of tableware that can range from the pure and elegant to the ornamental and florid.”

Professor Rob kessler
Artist and educator

kilns and firing

A kiln is simply a container allowing control of intense heat over a long period. A kiln can be as big as a building or small enough to fit on a tabletop. Some artists create kilns as sculptural objects in their own right.

Types of kiln and methods of fuelling have varied throughout history and cultures.

Today, for safety and convenience, school and studio kilns are most usually fuelled by electricity, automatically governed by a digital controller.

Clay is usually fired twice. A third firing is used for adding such decorative elements as transfers, enamels or lustres.

Temperature is chosen according to the clay body and glaze used. For this project, bisque firing at 1000°C and a glaze firing at 1120°C is recommended.

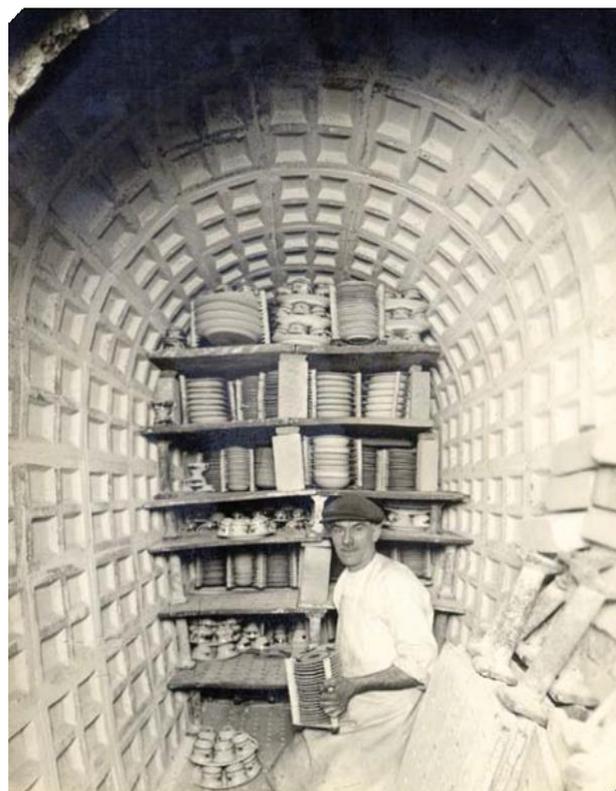
Loading a kiln circa 1955. This 'placer' is loading cranks full of ware into a gas fired kiln. This is the final stage of firing after all transfers and glazes have been added. The ware is placed into cranks that 'space' the ware so that the heat is dispersed properly. Filling a kiln to maximum capacity was a job that demanded experience. Photo: courtesy of Stoke-on-Trent Museums Service

KILN PACKING

Kiln furniture as in shelves and props are needed.

Before loading anything, place a shelf in the very bottom of the kiln. The aim is to pack the kiln with greatest economy of space. Assess the work to be packed. The task is like a three-dimensional jigsaw. Best use must be made of props and shelves to allow for the tallest work as well as the smallest.

Remember, always place the shelf-props one above the other as you stack the kiln shelves.



Susannah Biondo, Earth Vessel (detail), 2003. Heatresistant castable-ceramic material is held over a steel skeleton and fired on-site as a performance. 183x137x137cm



KILN FIRING

Bisque firing is usually at 1000°C. This makes the work stable and permanent, but still porous, allowing the glaze to be absorbed onto the surface.

As students' work will vary in thickness, an approximate 10-hour firing schedule is recommended.

All firing schedules can be programmed into the controller. It is also useful to make a chart for display near to the kiln. All controllers vary in the way they are programmed. Glaze firing for Tags, Tabs and Traces is 1120°C.

KILN VENTING

Kilns have openings of different sizes to allow for evaporation of chemicals. This has usually occurred by the time the kiln temperature reaches 600°C. These holes can then be closed with appropriate bungs to allow more efficient fuel use.

FIRING SCHEDULES

Up to 10 programmes can usually be stored in a digital controller. These can be timed to start at the most convenient time – allowing for closure of kiln vents, for example. Firing schedules can also be timed to take greatest advantage of off-peak fuel tariffs.

The average cost of a firing at the time of publication is approximately £2 to £5, depending on the size of the kiln.

Greenware objects can be stacked together in small numbers for bisque firing. Tiles can be fired on their sides, stacked together.

Be careful when placing fragile work, as it is easy to knock bits off. Clay Mender product works well for sticking bits back should this happen!

