

CLEAPSS
Design and
Technology

Futureminds

Tomorrow's world explored today



Spring 2017

CLEARPSS D&T e-newsletter

Design and Technology from CLEAPSS

Welcome to the fourth edition of *Futureminds*, which marks the first year of production. I would like to take this opportunity to offer my personal thanks to all the contributors who have helped to make this magazine such an interesting read.

At the CLEAPSS stand at this year's BETT exhibition, I was pleased to meet a number of D&T staff, teachers and technicians. One of whom explained how much he enjoyed reading *Futureminds*, and was looking forward to this edition. I hope he likes it!



We were also at ASE annual conference earlier in January, which is a science conference and exhibition, D&T is not really represented there, but I went along with the 3D printer and loads of examples of items we can make with it. The science teachers and technicians loved it. I may have lined up some work for D&T departments by showing some of the items we have made at CLEAPSS that are used in science investigations, in particular the wind tunnel. The instructions for making it are in the document GL228 *Make it Guide: Model Wind Tunnel*. This, and accompanying 3D printer and laser cutter files, can be downloaded from <http://science.cleapss.org.uk/Resource/GL228-Make-it-guide-model-wind-tunnel.pdf>

Schools running F1 may find the wind tunnel an interesting addition to the design process. There is an article about F1 in schools in this edition of *Futureminds*.



We like to set ourselves challenges at CLEAPSS and our latest D&T challenge is to build a robot! I am working with Samir (physics adviser) on developing a fully functioning arm and hand of the InMoov robot (www.inmoov.fr).



So far we have printed over 50 components, taking around 50 hours of print time. We now have a working hand, and our plan is to have a torso working by the summer and maybe a fully functioning walking robot by BETT2018. A blog keeping track of progress will form part of the new CLEAPSS D&T website when we get that up and running in the next year.



In this edition of *Futureminds* you will see that many of the articles are STEM (or STEAM) based. This is because there seems to be quite a lot of energy in schools, to drive this agenda forward. Many of the schools I have visited over the past year have STEM clubs or, in some schools, STEM rooms. I have recently met with Martin Webber at OCR to discuss the Cambridge Nationals and Technical Awards, to find out more about alternatives to the D&T GCSE and what impact that may have upon our advice regarding Health and Safety in D&T. Schools delivering these qualifications may start to investigate new and emerging technologies and work more closely with industry, so we need to make sure CLEAPSS advice remains appropriate. These are some very interesting developments for qualifications, and look similar to the 14-19 Diplomas. Pupils studying these technical awards or technical diplomas may progress to further qualifications that involve studying new materials or processes, working with real industrial clients, so may have access to facilities that many schools do not currently have.

To find out about Cambridge Nationals in Engineering visit: www.ocr.org.uk/cambridgenationals

<http://www.ocr.org.uk/qualifications/cambridge-technicals-engineering-level-3/>

GCSE Food Preparation and Nutrition – NEA Food Investigation

By Barbara Monks / Barbara Rathmill



With the introduction of the GCSE Food Preparation and nutrition, many teachers are getting to grips with the food science content of the specifications.

There are three drivers for the focus on food science, one being the need to cover food science content of the exam board specification; secondly

the need for a basis in food science methods to enable students to undertake their first assessment which is NEA 1; and thirdly the need for knowledge of food science to be embedded in readiness for the written examination.

Many teachers are now developing food science activities to suit the needs of their students. All these activities undertaken in the food room or those carried out in science rooms need to be covered by risk assessments.

Basic equipment to help teachers deliver food science and allow hands-on experiences of food science with their pupils has been listed by Julie Messenger, a senior associate of the Food Teachers Centre. It can be accessed through the Food Teachers Centre Resource Bank. <https://www.eventbrite.co.uk/e/resource-bank-sign-up-autumn-2016-tickets-27526898695>

The tasks have been designed so that they can be conducted with the usual kitchen equipment. Equipment from your science department should not be used in a food preparation room as it may be contaminated with chemicals.

