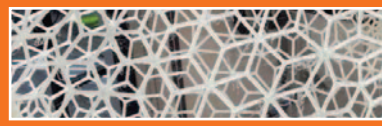
CLEAPSS Design and Technology

Futureminds

Tomorrow's world explored today



Summer 2022

CLEAPSS D&T e-newsletter

We have moved!

As you may have been aware, CLEAPSS has moved from the Brunel Science Park to our new offices in Chesham.

We now have a flexible working makerspace, giving us the opportunity to further develop our cross curricular problem solving. When we get approached by a school, or one of the science team comes up with a problem, we can work together to develop a solution that can be released for schools to make. Although we have been doing this for some years, we now have a combination of science lab, makerspace and classroom to facilitate this.
A STEM/STEAM centre!

We are also planning to offer training and other events at the new facilities, which will include, practical support for working in a flexible space, and the use of portable equipment.

New online training

In January we launched our online, facilities audit training, which over 200 people have now completed. The online health and safety course continues to be used by teachers and technicians, and by whole departments, as part of their refresher training.

If you are considering carrying out an audit of D&T, food or art facilities, the audit training is available here: https://dt.cleapss.org.uk/Resource/D-T-auditing-course.aspx

The H&S online training is here: https://dt.cleapss.org.uk/Resource/D-T-H-S-Online-Training.aspx

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CLEAPSS D&T e-newsletter

Model Risk Assessments (MRATs)

We have had a number of requests for a complete set of MRATs

In order to manage regular updating we no longer produce a complete set as a single document. The set is also no longer separated into distinct parts for the different subject areas, as there is now so much crossover in the way schools teach the relevant subjects.

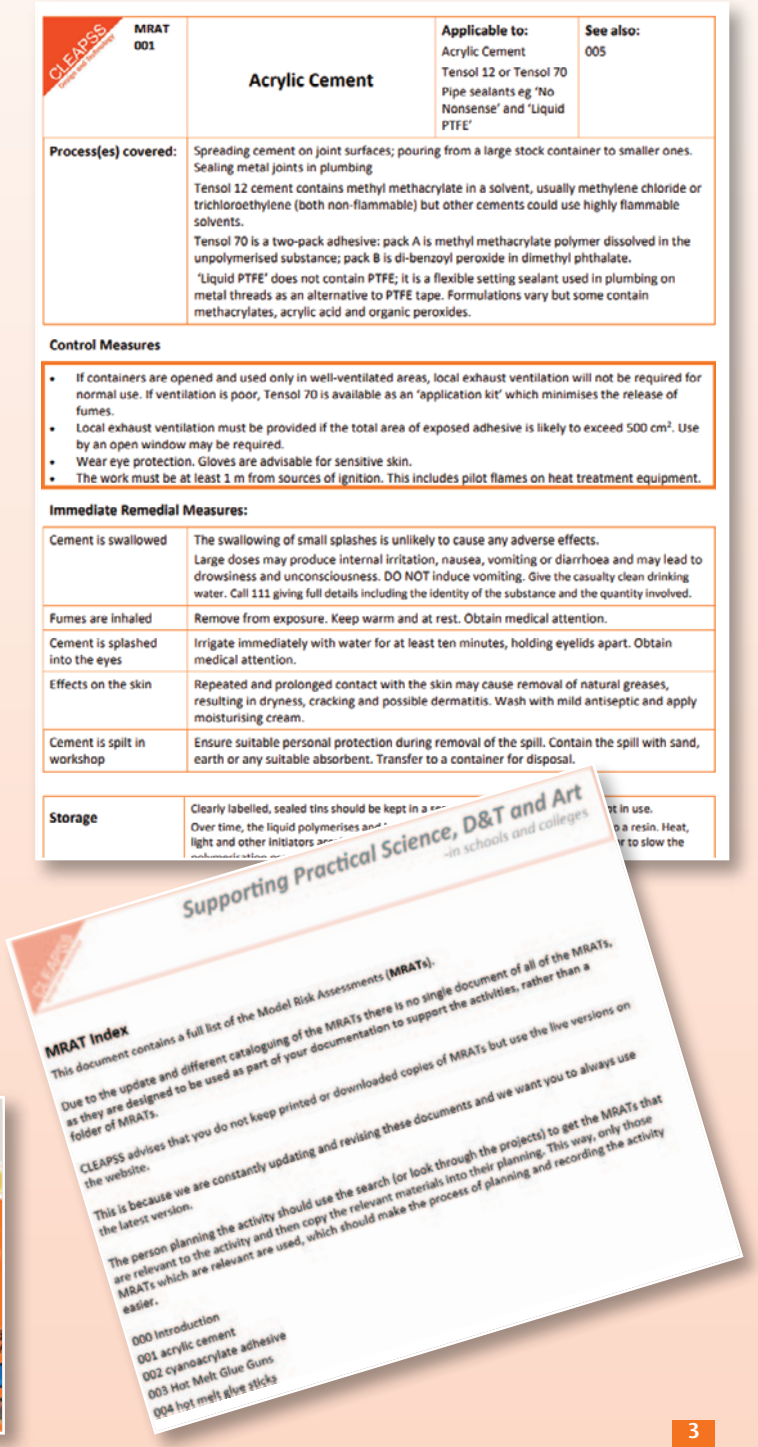
MRATs are designed to be used as part of departmental planning documentation to support activities, rather than a discrete folder of documents. CLEAPSS advises that you do not keep printed or downloaded copies of MRATs. This is because we frequently update and revise elements of them, and we want you to always use the latest version. To see what has been recently updated use the 'what's new' tab on the dropdown menus of the website. A catalogue of the 205 MRATs, indicating where updates have been made, is available on the website:
https://dt.cleapss.org.uk/Resource/MRAT-index.aspx

The person planning an activity should search the website for MRATs that are relevant, and copy those relevant materials into their planning. This way, only those MRATs which are appropriate are used, which should make planning and recording an activity easier.

We recommend that staff look at the projects section of the website to identify projects that approximately match the planned work, and then look at the associated documents listed beneath the picture on the project page. Alternatively, use the search function on the website, which will return any MRAT that is relevant to the search query.

The MRATs are in PDF format, and although difficult to edit, you can copy from them, and put the appropriate text into other formats, such as Word or Excel. The CLEAPSS guides in the links below explain the use of MRATs and the electronic version (E171) is a spreadsheet, that you can use, or adapt for your own local requirements:

GL171 - Using Model Risk Assessments in D&T
E171 - Using Model Risk Assessments in D&T


MRAT 001

Acrylic Cement

Applicable to: Acrylic Cement; Tensol 12 or Tensol 70; Pipe sealants eg 'No Nonsense' and 'Liquid PTFE'

See also: 005

Process(es) covered: Spreading cement on joint surfaces; pouring from a large stock container to smaller ones. Sealing metal joints in plumbing

Tensol 12 cement contains methyl methacrylate in a solvent, usually methylene chloride or trichloroethylene (both non-flammable) but other cements could use highly flammable solvents.

Tensol 70 is a two-pack adhesive: pack A is methyl methacrylate polymer dissolved in the unpolymerised substance; pack B is di-benzoyl peroxide in dimethyl phthalate.

'Liquid PTFE' does not contain PTFE; it is a flexible setting sealant used in plumbing on metal threads as an alternative to PTFE tape. Formulations vary but some contain methacrylates, acrylic acid and organic peroxides.

Control Measures

- If containers are opened and used only in well-ventilated areas, local exhaust ventilation will not be required for normal use. If ventilation is poor, Tensol 70 is available as an 'application kit' which minimises the release of fumes.
- Local exhaust ventilation must be provided if the total area of exposed adhesive is likely to exceed 500 cm^2. Use by an open window may be required.
- Wear eye protection. Gloves are advisable for sensitive skin.
- The work must be at least 1 m from sources of ignition. This includes pilot flames on heat treatment equipment.

Immediate Remedial Measures:

Cement is swallowed	The swallowing of small splashes is unlikely to cause any adverse effects. Large doses may produce internal irritation, nausea, vomiting or diarrhoea and may lead to drowsiness and unconsciousness. DO NOT induce vomiting. Give the casualty clean drinking water. Call 111 giving full details including the identity of the substance and the quantity involved.
Fumes are inhaled	Remove from exposure. Keep warm and at rest. Obtain medical attention.
Cement is splashed into the eyes	Irrigate immediately with water for at least ten minutes, holding eyelids apart. Obtain medical attention.
Effects on the skin	Repeated and prolonged contact with the skin may cause removal of natural greases, resulting in dryness, cracking and possible dermatitis. Wash with mild antiseptic and apply moisturising cream.
Cement is spilt in workshop	Ensure suitable personal protection during removal of the spill. Contain the spill with sand, earth or any suitable absorbent. Transfer to a container for disposal.
Storage	Clearly labelled, sealed tins should be kept in a ... in use. Over time, the liquid polymerises and ... a resin. Heat, light and other initiators are ... to slow the

Supporting Practical Science, D&T and Art in schools and colleges

MRAT Index

This document contains a full list of the Model Risk Assessments (MRATs).