Keep an eye on the kiln until it reaches 600°C, and remember to put bungs in. If your kiln has very small holes this procedure may not be required. Check with your Firing Up adviser.

Any surface of the ceramic objects coming into contact with the kiln shelf – like bases – must be well wiped and free of glaze before being placed in the kiln. Unlike bisque, glazed work must NOT touch anything else. Allow 1cm around each piece.

Kilns should ideally be located in a separate room, or the room in which it is located should be well ventilated with windows left open. Kilns can be fired safely overnight if necessary.

Did you know that clay has healing properties? A common cure for diarrhoea is kaolin and morphine. It is also used as a binding agent for tablets, making them easier to swallow.

kiln firing schedules and temperatures

PROGRAMME 1: FIRST FIRING – BISQUE 1000°C

Ramp or temperature increase by hour	set point or soak	Comments
80°C A cautious rise to avoid any risk of breakages. A faster increase may be used once familiar with the kiln	600°C	Any time after 600°C, the bungs can be applied
250°C	1000°C	Speed of temperature rise depends on kiln and controller
	Soak at 1000°C for 45 mins–1 hour	Soak means holding temperature at 1000°C to allow carbon deposits to burn out of the clay

PROGRAMME 2: SECOND FIRING – GLAZE 1120°C

Ramp or temperature increase by hour	set point or soak	Comments
120°C (for very thick items, reduce this rate to 100°C)	500°C	The temperature of a glaze firing can increase more rapidly than for bisque. This is because any water content in the clay will have been slowly driven off as steam in the first firing
250°C	1120°C	Note: <u>Tags, Tabs and Traces</u> uses earthenware fired at high temperature to give a durable clay body with the potential for bright colour
	No soak	

WEEKLY TIMETABLE FOR PACKING AND FIRING

three firings a week are possible in a busy department

MONDAY	Pack kiln and bisque fire overnight
TUESDAY	Kiln cooling
WEDNESDAY	Once temperature is below 150°C on the controller, the kiln door can be opened, although the work will still be very hot. Kiln gloves should be used. The work will cool more quickly and can be unpacked after two hours. Pack kiln with glazed work for firing at 1120°C or greenware for a further bisque firing overnight at 1000°C
THURSDAY	Kiln cooling
FRIDAY	As Wednesday, open kiln and repeat

Health and safety

A sensible approach to use of clay is necessary as it involves some potential hazards, the main ones being:

DUST

Dust is almost unavoidable. Daily exposure over a long period causes lung damage. In a school this level of exposure is unlikely. Care should be taken to:

- Always clean surfaces and aprons with a wetsponge.
 - Give students a damp sponge with which to wipe their hands as they work.
 - Avoid sweeping clay. Only use a dustpan and brush to clear up small amounts of dry clay.
 - Never sweep a whole room as it stirs up too much silica dust.
 - Use an old-fashioned mop-head mop and bucket to clean floor, rinsing the mop and changing water regularly. If necessary, scoop up obvious clay bits with a dustpan.
 - Avoid using clay on carpeted surfaces. If this is the only option, vacuum clean after each session.
 - Always wash tools after every session.
 - Wash canvas cloths as often as time allows.
 - Brush clothes outside the building if possible.
 - Have a good mat outside the clay room.
- Everyone on the staff will thank you!

KILNS

- Kilns should be in a separate room to allow for ventilation.
- If the kiln is in the art room, a barrier must protect students and staff from close contact.
- When firing, ensure ventilation by leaving windows open overnight (security locks allowing) or turn on extractor fan.
- The outer casing of the kiln remains hot for at least a day after firing whilst it cools.

GLAZES

- Wear a dust mask when mixing powdered glaze.
- Wash hands well after use.
- Mop spillages as soon as possible.
- Avoid putting fingers into mouths. Ingesting glaze won't kill but will result in an upset stomach. Should this happen, seek medical advice.
- Wear surgical gloves to protect any damaged skin or allergies.



Close up of the work of Pekka Paikkari (Finland) as part of Neil Brownsword's [Marli Project](#), British Ceramic Biennial. Photo: Johnny Magee, 2009

Cross-curricular example

An extensive cross-curricular project was devised by Clayground Collective and Oak Lodge School for the Deaf. It began with the enquiry: What on earth is clay? For this project Clayground Collective comprised Duncan Hooson (lead artist), Julia Rowntree (co-ordinator), Fabio Santos (performance), Brenda Edwards (dance) and Louise Wilson (artist). Students prospected for clay by digging in the school playground. It introduced clay to subjects across the curriculum from Art, Drama and Dance to Science, English, Maths, R.E. to Emotional Literacy, Media Studies to Design and Technology, Storytelling to community participation and celebration. Final artworks created with the students were installed in the school garden and featured clays dug in different parts of the world. More details and a film of the project can be found at: www.claygroundcollective.org/video.html.