The usual kitchen equipment found in a food room can be used, such as:

- saucepans, mixing bowls, measuring jugs, white trays, etc.,
- oven, hob, microwave,
- Class set of small containers or Small disposable yoghurt pots or similar (for weighing and mixing small quantities).
- Digital measuring scales
- Digital temperature probe and antibacterial wipes
- Timer
- Colour sample charts - Munsell charts or you can create your own by visiting a DIY store and collecting paint colour charts Brown etc
- Laminated viscosity mats so that they can be reuse (<http://www.foodafactoflife.org.uk/Sheet.aspx?siteId=20§ionId=85&contentId=322>)

- Camera and name labels
- Labels/cards
- Ruler for accurate measuring. NB. The ruler needs to start measuring from the very end of the ruler.
- Small measuring jugs or cylinders



Most food science work is on topics such as pH, temperature, coagulation, dextrinisation and gelatinization, and can be successfully carried out in food rooms in a very practical way. Making a dish such as lasagne or cauliflower cheese covers a large range of scientific principles from which smaller experiments, perhaps using differing ratios for sauce-making or adapting liquids used for a sauce, can be developed.



Where teachers do take students into a science lab for their lessons the content of the lesson and activities should be risk assessed and approved by the Head of Science and no food prepared in a science lab can be eaten.

Prior to delivering any practical activity, the teacher must ensure that they have put in place relevant control measures following a risk assessment. CLEAPSS has provided Model Risk Assessments (available on the website), which should be referred to in developing practical activities, and adapted to meet local circumstances.

For further advice on developing safe working practices, contact CLEAPSS.



Courses – details can be found here:

<https://www.eventbrite.co.uk/o/food-teachers-centre-founder-louise-davies-5315986231>

Investigate Food 2 –
Barbara Monks and Julie Messenger

Kings Lynn Norfolk	Summer Term 2017
Midlands	Summer Term 2017
Milton Keynes or Oxfordshire tbc	Summer Term 2017
UEL London	25 th June 2017

Teaching Food Science –
Simon Gray and Joseph Mann

Southampton	Tuesday 7 th February 2017
Nottingham	Tuesday 27 th February 2017
Kent	Tuesday 21 st March 2017
Cornwall	Tuesday 18 th April 2017
London	Tuesday 25 th April 2017

STEM CLUBS: WHAT THEY ARE AND HOW YOU CAN GET INVOLVED

By Gemma Taylor, Professional Development Leader, National STEM Learning Network

What is a STEM Club?

STEM Clubs offer a powerful way to engage your students with science, design and technology, computing, engineering and mathematics (STEM). They can be an opportunity to go beyond the curriculum to explore exciting ideas and technology, and give students the chance to build up 'soft skills', such as communicating effectively, teamwork and confidence. But more importantly, they are fun!

"You get the practical stuff you wouldn't do in class, you use your mind and knowledge, you learn something new every week."

STEM Club student

How can you start one?

1. Decide on why you want to set up a STEM Club

This will help shape your activities. Do you want it to have a careers focus? Is it about getting more girls involved in STEM? Are you looking to connect with disengaged students?

2. Approach people who might be interested in getting involved

Maybe this is a colleague in another department, a technician or a local business you have strong connections with.

3. Timing

Choosing a time that works for you and your students can be tricky. You also need to factor in room schedules so that you have lots of time to set up and clear down.

4. Decide on who your club members will be

This will follow on from point one, but you also need to factor in the types of activities you'd like to undertake, as this may mean you need to choose different age ranges. Older students can often take on a mentoring role within clubs for younger members, but running a club for multiple ages can be quite an undertaking!

5. Develop some ideas for activities

We've got some ideas below to get you started, but there are also loads more on our website. The world is your oyster!

Some ideas to get you started:

The final frontier

Why not challenge your students to become intergalactic pioneers? Together they will need to investigate what they need to start their own off-world community. What planet will they choose? What materials will survive the pressures and temperatures of their chosen destination? How will they generate energy, grow food and clean water?

Save the world

In the future the climate is likely to be much more unpredictable. Your club could look at designing houses that can withstand hurricanes, floods and earthquakes, building in reinforcement and choosing materials that can take the strain.

Don't forget, STEM Ambassadors are a great free resource that can help you build up your STEM Club, bringing ideas and equipment, as well as 'real life' experience to inspire your students.

Where to find out more

Would you like more ideas on how to get started creating a STEM Club? Visit our website, which includes step-by-step guide on how to build a STEM Club: www.stemclubs.net
Share your STEM Club stories on Twitter by tagging @STEMclubs.