Due to the update and different cataloguing of the MRATs there is no single document of all of the MRATs, as they are designed to be used as part of your documentation to support the activities, rather than a folder of MRATs.

CLEAPSS advises that you do not keep printed or downloaded copies of MRATs but use the live versions on the website.

This is because we are constantly updating and revising these documents and we want you to always use the latest version.

The person planning the activity should use the search (or look through the projects) to get the MRATs that are relevant to the activity and then copy the relevant materials into their planning. This way, only those MRATs which are relevant are used, which should make the process of planning and recording the activity easier.

000 Introduction
001 acrylic cement
002 cyanoacrylate adhesive
003 Hot Melt Glue Guns
004 hot melt glue sticks

What does D&T look like?

by Paul Woodward

It may seem a strange question, but it is one that I have been pondering lately. What does D&T look like nowadays? I am sure we will all have very different experiences of D&T as a student or teacher and, very much depending in your age, and advances in technology aside, should we expect it to be so different from the subject it was 20 or 30 years ago?

The question was also prompted, to some extent, by observing other departments in my school as well as other centres I have worked in. I have also been fortunate to teach subjects outside D&T and get a new perspective from 'looking in', so to speak.

While looking around subject departments in a range of schools, there are often clear similarities in what is being taught. Be it maths or science, history or geography, you will frequently see similar displays of material, posters etc. Teachers will, of course find, various and creative ways of teaching the material, but it's easy, even to a non-specialist, to see what is being taught.

Design and technology on the other hand, seems to take a wide variety of approaches to teaching the subject. Such variety and creativity might be applauded, but should there be a more consistent approach to delivering the subject material in a way that benefits the school and its students?

Design and Technology is a subject with an identity crisis which I have never understood.

We used to have a general approach to craft, design and technology that involved the use of most materials. Then the subject was reformed as design and technology that covered all material groups, and which offered examination level specialisms in graphic products, food, textiles etc. Jump forward to 2019 and design and technology became a single subject title that addressed all aspects of the subject, with food no longer being part of the material covered. The difference being that students now had to learn about aspects of the subject, even if they could focus on one, for some elements of the examination.

Since 2000 when D&T stopped being a compulsory subject, it has faced numerous challenges and has seen a steady decline in numbers, but I believe that this most recent change in subject content has caused the most problems with the subject's identity. Not because it has taken a step backwards in any way, quite the opposite, but because there are so many schools hesitant to take the step forward.

As a result, we have schools still making traditional crafted 'products' with a focus on hand making skills, while other schools are designing complex systems and incorporating robotics. Some focus more on design and critical thinking, while others value engineering skills. All are valuable, but does this approach offer D&T the coherent identity it really needs? What other subjects are there in the curriculum where you can choose what aspects of the syllabus to focus on and which to discard?

Continued on next page...

What does D&T look like?

by Paul Woodward

Approach or resources?

This range of different approaches begs the question, is this disparity a result of strategic decisions being made about what is taught in D&T, or are schools simply doing the best they can with the staff and resources they have? Undoubtedly, the latter is likely to influence the former and we are all too aware of the dearth of experienced D&T teachers out there now. In my 30 years as a design teacher, I worked for 20 years as a visiting moderator, so I have been fortunate enough to visit many different centres, but I have to say that I have seen this same wide range of approaches to the subject in all the time I have been teaching.

It does not require all the latest resources to teach strong design principles and to instil them into young learners. It does not require the latest tech to visualize an idea if students are taught to communicate and ideate through drawn methods. You do not need expensive materials to realise an innovative concept in model or prototype form. Maybe it is because I worked in situations where there were few resources and I had to be creative with very little, but I have always believed that austerity encourages innovation, creativity and risk taking; three words often associated with design and technology, especially in its current form.

Essentially it is the design process that has always been the foundation of the subject and it has evolved over the decades as we, as consumers, have also become more 'design aware'. I believe that the subject has moved in the right direction with regards to its focus on iterative design and prototyping, as these reflect many of the design skills necessary for modern manufacturing.

The problem is; the amount of theory that needs to be covered to achieve success in the examination and the lack of alternative courses at GCSE level that address the crafting and making skills some students will want to focus on.

When you consider the options available for practically minded students who may struggle with the theoretical content, it's not difficult to see why there is a growing trend to deliver the 3D route through art and design.

The irony of this is that D&T is based on creativity and innovation, and no two approaches are ever the same, and nor should they be. What I am suggesting is that there should be elements of the subject that need to be covered consistently across the country, not interpreted by individuals. Design and technology needs to be a unique subject with a clear sense of purpose. It's identity, at the moment, may be as ambiguous as it has ever been thanks to computing, 3D art, design engineering and other subjects addressing the various aspects of what only D&T could offer in the past.

Design and technology is a valuable subject that can deliver skills necessary for the future workforce. Without design skills being learnt, we will have no designers or engineers to develop solutions to sustain life on earth as we know it. If the subject cannot demonstrate how it can support the aspirations of students who wish to pursue this type of career, they will choose other subjects and inevitably, the subject will continue to decline until it is no longer viable for schools to offer it.

We have a responsibility to ensure this does not happen, but we need to work together to make Design and technology the subject that can offer the skills necessary to move into a range of creative and technical disciplines but, perhaps more importantly, the subject that delivers the creative design and problem-solving skills that have always been what makes it truly unique.

The 'no solder' lamp, let there be light

John Donnelly, head of design and technology at St James's C of E High in Bolton and director of DTResources ltd.
john@dtresources.co.uk

'The Lamp' remains a popular choice for design and technology projects. In our school we think it is a safe way to let students design something of their own, whilst the teacher has some control over the success of the project.

All that is needed is a reliable light source, some design work, and a selection of materials from which to construct the light. We use a variety of materials including card and some recycled components.

Working models

Students at my school are, from Y7 onwards, encouraged to model their products. I often find that working models lead to better final outcomes. This is because the student must incorporate real components into their solution, including the wire, LED card, and, sometimes, a switch. This takes the model from being a shape/form to a working prototype which the students see as having greater value. My students now have the option of using the fantastic LED card powered via a USB cable connection, which is a no solder cable.

Getting started

Students decide on the end user of the lamp. They then find out what sort of lamp they should design to meet the needs of the client. Some lamps are for reading and could be placed on a bedside table, some for working at a desk and others simply create a mood in a space.

Each lamp brings with it a different list of specification points, such as the height, the colour, the angle of the illumination, movement, and overall aesthetic appeal. From this, the students can sketch, involve the client, and even start on some simple concept models to communicate the form.

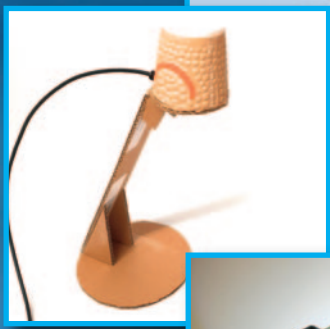
I have run this project as a modelling only unit of work, and have found it to be a great way of teaching students the benefits and art of making card models. When the model is complete the students can evaluate the outcome and compare it back to their specification points. At the end of the module, we can take these apart and re-use the components.

Design iteration

In the photos, you can see how the LED card connects to the USB cable without the need to solder. This no solder method of achieving a light source has become our new way of focussing on design iteration as the main learning outcome?

My students much prefer to make a model that works and provides light than one that simply communicates the form of the product. Many lamp iterations can be produced, photographed, evaluated, and modified in a single lesson. The no solder lamp has become the way to use an old project to teach different skills.

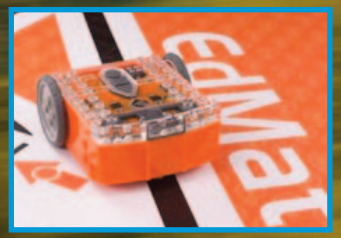
The USB cards shown here, along with sound activated LED cards and no solder USB cables are available from **www.dtresources.co.uk** within the LED section of the website.