1 Oak Lodge students learn about the ceramic process through dance. Photo: ClaygroundCollective

2 Oak Lodge students making clay wall and stop-frame film. Photo: Clayground Collective

3 Secrets enshrined in scrolls Design idea originating in RE study of Egyptian tombs. Photo: ClaygroundCollective

4 Large-scale mark-making inspired by Aboriginal painting. Photo: Clayground Collective

suggestions for cross-curricular and independent study

Look at public art made using ceramics. Compare two public art works to discuss how the relationship to the community, regeneration, location and content has been approached in each. Evaluate the successes of the works.

Find out about the mass production of ceramics in Britain, naming the major manufacturers, common production methods for the mass market, different target audiences for products and marketing methods.

Look at the different ceramics firing techniques and how the clay reacts in different ways. Look at the chemical processes involved in salt glazing, oxidising and carbonising.

Improve and apply numeracy skills within a creative project. For example: measuring the kiln and working out the maximum dimensions of clay objects for firing, and measuring the site of the artwork's installation.

Find similar Cycladic, Greek, Roman, Egyptian, Kenyan and contemporary British ceramics, and compare these objects through drawing. You may want to visit some galleries and museums to draw on particular exhibitions.

Explore ceramics in another language and/or culture—either in relation to the curriculum for Modern Foreign Languages, or for pupils with English as an Additional Language (EAL). Pupils could research examples of working with clay in the target language or culture, e.g. craft objects from European, African, Asian or American countries etc. Where possible, they could use the target language creatively and imaginatively to interpret and contextualise craft objects and practices.

Visit the Crafts Council website www.photostore.org.uk/HOME.aspx to search for contemporary ceramic makers. Find out what processes they use and the concepts behind their work.

Find out about the role ceramics could play in contemporary British society as a recyclable material and as an alternative to disposable plastic cups. Look at how refreshments are served on Indian trains in disposable ceramics cups.

USING HANDLING OBJECTS

Learning through engagement with handling collections is an exciting experience by the nature of the multi-sensory opportunities it offers and its embrace of a range of learning styles. As part of the Firing Up creative project, schools can access a loan from the Crafts Council's Handling Collection, comprising original objects made between the early 1970s and the present day. By exploring ceramic objects up close and three-dimensionally, pupils can investigate the material and formal qualities and explore how they were made.

The intimacy of touch is also invaluable for supporting pupils' own creative responses. It is therefore useful to return to the objects more than once, and think about how they can be reflected on at different stages of the creative process. Questions will usually focus on what they see, feel or think in relation to what's in front of them—laying a foundation for thinking about ideas of personal and collective narratives or other more abstract concepts relating to [Tags, Tabs and Traces](#).

An extension activity could prompt pupils to bring in their own objects (either ceramic or other materials as appropriate to the project) to compare aspects such as the form and surface, the purpose, and/or symbolic or cultural meaning of a range of different objects.

THE ROLE OF EXHIBITION AND DISPLAY

The power of exhibiting pupil work is well-known to teachers, enabling a celebration of the creativity and achievement of individuals and whole groups. At the same time, it is an excellent way to engage critically with the work and invite responses from audiences, such as peers, parents, and those outside the immediate school community. The Firing Up programme aims to integrate standard school Assessment for Learning methods with the new opportunities afforded by the Higher Education (HE) partnership. For example, pupils could participate in a Group Critique with current Undergraduate students—helping them to think about the potential developments or extensions of their ideas, as well as how contemporary practitioners think about and discuss their work with others.

Giving students the opportunity to exhibit their work was one of the key recommendations of the Ofsted report on Art, Craft and Design, *Drawing Together*, April 2009.

"Local authorities and headteachers should promote further opportunities for schools to exhibit their work publicly and for talented pupils to meet and work together, and increase pupils' first-hand experience by developing sustained partnerships between schools, creative industries, galleries and artists in the locality." Ian Middleton, HMI, Specialist Subject Adviser for Art and Design

Did you know that there are potter wasps to be found in the Mediterranean area? The female repeatedly carries little perfectly round balls of clay in her mouth to the site of her future home, and carefully coils a vase-shaped nest. It takes about half a day and the walls are perfectly even.