3D printing and STEM education

By Phil Cotton

"I feel challenged as it is something new, and you can be creative." Quote from GCSE student when discussing 3D printing.

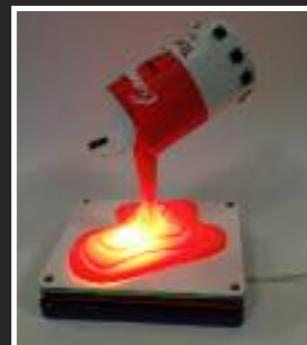
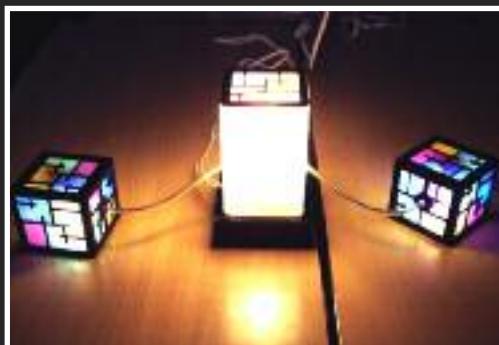
It's the first lesson with the 3D printer. You're out of your depth slightly. You've only had the printer one week with a few spare hours to try and figure out the machine. You're a novice in front of the class but you hold your nerve and demonstrate it anyway. Will it print first time or won't it, you're thinking? The printer starts to print, your class is fixated. Sink or swim time, sigh of relief, it worked. This was my first experience of teaching 3D printing to my students five years ago, and I have never looked back since, neither have my students.

The opportunity to embrace new technology in the classroom has never been more accessible. The current Design and Technology national curriculum includes the topic of 'new and emerging technologies'. The breadth of hardware and support available to meet this area is vast. From programmable components to 3D printing, students have never had it so good. For our students to compete in the ever-growing global economy, we must prepare them for jobs that possibly don't exist yet. The only way we can ensure that students achieve a world class education is by exposing them to the latest innovations such as 3D printing and the BBC microbit. This will allow them to keep pace with changing industries and prepare them for future careers.

If we look at 'additive manufacturing', or '3D printing' as it's more commonly known, my students have embraced the technology and run with it. The result is more challenging lessons and deeper learning opportunities. The technology naturally fuels students' creativity as they can design using 3D CAD, then it can usually be 3D printed. The technology encourages students to experiment and, ultimately, embrace an iterative design process which reflects a higher level of thinking. Rather than one episode of design and make, 3D printing encourages students to go back and re-design and then re-print, re-evaluate, and the process repeats. This models a more real life design and engineering experience. This experience is also reflected in students learning how to write code with programmable components. Very rarely will students write a correct line of code first time round. They must test out their code and then go back and re-write to ensure that they have achieved their intended objectives.

Where does this lead the future of technology education? There are ripe opportunities within education to tap into the 'future minds' of students. The support network is being led by National STEM centre in York with world-class teacher training courses being delivered to help UK students realise their potential in STEM education. Within a changing technological world, it is more important than ever to embrace new technologies in the classroom.

Phil Cotton is a National STEM centre accredited lead teacher of STEM. He has for the past 18 months delivered CPD courses at the National STEM Centre, on integrating 3D printing into the curriculum. He has simultaneously worked full time as a Design and Technology teacher at Ladybridge High School in Bolton. Phil has also worked with the University of Manchester delivering training for Initial Teacher Training on 3D printing in education and he has presented at regional STEMNET events and educational conferences.



There is a huge emphasis on improving primary and secondary education in science, engineering, technology and mathematics, or STEM. The intention is that a STEM-capable workforce will lead to better job prospects and a more robust economy. In reality, it is hard to imagine a productive job that does not require some STEM awareness. STEM skills are also essential to manufacturing, service, and product innovation and are key to the UK's scientific and technological competitiveness.



Unfortunately, STEM suffers from a clear discrepancy between work and education. Educationally, STEM means science and mathematics - the S and the M. Outside education, the vast majority of STEM-related occupations and the drivers for economic growth are based on engineering and technology - the 'missing' T and E. Are these important? You could argue that there is nothing that exerts more influence on our daily, hi-tech lives.