SCALEXTRIC 4 SCHOOLS

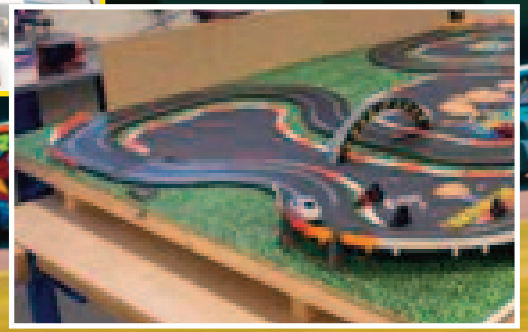
By Simon Hooker

COVID has hit design and technology in many ways, but rather than a disadvantage, we should see this as an opportunity to reshape our curricula.



Over the last few years at the Bishops' Blue Coat High School, Chester we have developed a 7-year curriculum journey through to A-level. 3D printing, laser cutters, and robotics are taught alongside traditional practical and designing skills, focussing on transferable and complementary skills rather than prioritising one over another.

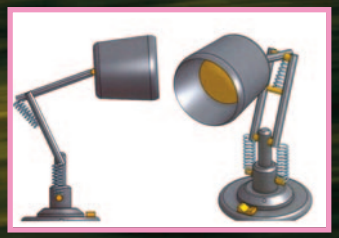
During this reflection time, it was our vison to ensure that the curriculum would meet the needs of our learners in a fun and engaging way Scalextric4schools was our catalyst for this change. Below are some examples of how other schools are using Scalextric to develop their own curriculum. They are just some of the many examples that are available on the relaunched Facebook group (see Futureminds edition 20). We have some exciting things planned for the group over the summer, with several webinars proposed including a specialist CAD Onshape Webinar from PTC and a collaborative SoW



A) Iveshead School, Leicestershire

Jim Mark, teacher of design and technology & STEM lead

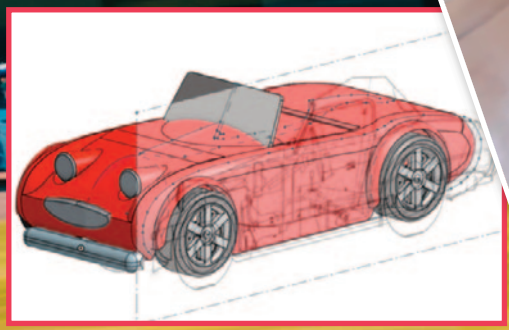
The club started because some of our students are car mad and enjoy the CAD project that is run in year 9. It covers a range of CAD skills, including advanced techniques. The outcome involves drawing an articulated angle-poise lamp in CAD.



As a starting point, we designed in-house a 3D-printable chassis that allowed for an adjustable wheelbase of 25mm. Designed on Onshape and exported to our 3D printer, the same chassis can be used for each student without the need to redesign.

We print using PLA for speed and ease. Students have the option to replicate an existing car or design their own. Many used the Tracing technique to develop a side profile of the car from an existing image.

Once complete, students export the design as a STL file, with the car bodies manufactured on our CNC Router. The foam blocks are then vacuum formed using HIPS sheet. Our small vacuum former was able to process two bodies at once without any ribbing.



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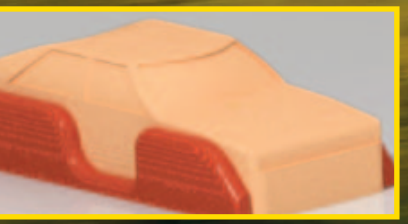
SCALEXTRIC 4 SCHOOLS

By Simon Hooker

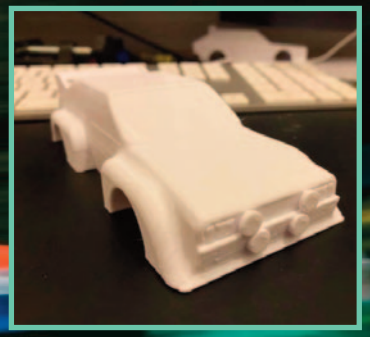
B) The Bishops' Blue Coat High School Chester

Scalextric makes up one of our KS3 schemes of work, with students using a range of techniques to develop their own car body designs which will be attached to an interchangeable chassis and motor assembly.

Students use our own YouTube tutorials to design the body in such a way that once it has been manufactured on our CNC machine, students are able to make side panels by hand which can attach to the car body to allow for customisation.



Students then develop their CAD designs to make a fully 3D printed car. Students spray the cars white and use 2D design to produce a decal for the body, printed on waterslide decal paper.



C) St Mary's Catholic School, Bishops Stortford

Alan Briggs, technician

We have developed a range of manufacturing techniques for the for the school club.
Taking a more traditional route with wooden bodies for the car, we used a router and a laser cut template to produce a pocket for the chassis. I wanted to introduce a bit of finishing, using sanding sealer, high build primer, and spray paint along with some vinyl cut, masked Shelby stripes.

We use a laser cut mould for some glue gun injection moulded tyres and we have developed Jigs to help with sanding the wooden-bodied cars.

Brothers Make

by Matt Browning

Over the past 4 years, my brother Jonny and I have been growing our YouTube channel 'Brothers Make' www.YouTube.com/brothersmake Initially, it started out as an excuse to hang out in my garage on weekends, but now it has become something that is earning us money. We make all sorts of things, from furniture and art pieces to a giant nerf gun ballista that can shoot inflatable dinosaurs. However, a large part of our focus recently has been around sustainability.

As a teacher myself, I have always enjoyed experimenting with new materials with my students. With ever-shrinking budgets, I am always on the hunt for ways to reduce our spending as well as keeping things environmental. This is where the recycling of HDPE came about. The first thing I ever tried making was a mallet head, from cut up milk bottles and bottle tops. The mallet turned out great and it is one of our most-used tools in our workshop still.

After much experimentation, we got more efficient at working with plastic and finding the most efficient ways to melt it into a usable material. So far, our favourite method is to use a panini press to heat milk bottle tops. This works perfectly since the press never goes above the burning point of HDPE (180 °C) and the direct heat contact works quickly and efficiently. Once enough plastic is melted, we then press it, either into a wooden mould, or into a flat sheet using a book press or some clamps. I run an Eco Club at my current school, where we have been using this technique successfully this year to make Christmas decorations and keyrings.

On our YouTube channel, we show how we have scaled this process up into our custom product range made entirely from 100% recycled plastic www.brothersmake.com/shop.
We also show how this process can be done on a budget, including some simple starter projects that can be done in schools https://youtu.be/FpsXvO5LsTY.
Since publishing this video, we have seen schools adopt this and create their own schemes of work from it. It has been amazing to see this, and it is encouraging to see more young people becoming interested in recycling.

As part of our long-term plans with Brothers Make, we would love to travel to different schools around the country to showcase the amazing things that this waste material can be turned into. Recycling alone will not solve the plastic pollution crisis. However, we believe that education is the key in changing our mindset of plastic and moving away from the throwaway culture that it has. Our trash can also be our treasure!

If this is something that you would be interested in, or if you would like to know more about what we do, please head on over to our website www.brothersmake.com and feel free to get in touch: hello@brothersmake.com.

The Design Education Research Programme

by Phil Holton, Senior Qualification Manager,
Pearson School Qualifications, UK

Following the recent publication by the Education Policy Institute titled "A Spotlight on Design and Technology Study in England," a group of subject experts here at Pearson are conducting wide-reaching research with the aim of adding value and insight beyond the paper's findings. We hope to move the conversation forward by taking a focus on resolving the pain points identified in the study.

Our first step has been to set up a Design Education Research Programme, and coupled it with the unique hashtag #teachdesign which we would like everyone associated with D&T education to use. By signing up to, and responding to forms and surveys on our website, reading and reacting to our research findings, and using our hashtag in your social media posts, we will be able to study and analyse what you tell us, and keep everyone in the conversation, which will empower us to turn these pain points into solutions.
#teachdesign

Why conduct research now when the national decline in design education is already so significant?

As an awarding organisation, it is our responsibility to develop qualifications with the needs of students and teachers at their very heart. Without taking this user-centred approach, our qualifications would not be successful, and would fail to meet the needs of those who study or deliver them. Our GCSE Design and Technology qualification was developed almost 8 years ago, at a time when the challenges being faced by teachers and centres were around the loss of specific material-focused course options, the introduction of both mathematics and science content, and the pressures of a national performance measure known as EBacc, in which D&T was not included. In response to these challenges, our approach was to maintain material specialisms. We responded to concerns over both the changes in content and the loss of those specialism courses by offering material-specific examination papers. We are the only awarding organisation to have taken this approach.

The National Education Landscape

As we look at the national picture of design education today, considering the impact of the COVID-19 pandemic, and including the recent EPI report which provided the numerical data behind the national decline in entries for GCSE Design and Technology, the needs of design education feel very different.

Pearson as an awarding organisation was able to adapt how qualifications were delivered by teachers throughout the pandemic, which saw issues including remote learning, a lack of access to technology for students, and closure of school sites and practical spaces.