[Ceramic Review](#)
issue 227 Sept/Oct 2007

National curriculum links

Although ceramics most naturally fits into the teaching of Art, Craft and Design, its wider relevance and application in industry and science, and its physical and cultural variation across the globe makes it an excellent cross-curricular vehicle for learning.

In particular, [Tags, Tabs and Traces](#) has meaningful links in subjects such as Citizenship, Personal Social and Health Education (PSHE), Geography, English and Science and Information and Communication Technology (ICT). Depending on a variety of factors that will vary in each school it lends itself to integration beyond the parameters of the art department both in terms of staff involvement and visibility on, or use of, the school site.

These are a few of the National Curriculum (2007) subject links to support such cross-curricular planning – this in no way an exhaustive list.

SUGGESTIONS FOR CROSS-CURRICULAR AND INDEPENDANT STUDY

English
Key Stage 3/4

1.2 – Using language creatively and imaginatively with descriptions of craft objects; making fresh connections between experiences, ideas and objects.

1.4 – Showing a critical understanding of craft objects by exploring and comparing the work of others. These ideas could be applied effectively for 'real' purposes, e.g. writing a review of a craft object or exhibition.

2.1 – Making relevant contributions in groups, by responding appropriately to others, proposing ideas and asking questions. Pupils could communicate effectively with others using dramatic approaches to convey 'stories' about their work and that of other craftspeople.

4.2 – Developing their independence in learning, by researching and reading about contemporary ceramics and exploring issues creatively in their own work (e.g. sketchbooks)

DEVELOPING CULTURAL AWARENESS

Citizenship
Key Stage 3/4

1.3 – Appreciating that identities are complex, can change over time and are informed by different understandings of what it means to live together in the UK, e.g. though pupils interviewing friends, families, members of community as part of the 'local narratives' research. Explore how the project could respond to the make-up of local communities and promote community cohesion and 'togetherness',

especially if a site-specific installation is possible. The diversity of craft, and specifically ceramic practices, could be a useful way of looking at the value of difference, and its relationship to makers' backgrounds and cultural heritage.

2.1 – Research, plan and undertake enquiries into issues in relation to [Tags, Tabs and Traces](#) – useful examples include local and national heritage, migration, youth culture, as well as ecological issues/ sustainable resources in advocating clay. Explore the idea of sustainable development and recognise its implications for people, places and environments and for their own lives e.g. disposable drinking cups and reusable ceramic cups in schools, offices and cafes. Analyse and evaluate the notes and stories gathered and consider how the multiple viewpoints, narratives and traditions can be incorporated into the clay installation.

2.3 – Explore creative approaches to bringing together, or 'mapping', members of the local community through a collaborative clay project. Work individually and with others in the planning and negotiating of a collaborative project; including digging locally and discussing the importance of sustainable resources.

Art, Craft and Design/ Citizenship: Look at public art made using ceramics. Compare two public art works to discuss how the relationship to the community, regeneration, location and content has been approached. Evaluate the successes of the works.

Geography
Key Stage 3/4

1.1 – Understanding the physical and human characteristics of real places, through the [Tags, Tabs and Traces](#) project, in which they can develop 'geographical imaginations' of the places examined on their maps.

1.3 – Appreciating different scales in geography – from personal and local to national, international and global. This can also be looked at in terms of the scales of craft from the domestic to the architectural etc.

2.1 – Collecting, recording and displaying information about the sites considered in the project, pupils can find creative ways of using and applying geographical skills and understanding to create new interpretations of place and space. They could discuss how we 'make' and 'remake' space, and how this makes geography a cultural practice, or 'craft' in itself.

2.3 – Constructing maps and plans at a variety of scales, pupils learn to use graphical techniques to present factual and imaginary qualities of places.

PSHE: economic wellbeing and financial capability
Key Stage 3/4

1.1 – Understanding the range of career possibilities in ceramics and craft. Understanding the qualities, aptitudes and skills needed for employability, and exploring how the wider application of the specialist and transferable skills of a contemporary craftsperson.