There is some good news. National education institutions are taking steps to repair the dichotomy, introducing engineering and technology into many qualifications. The latest mathematics GCSE requires students to link maths to real-world problems, and the list of science qualifications has been joined by computer science. Many national organisations are also taking steps, including the National STEM Centre, with learning strategies that emphasise design and technology's connections to science, engineering and maths.

Where's the T and E in STEM Education?

By LJ Create



In work and personal life, students will be bombarded with STEM-related issues across a wide range of topics. This ought to be reflected in their educational experience. Research has shown that for students to engage in STEM subjects and understand STEM concepts, they need to start early, and they need to participate in practical activities.

Today's students, rightly, dislike being passive learners, simply receiving information from teachers and books.

The empirical support for active learning is extensive, showing that it produces better student attitudes, motivation, and performance. At LJ Create, we develop active learning opportunities for STEM. Our approach uses a project-based curriculum, presenting subject matter through themes such as agriculture, biotechnology, and programming. This interdisciplinary approach integrates knowledge from the four disciplines and encourages students to explore topics more deeply, develop more sophisticated skills, and feel more confident in their ability to learn.

Students investigate each theme by working through a range of short, focused, meaningful activities that lead towards the group development of a creative solution to an open-ended project. The range of student activities is extensive and includes research, debate and discussion, modelling, simulation, practical planning, design, testing, and experiment tasks. Student cooperation is a key element. In addition to developing interpersonal skills, collaboration reduces attrition in technical programs and can be particularly effective for improving retention in underrepresented groups.

We know that programmes are often judged by the impact they make to core academic skills. We therefore align our courses to secondary qualifications and we create academic support units that the students can access when needed. What we want to hear in staffrooms is,

*"Would you like a report of the GCSE English standards my D&T students have mastered?" Or,
"Take a look at this great piece of written work by one of my STEM students."*



A project-based STEM curriculum, covering a range of technological and scientific themes, both introduces students to a wider range of career clusters and develops invaluable 21st Century skills; skills such as adaptability, communication, collaboration, problem solving, critical thinking, and systems thinking. It is vital that today's students are equipped with such skills, and that they are alive to all the pathways available to them, allowing them to grow and evolve in a way that meets their learning and career needs.



LJ Create has been providing award-winning active learning solutions for technical education since 1979. Our complete systems combine online learning content and tailor-made hardware kits.

Please visit www.ljcreate.com for more information.

Food Teacher Professional Portfolio

Do you teach food in a secondary school? Are you a trainee, Newly Qualified Teacher (NQT), Higher Level Teaching Assistant (HLTA) or perhaps a more experienced teacher?

Whatever stage you are in your food teaching career, whether you are a food specialist or not, the Food Teacher Professional Portfolio programme (FTPP) has been designed with you in mind.

Following publication of the Food teaching in secondary schools: *A framework of knowledge and skills* by Public Health England in 2015, the British Nutrition Foundation (BNF), in collaboration with the Food Teachers Centre (FTC), developed the FTPP; a personal and professional development programme for secondary food teachers. Over 1,600 teachers have registered for the programme since its launch in late 2015.

A clear ambition

The ambition of the programme is to further enhance professional standards of food teaching, involving curriculum planning; classroom management; practical cooking skills; food commodities; nutrition and health; hygiene and safety and consumer awareness. Its aim is to formalise and support food teachers' professional learning and provide a means for them to audit, plan and evidence training and development against a structured framework. It is envisaged that the portfolio will also provide evidence for performance management and appraisal.

Through engaging with the FTPP programme, it is hoped that teachers identify and build on their strengths and work on areas of development; use the framework to identify, prioritise and plan for their own professional development; establish the practice of target setting and review; recognise the requirements expected of them at different stages of their professional career; plan their individual career development; and importantly, develop their career in the way they desire.

How do teachers get involved?

Teachers wishing to engage in the programme sign-up online (www.foodteacher.org.uk) and complete a short registration form identifying their qualifications, current job role and number of years teaching.

Registered teachers are then asked to complete an initial audit of their food skills and knowledge. The aim of the audit is to provide a baseline from which teachers can plan their professional and personal development, as well as provide BNF with data on training needs and requirements.