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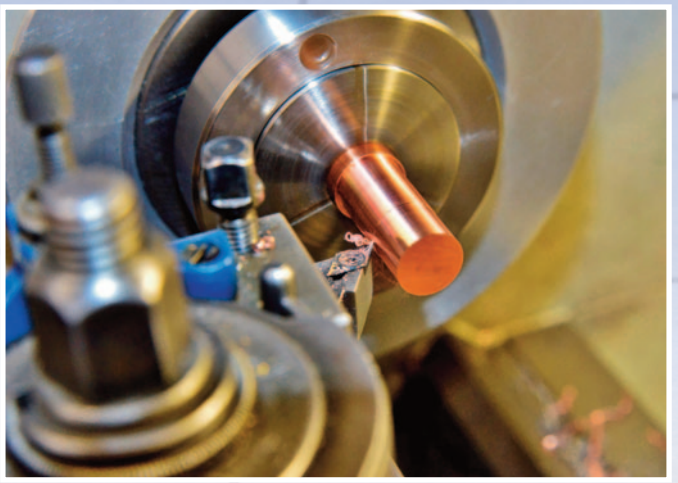
We worked collectively with other awarding organisations during the pandemic, agreeing to retain fair opportunity for all students no matter their centre, socio-economic status, awarding organisation, and prior experience of studying the course. By removing the requirement to make a high-quality final prototype, we were able to achieve a better level of parity between students and established a situation where the NEA could be assessed to decide their final grade. Making is a requirement in the Design and Technology conditions and requirements framework provided by the Department for Education (DfE). Removing high-quality making would mean that for the period of school closure, and impacted learning, students were permitted to sit an alternative course that differs to the national plan which the DfE expects. With the freedom to propose what could be done instead, awarding organisations chose to encourage and still expect a level of iterative modelling, or as Pearson coined it, the creation of a proof of concept. This term eventually encapsulated what all students of D&T could produce whilst completing their study of the subject in both the 2021 and the current 2022 series.



Advance information (or AI), a document providing students with a list of content that will appear in their summer examination paper, was developed later, as the pandemic continued to impact schools, but again was agreed through the collaboration of awarding organisations. Working closely with Ofqual throughout, the criteria under which AI was agreed resulted in support for students relating to the higher tariff questions in their paper, excluding both lower tariff and mathematical questions. The differences between assessment approach from one awarding organisation to the next meant that equal and equitable ground was best achieved through support for higher tariff questions, prioritising the needs of students and teachers as best as possible.

Whilst these two changes were made to react to the pandemic and the challenges schools were facing, they have in part become opportunities to reflect on design education and explore the importance of features of the course to schools, teachers, and students. How important is high quality manufacture to progression? How valuable are sections of the course content and should they continue to be assessed in the same way in an examination paper? Are GCSE D&T course requirements impacting the way in which schools are approaching D&T? Should the current GCSE D&T course modifications remain for future cohorts and has there been any significant benefit for schools and students? Is high quality making still important? These are all interesting questions.

With the predictions that the number of entries for GCSE D&T will continue to decrease, we would like to explore the following assumptions:

1. Students are choosing fewer GCSE options overall because of the challenges experienced in schools during the pandemic, which is resulting in lower D&T entries

2. Students are choosing alternative options to D&T, because of their experience of D&T at KS3 during the pandemic

3. The number of students sitting GCSE courses are l lower overall, impacting entries for D&T

4. The factors that were resulting in the national decline of D&T entries prior to the pandemic are unchanged

5. Fewer schools are offering D&T because of wider stakeholder issues (including but not limited to; ITT, the availability of specialist teachers by region; school level funding; school level curriculum rationalisation; a lack of progression pathways to higher and further education)

6. Has there been any tangible improvement in D&T in schools, related to the changes made for 2021 and 2022 in the assessment of NEA and examination papers

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The Design Education Research Programme

by Phil Holton, Senior Qualification Manager, Pearson School Qualifications, UK

Our research programme aims to look at pain points in the now, and contextualise them for future solutions.

What we are aiming to do with our research programme is to understand the specific pain points experienced by teachers, students, senior leadership staff, higher education institutions, and the wider education community, including those in initial teacher training and schools direct programmes.

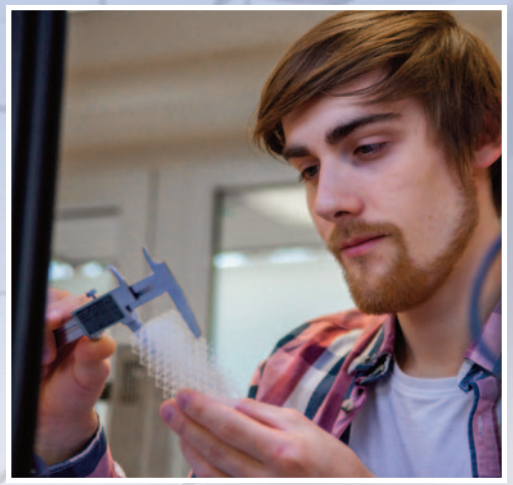
Whilst the EBacc measure will no doubt be an obvious cause that could be attributed to the national decline in entries, this appears not to be the case when teachers or school leaders are asked to consider the impact EBacc is having on school curriculums. Yes, schools would like to perform better against the EBacc measure, but challenges remain for those subjects that are part of this group, and the effective implementation of measures to increase the uptake of EBacc subjects by students is not as simple as one might assume.

The challenge we have as an awarding organisation, is in separating the pain points experienced because of the COVID-19 pandemic from those that would have been experienced irrespective of this global situation, and acknowledge that a group of factors will be impacting the national entry data and future long-term potential for D&T education in UK schools. It may also be the case that in a post-pandemic world, the challenges or opportunities for schools are now different.

Learning from design thinking to take an effective approach to understanding and researching design education, we have established our first question.

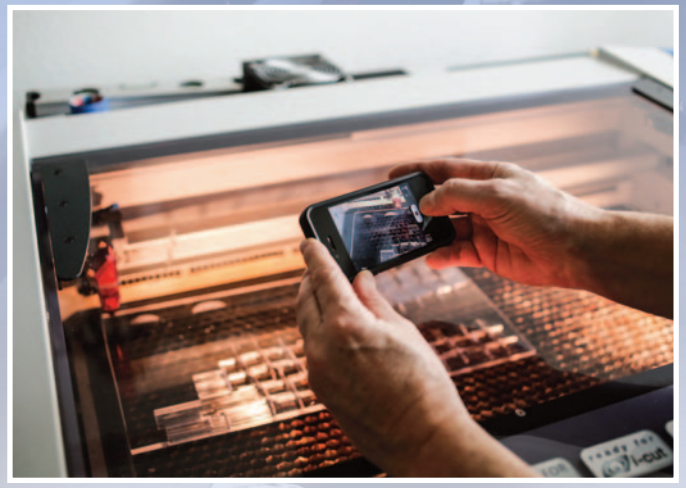
How might we (Pearson) create the opportunities for design education to thrive in UK schools?

To answer this question, we need to hear from stakeholders, not only those who have retained
D&T on their curriculum, but also those who have made the difficult decision to remove D&T education from their curriculum. We would also like to hear from those who have significantly adapted their offer (potentially in response to the pandemic or otherwise), away from a material-focused GCSE course, and aligned to a different vision for design education.



On 1 June, we release our GCSE contextual challenges for the 2023 examination series. We at Pearson have our own contextual challenge to respond to, and our theme is design education. Just as students will do up and down the country, we too will be conducting user-centred research, defining the pain points, developing solutions, and testing these with users, in an iterative way, until we find a solution that we believe addresses the identified problem. We would really welcome you to join this process and help us complete this research phase.

Design and Technology I Pearson qualifications



PrintCity

by Alan Dempsey, Project Manager, PrintCity

PrintCity is a 3D Print and digital manufacturing facility at Manchester Metropolitan University. Established 4 years ago, PrintCity has grown from one member of staff and five 3D Printers to over twenty members of staff and over sixty 3D printers, moving into a larger facility in June 2020.

PrintCity operates within four core areas: teaching, research, schools outreach, and working with businesses, as well as offering our students a 3D Printing service. Our extensive range of 3D Printing equipment includes six different technology categories, 3D Scanning and some subtractive manufacturing technologies.