3 – Explore different types of work (incl. the self-employed norm of craftspeople) 'Combining employment satisfaction and vocational stability with artistic enquiry and business risk, makers provide an illustrative model of the new creative entrepreneurs of the 21st century.' Making It in the 21st Century, Crafts Council 2004

4 – Explore the changing distribution of economic activity and its impact, including; types and classifications of economic activity e.g. independent makers, producing, marketing and selling craft objects. Look at how and why distribution has changed and is changing e.g. galleries representing artists and makers, charging commission on sales, the impact of new technologies, and the effects of such changes resource issues e.g. clay as a natural and sustainable material

UNDERSTANDING MATERIALS

science
Key Stage 3/ 4

1.2 – Looking at the creative application of science within the range of domestic, industrial and environmental contexts e.g. uses of clay in kitchens and bathrooms (ceramic toilets, wash basins), bricks, crockery.

1.3 – Look at the cultural roots and variations in science practice in relation to materials, and their applications.

3.2 – Understanding that virtually all materials are made through chemical reactions, to recognise the importance of chemical change in everyday situations, e.g. effect of firing process on clay and glazes. Reference the chemical reactions of clay, and its composition from metal ores and rocks (e.g. the effects of firing and glazes on clay; where mass is conserved because the same atoms are present, although combined in different ways.) KS4 Pupils can also look at how the rates of reactions can be altered by varying temperature or concentration, or by changing the surface area of a solid reactant, or by adding a catalyst, e.g. effect of firing process on clay and glazes.

3.4 – Understand how igneous rocks are formed by the cooling of magma; sedimentary rocks by processes

including the deposition of rock fragments or organic material, or as a result of evaporation; and metamorphic rocks by the action of heat and pressure on existing rocks. Clay sedimentary rock is created when the forces of wind, ice, water and pressure from other rocks compress in the earth's crust and decompose igneous rocks.

Information and Communication technology (ICT)
Key Stage 3/4

1.2 – Collaborating with others to explore a variety of information sources and ICT tools in a variety of contexts e.g. visiting website listed in this pack for research into contemporary craft practice.

1.3 – Developing and exploring information, solving problems and deriving new information for particular purposes e.g. to reach conclusions by exploring information relating to the suggestions here.

2.1 – Finding information well matched to purpose by selecting appropriate sources, using and refining search methods and questioning the plausibility and value of the information found e.g. research into ceramics makers and making techniques.

2.3 – Interpreting information to reorganise and present it in a variety of forms that are fit for purpose e.g. presenting research undertaken into the work of a maker and discussing it with others.

english/ literacy

1.2 a, b, c, d
1.4 a, c
2.1 e, f, g, h
4.2 a

Citizenship

1.3 a, b, d
2.1 b, c
2.3 a, b

Geography

1.1 a, b
1.3 a, b
1.7 a
2.1 a, b, e
2.3 a, b

PsHe: economic wellbeing and financial capability

1.1 a, c
3 a
4 a, j

science

1.2 a
1.3 a
1.4 a
3.2 a, b
3.4 a, c

ICt

1.2 a
1.3 a
2.1 a, b
2.3 a, c

Reading list

BOOKS

A & C Black, Ceramics Series on different techniques and methods.

Cooper, Emmanuel, [Contemporary Ceramics](#), Thames & Hudson, London, 2009.

Hanoar, Ziggy, [Breaking the Mould: New Approaches to Ceramics](#), Blackdog Publishing, 2007.

Lefteri, Chris, [Ceramics: Materials for Inspirational Design](#), Rotovision, Switzerland, 2003.

Logan, William Bryant, [Dirt. The Ecstatic Skin Of The Earth](#), Riverhead Books, USA, 1995.

Mattison, Steven, [The Complete Potter: the complete reference to tools, materials and techniques for all potters and ceramicists](#), Apple Press, Hove, 2003.

Peterson, Susan, [The Complete Pottery Course](#), Ebury Press, London, 1992.

Quinn, Anthony, [The Ceramics Design Course](#), Thames & Hudson, 2007.

JOURNALS

Ceramic Review, [www.ceramicreview.com/](#)

Crafts Magazine, [www.craftscouncil.org.uk/crafts-magazine/](#)

WEBSITES

Aberystwyth International Ceramic Festival: [www.internationalceramicsfestival.org/](#)

British Ceramics Biennial: [www.britishceramicsbiennial.com](#)

Crafts Council: [www.craftscouncil.org.uk](#)

For ceramic and craft books: [www.acblack.com/visualarts/books/list.aspx?catid=227](#)

UK studio potters online: [www.studionpottery.co.uk](#)

For scientific applications [www.ceram.com/materials/ceramics/](#)

Important ceramic collections Aberystwyth University Ceramic collection: [www.ceramics-aberystwyth.com](#)