Once teachers have completed the audit, they receive a printed organiser designed to act as a 'one stop shop' for them to audit, plan, organise and record their professional development. In addition, the organiser can hold records of health and safety training and other training records. It is anticipated that teachers will build up the contents over time providing a personalised professional portfolio.

In addition to the printed organiser, teachers have access to a package of free support including monthly webinars, emails with guidance and resources focusing on the webinar topic, and face-to-face training. Webinars take place online after

school hours meaning that classroom cover is not required and busy teachers do not need to travel or incur costs in time or money.

If a teacher is unable to participate in the live event, all webinars are recorded and can be watched at a more convenient time. After each webinar, or face-to-face event, the teachers receive a certificate as evidence of participation for their portfolio. All training is linked to the *Food teaching in secondary schools: A framework of knowledge and skills guidelines*, which, in turn, supports the updated curriculum and new GCSE qualification.



Food Teacher Professional Portfolio

Teachers' comments on their experiences of the programme so far:

'The audit was an excellent measure of my confidence in subject knowledge and competence as I was at the time returning to teach.'

'The portfolio itself has been useful in collating all my evidence, so much so that my school has "borrowed" it as an excellent exemplar for staff to develop and use.'

'As an experienced food teacher, I entered the programme not expecting to gain much, especially after completing the audit, a confidence booster in itself! I have been grateful for the support and guidance. The programme has also given me what I believe to be essential back-up for performance management.'

'The information supplied has really enabled me to build my confidence and competence in teaching food as a non-specialist.'

'Having taught for so many years and being the only food teacher, this has helped enormously to update me and get valuable resources for the new way forward in this subject.'

'Excellent – a wealth of resources and training opportunities that can be accessed in my own time.'

Feedback at the end of year one also showed that eight out of ten registered teachers agreed or strongly agreed that the FTPP programme stimulated their thinking and professional knowledge, ensured their practice is critically informed and up to date, and aided reflection. A majority of teachers also indicated that their confidence and competence had increased through the support of the programme.



Future training and support

A wide-ranging programme of free webinars and face-to-face events has been planned for 2017, including monthly webinars, twilight events and a one day conference especially for non-specialist food teachers.

Month	Webinar topic
February	Behaviour change and healthy eating
March	Professional practice – writing schemes of work/lesson plans and ensuring transition (primary to secondary) and progression
April	Teaching strategies during a practical lesson, differentiation, pupil choice and personalisation of cooking activities, encourage independence and decision making skills
May	Teaching food in special schools
June	Factors affecting food choice
July	Applying aspects of consumer awareness – focus on food labelling

If you would like to get involved in this highly regarded professional development programme or know someone who might, more information can be found at: www.foodteacher.org.uk

Acknowledgement

The FTPP programme was developed and is run by BNF and the Food Teachers Centre. It is supported by an educational grant from the All Saints Educational Trust.

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REV UP FOR THE FORMULA 1 IN SCHOOLS STEM CHALLENGE

By Alison Hill
ID PR & Marketing



F1 in Schools, the Formula 1-linked global STEM challenge, is an education programme that has established itself as one of the premier competitions, that not only offers students an engaging and exciting learning experience, it also gives participants a headstart on a career path for motorsport, Formula 1 and allied engineering industry.

This programme features a new class of competition, aiming to encourage first-time entrants, with a simplified set of rules and regulations. It is a streamlined version of the current classes, offering a low-cost, time-efficient competition, which introduces students to the highly respected F1 in Schools programme. The three classes create a tiered system with the Entry Class as the first step, the Development Class as a second level, moving on the Professional Class for the more experienced students.



Schools can incorporate F1 in Schools into their curriculum and extra-curricular activities, as well as compete against other schools at a series of regional finals around the country. The best teams at each regional final will compete at the UK National Finals and for 2017, the Champions will win a trip to the McLaren Technology Centre, home of the championship-winning McLaren F1 team and its sister automotive company, McLaren Cars. For the school of the winning team, F1 in Schools loyal sponsor and supporter, Denford Ltd, will present them with a Denford MRC 40 machine, for routing, milling and engraving.



The MRC 40 has a powerful 500W spindle motor and offers high speed manufacture linked with a large working envelope. This versatile machine handles small engraving jobs; and the large working envelope and Z axis capability (110mm) is perfect for the manufacture of large 3D designs. Set-up and tool changes are a simple process, and the MRC 40 will be supplied with a long series ball nose cutter and an F1 Fixture.