PrintCity is made up of a multidisciplinary team of Academic teaching and research, Technical Services, and Strategic Planning staff. The team come from a number of specialist areas including Product Design, Chemistry, Engineering, Textiles, Set Design, Graphic Design, Circular Economy, and Environmental Sustainability disciplines. The diversity of specialisms within the team ensures we provide the best possible specialist support to all our users equipment includes six different technology categories, 3D Scanning and some subtractive manufacturing technologies

PrintCity has been working with businesses from all sectors for the past three years. Over 70 commercial projects have successfully been delivered, including one product that was featured on Dragon's Den in 2021. Within the projects that PrintCity has delivered, many businesses have used our services to develop and prototype new products. However, during the pandemic we saw more companies adopt additive manufacturing to produce end use products due to shortages in their supply chains. As most companies have started to engage with 3D printing, we often provide consultation on which technology type and material would best suit the businesses applications. Within PrintCity, companies in the Greater Manchester area can access our PrintCity Network Programme. This fully-funded project enables companies to explore 3D printing to create new products process and services. Over the course of the programme, the project is set to engage with 150 local companies, of which 75 will receive technical support.

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PRINTCITY

The 3D printing technology, materials, and computer aided design (CAD) software have seen huge developments in recent years. With the move to cloud-based software, computational advances, and artificial intelligence (AI), CAD has become much more powerful and intuitive. 3D Printers have become much more reliable and accurate, with new machines launched every few months. New materials and additives are constantly becoming available, enabling the technologies to solve specific industry challenges, particularly in heavily regulated industries such as aerospace and healthcare. The advances in the 3D Printing technology have really progressed at pace. Alongside improved capability, the cost of the technology is reducing making it more accessible to smaller companies.

Whilst working with businesses over the last couple of years one thing is clear, there is a digital skills shortage in the industry. Companies are looking for 'digital natives' to exploit the technology, unlocking opportunities and adding value to their business. With this in mind, PrintCity has an objective to Bridge The Skills Gap. We therefore teach as many young people CAD and design for additive manufacturing (D4AM) as possible through our teaching and schools outreach activities. Without the skilled people, the technology will not solve future manufacturing challenges.

The future does look bright for 3D Printing. The technology and material capabilities are improving, the cost is coming down, more businesses are investing in 3D Printers and more young people are learning the essential digital skills.

If you would like to know more about this innovative and exciting facility, look at the website (PrintCity - Manchester Metropolitan University - 3D - Innovate - Educate - Collaborate (mmu.ac.uk)), or contact Alan: A.Dempsey@mmu.ac.uk

Inspired by Space

By Paul and Julie Boyd

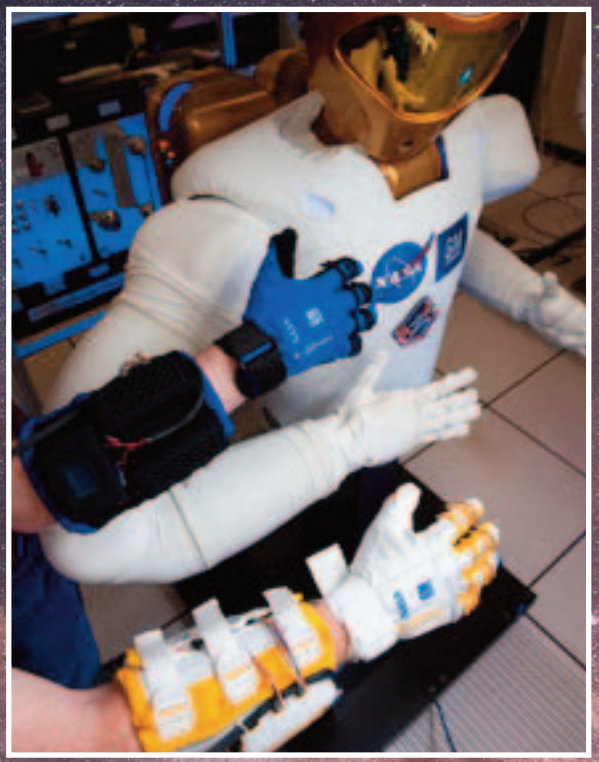
Technology transfer programmes such as those run by NASA (National Aeronautics and Space Administration) and ESA (European Space Agency) are a great starting point for discussing innovation in D&T, and for modelling how designers take high tech ideas designed for extreme environments, such as travel, and apply them to problem solving back on earth.

Both NASA and ESA have spinoff websites that highlight commercial products developed by companies using space technologies https://spinoff.nasa.gov www.esa.int/Applications/Technology_Transfer
The websites might be hard for younger learners to navigate but NASA's annual report is more user friendly, and some pages would make a great set of posters or classroom case studies https://spinoff.nasa.gov/spinoff/brochures

An example of technology transfer is a collaboration between NASA and General Motors on the Robo-Glove, a glove that increases the user's ability to carry out repetitive motions, reducing the risk of repetitive strain injury. General Motors were interested in this for use by operatives on production lines to reduce the amount of effort needed, especially when using tools that require manual strength.

The glove was inspired by Robonaut which was the first humanoid robot in space. The glove's dexterity is created by leading-edge sensors and actuators that are developed to be comparable to nerves, muscles, and tendons in the human hand. As well as applications where added strength is required, the technology also has applications in prosthetic devices and rehabilitation aids.

The glove won a NASA Commercial Invention of the Year award in 2020 and has gone on to be manufactured by Bioservo, a Swiss company marketing the glove under the name of 'Ironhand' https://www.nasa.gov/mission_pages/station/main/robo-glove.html and www.bioservo.com



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Inspired by Space

By Paul and Julie Boyd

Italian company Grado Zero www.gzinnovation.eu is using space technologies, particularly within textiles. This includes a smart shirt made from Oricalco, a material inspired by ESA's work with shape memory materials. It has shape memory alloy woven into a textile material and this enables the fabric to change shape in response to heat, giving it the ability to be restyled, as well as being able to keep itself crease free using body temperature. In addition to having the potential to change how we view garments, this material has medical applications particularly within compression products www.gzinnovation.eu/material/7/shape-memory-materials

Grado Zero has developed a wide range of other exciting and innovative materials, including Flex Tree, a hemp canvas textile laminated to Cypress wood to create a sewable, washable, and flexible material that is an alternative to animal leather.

These are just a few examples of material innovation, and the website links above showcase many more. In some of our courses at Boyd Education we consider the changing nature of materials and how they can be used to prompt design thinking and innovation in the classroom. Both our curriculum planning course http://www.julieboyd.co.uk/CPD/calendar/curriculum.html and course to support textiles specialists delivering the core content http://www.julieboyd.co.uk/CPD/calendar/other.html include samples of both common and more unusual materials and how they might be used to inspire learners to think differently about materials.
www.julieboyd.co.uk

CPD MARK

How sustainable is your 3D printing ?

by Alex McIntosh, Business Development, Filamentive

Humanity is facing the growing impact of plastic waste polluting our land and marine environments, the effect of increasingly severe weather events, as well as the consequences of global warming.

The natural environment cannot be replaced or replicated, so it is imperative that a strong sustainability agenda becomes embedded in our societal and economic structures.

Sustainability requires the use of resources at a rate which allows for continued future use. At Filamentive, we aspire to curate a Circular Economy business model. This means designing out pollution and keeping materials in use by reusing and recycling. In addition to resource efficiency, we are also taking action to minimise the overall impact of our business operations.

Material sustainability is an issue that can no longer be ignored due to wide adoption of 3D printing

Our aim at Filamentive is to provide a sustainable source of raw materials to 3D printing users. Where possible, recycled materials will be used to produce our 3D printer filament, in accordance with ISO 14021:2016.

Global Plastic Problem

90% of plastic produced is from non-renewable resources (Plastic Atlas, 2019)

More than 400 million tons of plastic produced each year (Plastic Soup)

Less than 10% of plastic is recycled (Nat Geo)

Growth of 3D printing

"Material sustainability is an issue that can no longer be ignored due to wide adoption of 3D printing". Zhao et al., (2018)

UK is #2 3D printing market globally (Ultimaker)

232,000 3D printers installed in the UK (Filamentive)

24% market growth rate (Hubs)

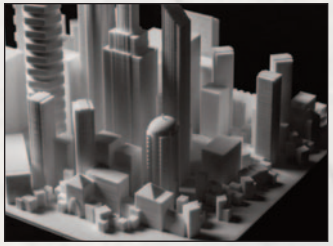
How 3D Printing contributes to Plastic Waste

99% of the market is non-recycled filament (Elizabeth Sensky, Medium)

Average 3D printer (operator) uses 12 kilograms of (plastic) filament annually (Filamentive)

Aggregating with 232,000 3D printers installed, this equals 2.78m tons of plastic needed

Whilst at its core 3D printing is fundamentally less wasteful than traditional subtractive manufacturing methods, the use of plastic in manufacturing can still exacerbate the potential global issues related to plastic waste.



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How sustainable is your 3D printing ?

by Alex McIntosh, Business Development, Filamentive

How Green are 3D Printing Users?