Ashmolean Museum: [www.potweb.ashmolean.org](#)

Cheltenham Art Gallery and Museum: [www.cheltenhamartgallery.org.uk](#)

Fitzwilliam Museum, Cambridge: [www.fitzmuseum.cam.ac.uk](#)

Gladstone Pottery Museum: [www.stokemuseums.org.uk](#)

Harris Museum and Art Gallery, Preston: [www.harrismuseum.org.uk](#)

Hove Museum and Art Gallery, Brighton: [www.brighton-hove-rpml.org.uk](#)

Middlesbrough Institute of Modern Art (MiMA): [www.visitmima.com](#)

Nottingham Castle: [www.nottinghamcity.gov.uk](#)

Rufford Craft Centre: [www.nottinghamshire.gov.uk](#)

Ruthin Craft Centre, Wales: [www.ruthincraftcentre.org.uk](#)

Stoke-on-Trent Potteries Museum: [www.stokemuseums.org.uk](#)

Victoria and Albert Ceramic Collection: [www.vam.ac.uk](#)

Walker Art Gallery, Liverpool: [www.liverpoolmuseums.org.uk/walker](#)

Wheal Martyn Museum: [www.wheal-martyn.com](#)

WEB REFERENCES FOR TAGS, TABS AND TRACES

For backstamps: [www.made-in-england.net/](#)

Film of Clayground Collective cross-curricular project: [www.claygroundcollective.org/video.html](#)

A contemporary ceramics image resource: Digital Ceramic library: [accessceramics.org/](#)

USEFUL SUPPLIERS

Potclays: [www.potclays.co.uk](#)

Technology Supplies: [www.technologysupplies.co.uk](#)

PotteryCrafts: [www.potterycrafts.co.uk](#)



Phoebe Cummings, *Between*, 2005. stoneware sprayed with porcelain 240x40x7cm. Woven ceramic installation

shopping list

Quantities based on class of 30

STUDIO

- Plastic storage boxes or bins with lids x 2
- Plaster batt x 1 minimum size 45cm square
- Buckets x 6
- Sponges of different sizes x 10
- 80-mesh sieve x 1
- Old-fashioned string mop and bucket
- Large plastic basins for glazing x 6
- Buckets with lids for glaze storage x 2
- Boards of varying sizes x 30, anything but solid wood as this may warp. Laminate flooring is great

TOOLS

- Cheese wires x 6
- Rolling pins x 6
- Rolling guides x 12
- Canvas or cloths x 30
- Metal kidneys x 6
- Rubber kidneys x 6
- Wooden paddles x 6
- Modelling tools x 30
- Loop or strip tools x 6
- Soft brushes essential x 30 different sizes

MATERIALS

- Clay body: sanded buff 12.5kg bags x 15, for this project
- Transparent earthenware glazes in powder form: 10kg matt, 10kg shiny
- Coloured slips, a minimum of 5 ready-mixed 1 litre: black, white, blue, yellow, green recommended
- Velvet underglazes (as budget allows)
- Set of 6 enamel colours
- Liquid wax resist for slip decorative technique x 1 bottle
- Clay Mender ceramic glue x 1 pot
- COSHH health and safety data sheets for individual products downloadable from supplier

FIRING

- Kiln furniture as advised by Firing Up adviser
- Kiln gloves

EXTRAS

- Plastic sheet/bags
- Newspaper
- Found objects
- Cardboard
- Kitchen forks and knives
- Drainpipe
- Poster tubes

“Clay is such an engaging material. Getting a kiln for the school has been one of our best purchases: it really added a new dimension to the students’ artistic practice. There are some students that really excel in three dimensional work and clay is such an expressive medium to work in.

A lump of clay is a very inviting thing and forming clay can be a very satisfying activity. Clay seems to have a wonderfully therapeutic nature: I always sense better behaviour when students are working in clay, as long as there are clear boundaries and expectations.

Teachers should have a fair understanding of the qualities of clay and its structural properties. This knowledge of clay is only possible through experimentation and play. There are loads of books out there to help. If you are new to clay, a night course in ceramics may be the kick-start to a wonderful learning curve.

There are many opportunities for cross-curriculum learning. Science and maths concepts assist students’ understanding of the structural possibilities and working practices.

To be honest, ceramics in the curriculum is labour intensive. Storing work, stacking kilns, testing glazes, keeping the room clean: these tasks take time. But the rewards are well worth the effort.”

Darryl Bedford
Art teacher, Oak Lodge School for the Deaf