The elite of the UK National Finals teams will be rewarded with a place at the F1 in Schools World Finals, set to be held at an international destination, alongside a round of Formula 1 Grand Prix. These students compete for the coveted Bernie Ecclestone F1 in Schools World Champions trophy, and highly valued City University London and University College London Engineering scholarships.



F1 in Schools invites you to come along to the National Finals at the prestigious Silverstone Wing Building at Silverstone Race Circuit in Northamptonshire at the end of March 2017.

If your school would like to be involved in this great Formula 1 linked initiative, just head to www.f1inschools.co.uk and register to take part. Or email us: contactus@f1inschools.co.uk



Arts & Crafts in the new world...

by Dawn Foxall (Textiles Skills Academy)

As we 'STEAM' ahead with new technologies and the move towards mass customization, what are the implications on the arts and of what will be a dramatic and impending shift in how our world works. The so-called 4th industrial revolution brings us unlimited possibilities with the convergence of mind-boggling computer power, ever-smarter artificial intelligence (AI) and globalization, all combining to challenge our understanding of what it means to be a 'worker'.

Indeed, some profess that automation and AI will remove the need to work, or, for the more cynical, take people's jobs. None of this is a surprise, but while it is easy to be worried by the implications of automation and AI, a closer look at the nature of humans, computers and how they interact makes us think carefully about the future and how the arts will contribute.



Humans are social creatures and the way we learn and interact depends on our interactions with others. We know that you can learn more by discussing or working with someone than by lonesome book reading.

IT and AI can do the easy stuff that we once spent hours doing, but what it can't do is be creative, innovate, inspire or motivate. We are good at creating and the need for ideas and innovation is behind the new D&T GCSE.

However, in recent years, STEM subjects have been at the forefront of worldwide initiatives in education, with encouragement and funding being pushed towards science, technology, engineering and maths, at the expense of creative subjects, particularly in the UK. These STEM skills are undoubtedly essential both socially and economically to keep the world ticking and developing, but we can get a computer to sort our mathematical problems and robots to build our cars! What we need is designers and creatives to enhance our world.

In fact, in the UK, we are in a time when the creative industries are a huge economic success, employing over 2.6m people. That equates to 1 in every 12 jobs!

Research has shown that industries which combine creative with STEM skills (STEAM), can outperform those that don't. (nesta.org). It is old news to those of us in the creative industries to hear that arts skills aren't just a 'nice' thing to do/have, an 'add on', but play a vital role in the UK economy. Likewise, in education we need to nurture students to be flexible, intuitive, collaborative and creative - essential skills needed for a workforce in a world undergoing profound changes.



Arts & Crafts in the new world...

...continued

We are also seeing increased demand for 'craft' skills and education in a variety of arts and crafts. The gradual understanding of sustainability, environmental issues, economic, gender and ethical equality etc. are bringing about changes in society's needs and demands, with focus on less rather than more, quality and value. Highly skilled crafts are becoming respected again as something we should value and that will support our society to become relevant, economically stable and add value to our lives.

Mass customization will require innovative, skilled crafts people to deliver bespoke products with the support of AI and automation.