The data below is drawn from recent Filamentive research:
97% of users of 3D printing filaments consider plastic pollution to be a problem

98% of current customers believe it is important to behave sustainably
69% perceive of those believe the rise in plastic use for 3D printing to be a problem

7 Tips to 3D-print more sustainably

1. Waste reduction: prevention > cure - do I really need to 3D-print this?
2. Seek optimal settings / print profiles
3. Use a bioplastic e.g., PLA
4. Use recycled materials
5. Use Sustainable Spooling (Cardboard or Masterspool)
6. Buy local - reduces transport CO2 and resources
7. DIY filament recycling

Remember: "Sustainability is a journey, not a destination"
The benefits of Sustainable 3D Printing

- Reduce the environmental impact of your digital manufacturing
- Increase the value of your product / service
- Comply with sustainable procurement
- Risk management against future policies discouraging virgin material use

For more information look at our website: https://www.filamentive.com/

FILAMENTIVE
Sustainable 3D Printing

LEV Testing

by Louise Wood, Airducts Design Ltd & Airducts Engineering Ltd

So, you have had your LEV system(s) COSHH tested, now what?

In the spring edition of Futureminds, Kevin Hughes on behalf of HME shared a brilliant guide to LEV testing. If you have not read that, I highly recommend that you do. It condenses what an LEV is, and your legal obligations.

This article is an extension of the LEV theme, looking at what to do following an LEV test. As an LEV test provider, we are seeing the same failures ignored every year. We are concerned by the risks to the health of those who continue to work with LEV that has failed, and is unsafe to use.

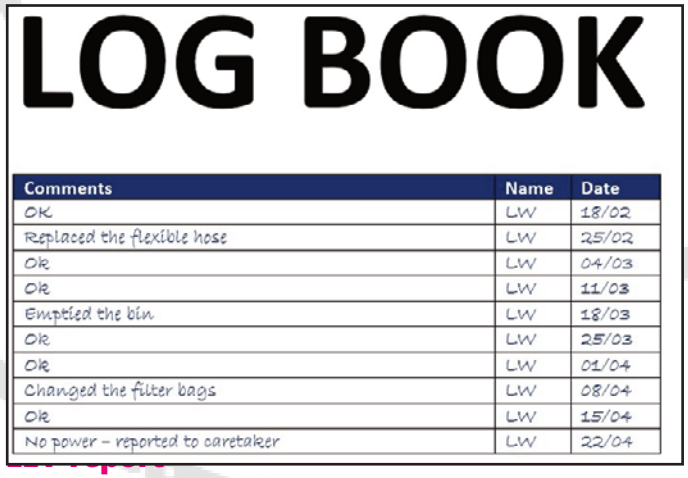
Ignoring LEV test failures is also a serious breach of health & safety regulations.

About our concerns

The main culprits are the recirculating dust filter units that are typically found in wood-working rooms. These are under bench filter units, typically found connected to circular saws, fretsaws, and bandsaws. They hold a higher risk to health because the filter fabric is fragile and will wear with use. If there is any dust on the clean side, then this indicates the filters are worn and dust is passing into the classroom air. We want to avoid dust, especially wood dust, becoming airborne because that is when we are at risk of breathing the particles in that can damage an operator's health.

It is especially important to obtain a copy of the LEV report. Where to find a copy of your report depends upon who is responsible for the contracting of your LEV provider. That may be the school directly or a group of schools, such as a MAT or local authority.

You should have the last 5 years of reports to hand.



Read it

You need to read your LEV reports, you need to know, have your LEV systems:

- Passed
- Passed but with conditions
- Failed

Fix it

Passed but with conditions indicates that more needs to be done to ensure that your LEV plant works effectively to protect your health. Pay attention to that and action the recommendations. Contact CLEAPSS in cases of doubt.

Failed systems should not be used until fixed, and doing so is a breach of the COSHH Regulations. Failures need to be addressed immediately. Failures can result in conditions that are hazardous to health which is why we stress the importance of rectifying any conditions and getting the system repaired.

Retest the LEV

After any alterations or maintenance, your LEV system will require a re-test. This is a statutory requirement of COSHH to establish that the system is safe to use.

Weekly checks

Once a week, someone needs to look at each of the LEV systems and do a visual inspection. Look at the condition of any flexible hose, take the doors off and look at the clean side of the filter units and empty the bins. The results of the weekly checks should be recorded in a logbook.

News from the Food Teachers Centre

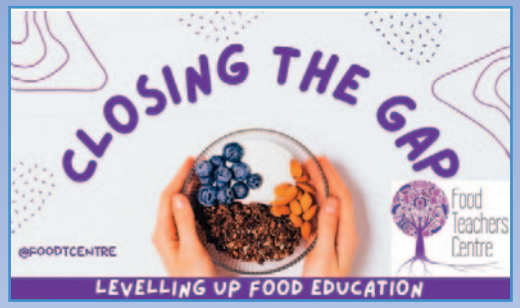
by Barbara Rathmill

The Food Teachers Centre continues to campaign to recruit more food teachers and let the Department for Education know about issues we have around food teacher shortages, lack of support for non-specialist staff and working conditions affecting teacher retention.

The latest government figures show that individuals undertaking initial teacher training are only 23% of the target needed. We simply do not have enough trainees entering the profession. So, in March we worked with Sharon Hodgson, MP, to ask a parliamentary question about what the DfE was doing about this teacher shortage

CLOSING THE GAP

Saturday 9th July (online and recorded)
Join the Food Teachers Centre and inspirational speakers for this national food and nutrition education conference. This event brings together the latest national changes and challenges for food education all in one place, as well as providing practical solutions and ideas to use directly in teaching.



The event aims to:

- set out the current national agenda, and how this directly affects what we do
- outline the whole school food agenda for pupil health
- review new research into poverty, deprivation, and food teaching
- investigate practical strategies for inclusivity and diversity
- explore practical ways in which the food teaching community can close the attainment gap
- look at how we can provide life changing opportunities for all pupils.

Community Accelerator News 2021-22

The Next Generation group is made up from several food teachers who will be participating in an exciting programme to develop their national leadership skills and community management, whilst progressing in their subject expertise.

Kitchen Angels

This is a volunteering programme to bring practical help to our food teachers in busy secondary schools.
Are you:

- Passionate about food and cooking?
- Happy to share your cooking skills and tips?
- Enjoy supporting young people to learn about food?
- Willing to help in lessons or preparing for lessons?

In 2022 we have 5 areas in the pilot programme: Manchester (NW), Tyneside (NE), Devon (SW), Sussex (SE), and London. We have secondary schools actively looking for volunteers, if you would like to offer your help, please fill in our online form here: https://forms.gle/jBGCd3FM9Dpj2prT6
If you have a few hours to volunteer, and would like to know more, get in touch

Fly Higher – join the pilot

Fly higher is a programme of support and key resources for secondary food teachers who need the most help. These may be new teachers, early career teachers (ECT/NQT), lone teachers, teachers who have transferred from other subjects with little training, and those in challenging teaching situations.

Each term, the teacher will receive targeted help, delivered by very experienced food teachers and leaders. The support will be divided into manageable chunks and personalised. It will provide the 'just in time' resources that teachers need to deliver high quality lessons, without re-inventing the wheel.

The pilot programme is now under way. Following testing and feedback, the main programme will be launched in the autumn term 2022. For further information contact us at info@foodteacherscentre.co.uk

A modern paradigm for food education

by Frances Meek, British Nutrition Foundation

A British Nutrition Foundation project to understand what modern food education looks like, supported by the All Saints Educational Trust.

The National Food Strategy and the recent Levelling Up the United Kingdom White Paper has brought the debate about food education to the fore once again. There is currently plenty of discussion around what the government, and those in the media, think that young people should be taught. Including them being able to make six recipes by the time they leave school. Rumours abound as to what these should be! However, has anyone asked the young people themselves

This is exactly what we at the British Nutrition Foundation decided to do. To ask young people, and their teachers, what they think about their food and nutrition education, what lessons should look like in the future and what recipes should be made in schools.

The full results of the survey can be found **here**. However, a snapshot shows that:

- Pupils, mainly Key Stage 3/S2, rated their overall experience in food as mostly good or very good. However, pupils rated their experience of 'Where food comes from' as less positive.
- The majority of pupils enjoyed practical lessons and wanted more. They rated their teaching as good or very good, and they enjoyed independent learning.
- When asked to sum-up their learning experiences, pupils described it as enjoyable, fun, and interesting. However, on a less positive note, some described it as stressful, crowded and loud. This was also reflected in the teachers' responses. However, teachers' future expectations of the experience included lessons being calm and valued.
- Teachers and pupils agreed that recipes should be healthy and be within the context of family/everyday, tasty (pupils) and low cost (teachers). The importance of culture and diversity was important for both teachers and pupils.