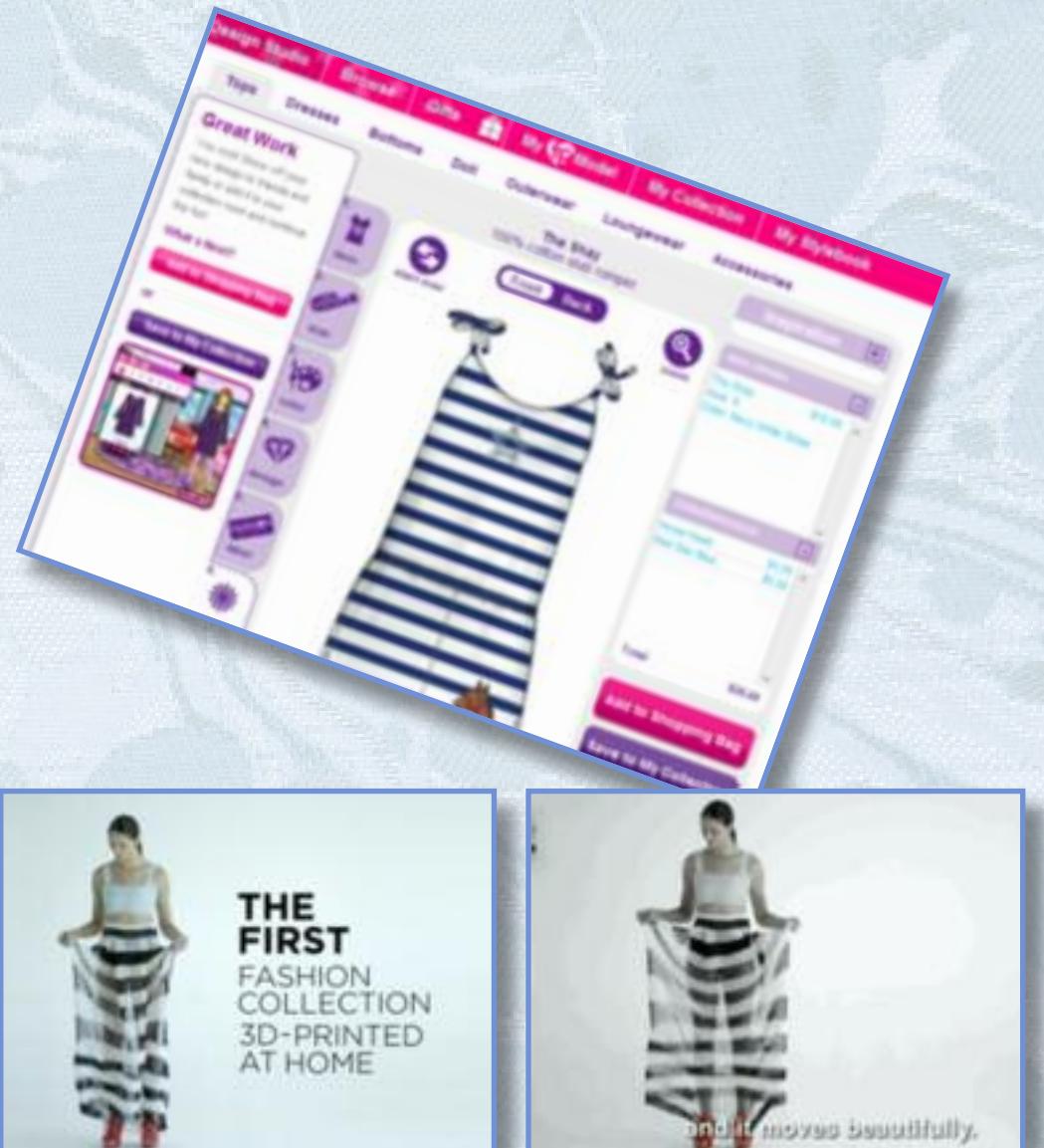
3D printed products need the product/building designing as well as the hard and software behind it.

Mass customized garments made to your own measurements need a creative to design the fabrics and the styles as well as the software and machines to produce it.

The world is going through its biggest change ever and we need to ensure we have a society that can deal with the challenges this brings. Scientists, mathematicians, engineers and creatives are equally required to deliver a future that supports and enhances the human in all ways. Innovation, diversity, flexibility and collaboration will see the next generations enjoy the fruits of this 4th 'industrial' revolution.

STEAMCo.org <http://www.steamco.org.uk/home#creativity>

Video link to the sewing robot: <https://youtu.be/jaA5er7t1fo>



THE NATIONAL CENTRE FOR EDUCATION IN ART AND DESIGN (NSEAD)

BY LESLEY BUTTERWORTH, GENERAL SECRETARY NSEAD

At the time of writing 2016 is drawing to a close. A new year feels like a fresh start, but with funding cuts, the implications of government policies on the arts, and Brexit, the chaos of 2016 continues into 2017.

Does Brexit impact on formal education? If it doesn't immediately affect art and design at school, it has certainly stepped in the way of the future choices and landscape within which children and young people will live, develop careers, and work.

At our recent All Party Parliamentary Group for Art, Craft and Design in Education meeting we debated the impact of Brexit on the art and design communities, the cultural sector and Higher Education.