We also wanted to get consensus as to what a modern, diverse food and nutrition education that meets the needs of young people, their families and carers, and society should look like. To this end, we held an online conference in October 2021 which attracted speakers and delegates from around the UK and beyond. Based on the debates and feedback from the event, a list of ten recommendations was compiled which we hope will help to move the profession forward to a food and nutrition education across the UK that is fit for the future.

The full conference report can be found here, and the recommendations are:

- **Food and nutrition education for all.** Food and nutrition education should be made universally available for all children and young people from at least 5 to 16 years.
- **Progress for life.** Ensure that there are routes for learning post-16, which include the reintroduction of A-level food and nutrition in England and Wales.
- **Teacher recruitment and training.** Ensure that there are enough specialist teachers at secondary school level to provide high-quality, rigorous teaching.
- **Empower primary school teachers.** At primary level, ensure that food and nutrition teaching is part of initial teacher training courses and that ongoing CPD is available, ensuring high quality experiences by all pupils.
- **Unlock the subject.** Tackle the life-long persistent problems that have held-back the subject, namely ingredient provision, resource allocation, curriculum time (frequency/length), and technician support.

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- **Respect, importance and impact.** Address the value and respect for the subject, starting from the top down, i.e. policy makers, school governors and senior leadership teams. Show the importance and impact of food and nutrition education, including careers in food, to parents/carers, which can include getting families involved in learning (in and out of the classroom).

- **Inclusive, diverse and modern.** Ensure that teaching reflects the now (and continues to evolve with change), taking into account cultural aspects, family life, socio-economics, health, and sustainability. Food and nutrition education is for all pupils, diverse and inclusive.

- **Characteristics of good education.** State what a modern food and nutrition education looks like, enabling teacher trainers, schools and CPD providers to have a consistent approach for the subject.

- **Expand learning experience, don't limit.** Schemes of work/learning should include dishes that pupils want to make, and that reflect their families/lifestyles, in the context of healthy and sustainable diets. Pupils should be given opportunities to use ingredients that they are initially familiar with, but then extended over time to broaden their learning experiences, handling, cooking and tasting a variety of ingredients.

- **It's about context.** Healthy and sustainable diets need to be the basis for food and nutrition education going forward, with learning about food from around the world, reflecting personal cultures and values, demonstrating diversity and inclusivity.

"Really great tips and ideas for Schemes of Work."

A modern paradigm for food education

by Frances Meek, British Nutrition Foundation

Since the consensus-building event in October 2021, the Government has published the **Levelling up the United Kingdom White Paper** (February 2022), which sets out the next steps in the Government's programme to reduce inequalities across the UK. We were happy to see that the White Paper reflects many of our recommendations for a future modern, diverse food and nutrition education.

A third part of the project is to develop a range of recipes new to ***Food – a fact of life*** from cuisines around the world. Based on what pupils said they wanted to cook at school, the recipes will be from six cuisines: African, Middle Eastern, Eastern Asian, Caribbean Islands, South American and Eastern European. The recipes will be developed over time and the recipes from African cuisines, such as West African Jollof rice, the wonderfully named Bunny chow and the delicious Mealie bread, can be found here, along with recipes from Middle Eastern and Eastern Asian cuisines. The recipes from Eastern Asia include Katsu curry, one of the six recipes rumoured that pupils should be able to make by the time they leave school. More recipes, such as Jamaican coco bread, bean and plantain stew and Chimichurri fish traybake will be available soon. We have also provided background information for each cuisine.

Finally, we are also running teacher training to support teachers with building diversity and inclusion into their schemes of work/learning and lessons. Including, incorporating different flavours, ingredients and culinary techniques and experiences to widen young people's understanding of food and cultures around the world; encouraging pupils to share their personal experiences around food culture, ingredients and recipes with the class or school community, and considering healthy, sustainable diets.

"Thank you for this (Middle Eastern cuisine) workshop, I really enjoyed it. My concern was the broad beans for young people that are picky eaters such as my daughter (y7) however she is enjoying the Ful madame as I write this email. What a win!!!"

Find out about our free training, including virtual practical workshops, **here.**

So, what does all this mean in practice?

We believe that it means that we need enthusiastic, well trained, and supported teachers who deliver a curriculum that young people need and want, who encourage diversity and inclusion in everything they do and with an underlying focus on healthy, sustainable diets.

We know there is excellent work around cooking and food skills already taking place in schools, supported by a dedicated workforce of food and nutrition teachers, we just need to make sure that schemes of work/learning and exam specifications are fit for the future and serve the needs of our young people. The British Nutrition Foundation and Food – a fact of life, will continue to advocate for food and nutrition education for all, and support teachers and schools so that they can meet the needs of children and young people, their families/carers and society.

FUTURE OF FASHION & TEXTILES

by Dawn Foxall, Textiles Skills Centre

Post-COVID, and 2 years of PPE making, the fashion and textiles industry is back on track to push the climate change issue that is the elephant in the room of clothing manufacture.

The biggest problem is decades of fast fashion which has ingrained in our psyche, making clothes shopping a habit that needs kicking.

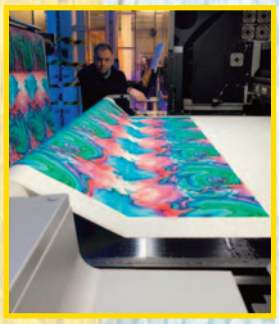
Perhaps this post-COVID recession, and the onset of higher energy prices, will start to alleviate the stigma of not having a new top every time we go out, and instilling some real urgency from the industry into find new ways of more sustainable and less energy use in manufacturing.

Technology is showing us the way, with ideas that began their infancy in the 1990's. Innovative methods of manufacturing now include on-demand digital fashion and textile production technologies from companies such as, a worldwide market leader, Kornit Digital Ltd.

Watch video: https://vimeo.com/680325879

Kornit Digital Ltd recently joined forces with Fashion-Enter Ltd (a social enterprise in North London, which has manufacturing and an academy on-site) and announced a first-of-its-kind Fashtech Innovation Centre in London.
Aiming to bring on-demand fashion and textile mass customisation back to the UK, the Centre is fully supported by Kornit Digital's revolutionary, direct-to-fabric, and direct-to-garment digital production solutions.

Textile manufacturing has a negative effect on global carbon emissions, through over production and high levels of water waste. Kornit's technologies are transforming the industry with more efficient and sustainable processes. The Company's systems boast up to 95% less water usage, 94% less energy use and which helps to achieve 83% less greenhouse gas emissions, thereby minimising the carbon footprint from production.



The systems in place at FashTech Centre include direct-to-fabric and direct-to-garment systems, as well as numerous graphic design and workflow tools to enable cut-and-sew operations. These machines enable a designer to print their chosen artwork/designs either as fabric, or a placement print, such as T-shirt printing, and have the garments cut and manufactured on-site.

The Centre now serves as a prototype for brands and designers seeking to alleviate logistical complexities and long lead times, by bringing production nearer to the end consumer. This will ultimately eliminate overproduction, with the ability to produce on demand, contribute to local economies and remove transport-related waste.

If you are interested in scheduling a visit to the Fashtec Centre located at
Crusader Estate, 167 Hermitage Road, London N4 1LZ, please contact:
education@fashioncapital.co.uk
https://fcfta.com http://www.fashion-enter.com

If you want to learn more about the Textiles Skills Centre and our courses and events, then visit:
www.textileskillscentre.com

"This Innovation Centre makes it possible to capture the full, end-to-end production process in one, single location. The beauty of having print on demand means there are no minimums, so we can make one garment, or we can make up to 30,000 garments a week from all locations at the same fixed cost. Here, we can also train future generations on the right way of producing garments for today, responsive to demand, with minimal waste– ethical and sustainable."

Jenny Holloway, CEO,
Fashion-Enter Ltd.

CLEAPSS small print

New and updated guidance

We have not only moved, but we have also been updating existing guidance and producing new guidance.

To find out what has been updated recently, use the What's New link under each of the headings on the website.

The MRATs, all 205, went through an update, to consider the latest information on dealing with minor burns or flushing eyes, which has moved from 10 minutes under running water to 20 minutes, following updated guidance from the NHS, and leading first aid organisations:

https://dt.cleapss.org.uk/Resources/MRATS/

The Introduction to the MRATs also got updated, as did the MRAT index:
https://dt.cleapss.org.uk/Resource/MRAT-000-Model-Risk-Assessment-Introduction.aspx

https://dt.cleapss.org.uk/Resource/MRAT-index.aspx

The Working with Food document, MRAT 500, also had an update:
https://dt.cleapss.org.uk/Resource-File/Working-with-Food.pdf

We have produced a new guide for those who are looking to develop a new room for D&T or food:
https://dt.cleapss.org.uk/Resource/GL055-Setting-up-a-new-room-for-D-T-or-food.aspx

Following various discussions with schools and others about recycling plastics, we have produced a guide on how to practically and safely recycle HDPE for new uses, in a school environment:
https://dt.cleapss.org.uk/Resource/GL382-practical-plastic-recycling-in-D-T-using-HDPE.aspx

We have also updated our drone flying guidance, to match with the latest information from the CAA and other agencies:
https://dt.cleapss.org.uk/Resource/GL262-Drone-Flying-in-Schools.aspx

We produced a machine maintenance log, to go alongside the guide G254 Health and safety maintenance of D&T workshop equipment. The log is a Word document made up from tables that can be edited or amended as needed. It has entries for each of the machines and pieces of equipment identified in G254, as well as lots of other items. There is space to record periodic checks:
https://dt.cleapss.org.uk/Resource/G254A-Machine-Maintenance-Log.aspx

The guide GL388 Health and safety training plan for D&T explains what H&S training may be required by D&T, food, or art staff.
https://dt.cleapss.org.uk/Resource-File/GL388-Training-Plan.pdf

We received a query on our *Helpline* asking what documents could be found on the CLEAPSS D&T website, so we produced a catalogue of our published documents:
https://dt.cleapss.org.uk/Resource-

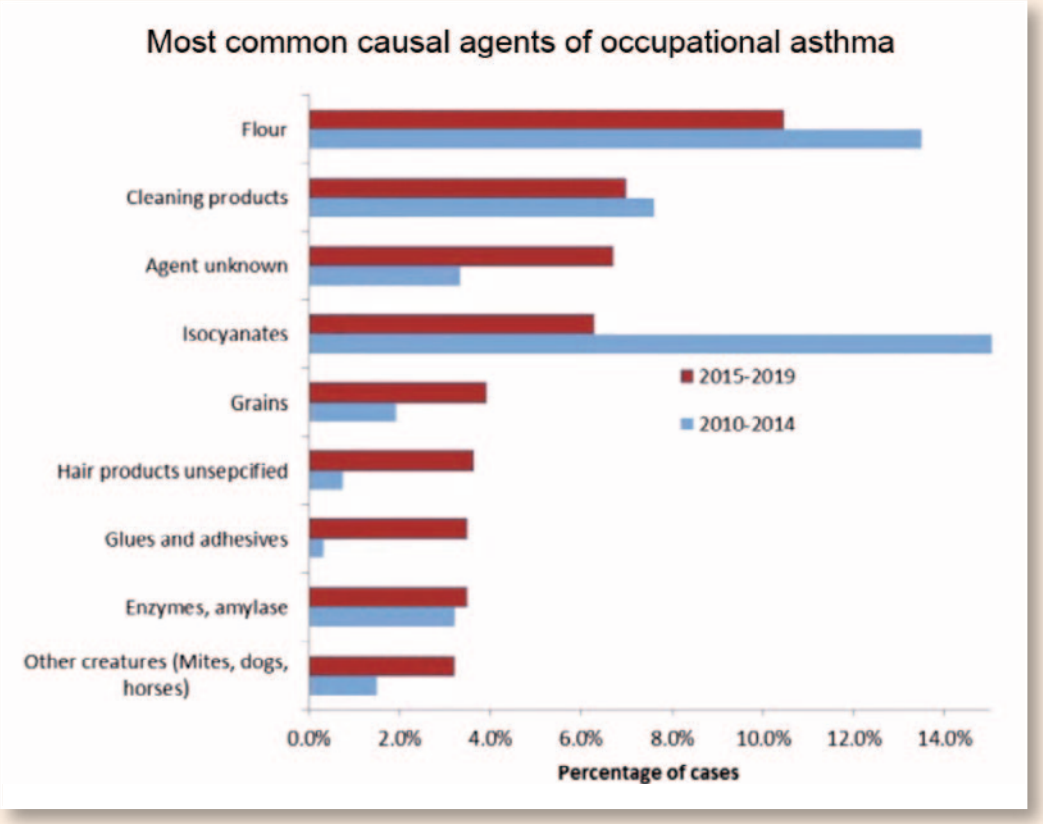
COSHH

We get lots of *Helpline* queries about risk assessment and COSHH (the Control of Substances Hazardous to Health). COSHH requires the hazards for substances hazardous to health to be identified, along with the risk of harm from using them in any particular procedure. COSHH is not just concerned with chemicals but includes microorganisms, dusts, fumes, gases, and other emissions.

Where a D&T department needs to be aware of particular hazards and risks associated with chemicals, dusts, etc, these are identified in the Model Risk Assessments and other relevant CLEAPSS documentation. It is important that schools take notice of this, as there are significant risks to health associated with the use of some materials. These risks must be controlled, and the control measures must be included in the relevant risk assessment. Within the COSHH regulations are detailed requirements. These include:

- Regulation 6 requires that an assessment of risk is made for every anticipated workplace exposure
- Regulation 7 requires employers to prevent exposure or implement suitable measures to control exposure through all routes of entry – eyes, skin, ingestion, inhalation,
- Regulations 8&9 require the use of controls and to ensure their ongoing performance, annual testing of LEV, but weekly or even daily monitoring of the system and checking PPE or RPE.
- Regulations 10&11 require that where exposure is not adequately controlled, conduct monitoring and health surveillance should be put in place
- Regulation 13 requires a plan for emergency procedures

CLEAPSS recommends that the process of carrying out a risk assessment for the use of a chemical or substance that may be hazardous to health, should be part of the 'normal' risk assessment process in a school. Where there is a need for control measures, these should be recorded and acted upon. All of this can be found in the MRATs.



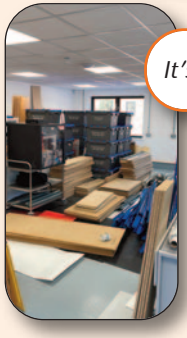
Some recent tweets

Stilride not only have an innovative metal folding process for making electric scooters, they have a fantastic website: stilride.com

Electric scooters made by folding metal like origami - great starter for a D&T lesson: stilride.com

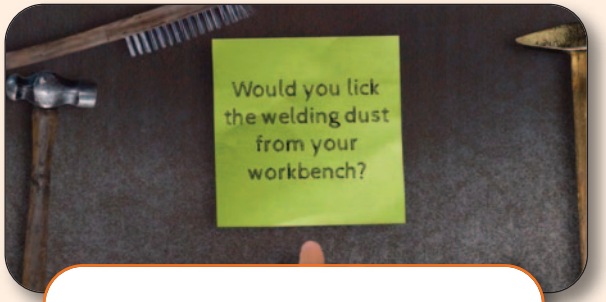
End of an era removing this sign…

Thinking about setting up a new room for D&T or food teaching, take a look at our new guide first: GL055 Setting up a new room for D&T or food (cleapss.org.uk)

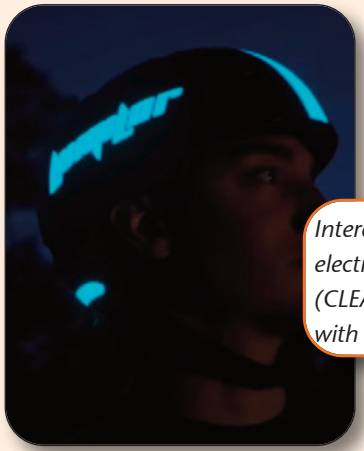


It's not empty here in Chesham

The move continues over the weekend.



Useful short video on why it is important to control welding fumes: Welding fume and cancer video ...LOcHER Project - YouTube



Interesting discussion for D&T materials, electrically conductive luminating paint (CLEAPSS note: this is paint which lights up with an electric current) lumilor.com

Surely time for a revival. #bringbackS4S let's get this liked and retweeted. @Scalextric @BoxfordLtd @RootSolutionsUK @MrJamesMay Scalextric4schools 2022 Relaunch Video - YouTube

Technicians are so important in supporting teaching, take a look at the gallery of images from #TECHOGNITION techognition.org/event-gallery/

In the next issue of *Futureminds*, we will be describing how our new facilities will be supporting the work of CLEAPSS, but also supporting teachers and technicians across the country to develop exciting and safe practical work.

We will also have our usual range of articles from the wider world of D&T, and food as well as some innovative approaches from schools.
If you would like to contribute to Futureminds, please get in touch: dt@cleapss.org.uk

You can also follow us on twitter @CLEAPSS_DT
You can also still follow Daves allotment progress on Instagram @parrys_plot