Post Brexit, two inquiries were launched. The Culture, Media and Sport Committee considered the impact of Brexit on the creative industries, tourism and the digital single market. For these industries, Brexit forms an unwelcome landscape because of the possible impact on future employment and the ability of the creative industries to continue to attract and retain talent from across the world, alongside a fall in the pound and more onerous visa requirements.



The second inquiry, launched by the Education Committee sought to examine the effect of Brexit on higher education. Issues of concern include the following:

- The Erasmus+ Programme gives EU students the chance to work and train in another country. More than 2000,000 UK students have taken part in this programme which employers value highly. The implications of Brexit may detract from our engagement in this programme.
- The UK is a major recipient of EU research funding. This is of concern because EU students contribute financially and reputationally to UK institutions, especially within the creative sector where EU nationals account for a higher proportion of the sector than on other sectors e.g. 13% at the University of the Arts, London.
- Post Brexit, specialist arts institutions could sustain significant income losses because of the high proportion of EU students. Post Brexit, UK Universities will have to charge EU students international not domestic tuition fees. For EU students the current domestic rate is £9,000 compared with non-EU students on a range of between £15,000 and £25,000. This will put UK Universities at a disadvantage because they will have to charge EU students international, not domestic rates.



Design can help the UK thrive after Brexit. The Brexit Design Manifesto is an example, coordinated and produced by Dezeen (www.dezeen.com) and endorsed by people and organisations across the design and architecture sectors. The manifesto singles out education and the role of design in schools to inspire future generations of design thinkers and makers.

<http://downloads.dezeen.com/brexit-design-manifesto-dezeen.pdf>

NSEAD is preparing a Manifesto for Art, Craft and Design Education during 2017 as a tool to influence policy on the run up to the next General Election.

For information about the extensive membership benefits of joining NSEAD please look on our website www.nsead.org or get in touch with lesleybutterworth@nsead.org



CLEAPSS small print

Flashback Arresters

Schools using oxyacetylene welding equipment, please take note:

In early December the HSE released a bulletin highlighting an update to The Acetylene Safety (England and Wales and Scotland) Regulations 2014. There is now a mandatory requirement to use flashback arrestors.

There is concern that the requirement to use flashback arrestors may not have been fully implemented by all welding operators. The requirement for flashback arrestors is a reasonably practicable control of the risk and that is why the law requires them.

Please ensure you are protected by fitting arrestors if they are not already fitted.

If you are not sure whether your welding equipment is fitted with suitable arrestors (most will be), stop using it, contact your supplier and get confirmation from them.



Health and Safety Audits

Since last summer I have carried out around 15 D&T health and safety audits, often also incorporating the Art and Design departments. Because of this we have been working on a new version of the CLEAPSS guide G79 Auditing H&S in a Secondary School D&T Department to include aspects and areas most commonly found in Art departments, including ceramics areas and darkrooms. The new document, and associated checklists and layout drawings, should be published on the CLEAPSS website around the same time that this edition of Futureminds goes live.

A CLEAPSS audit costs around £800 (next year's prices have yet to be agreed by the Governing Body). I usually spend around 3 hours in the department(s), talking to staff and checking the facilities. The first part of the visit is about departmental documentation.

It includes discussion with the head of department on policies and procedures, a review of risk assessment materials and other documents. This part of the audit concludes with suggestions on improvements that could be made so that materials are more useful and easier to manage. The second part of the visit is to look at the practical spaces. Where there is a H&S issue, I will explain the problem to staff and try to identify a suitable solution. All machinery and facilities are documented by photograph.

The report of the visit includes a range of recommendations covering the documentation, practices and equipment and facilities. Reports generally run to around 10 pages, and include photos of equipment where helpful. The report is checked by a second CLEAPSS adviser and then sent to the school.



Some of the common issues which have emerged from recent audits are:

- Risk assessments out of date, incomplete, not related to activity
- Little or no risk assessment of teacher or technician activity
- Fixed machines not securely bolted down or mounted too close to other equipment
- Hobby-standard machines that are not suitable for school use
- Storage of items on or around work benches and machines, rather than in purpose-designed storage facilities
- Keys left in key switches
- Reports from annual checks not acted upon, fail notices ignored

If you would be interested in getting CLEAPSS to carry out an audit of your D&T and Art facilities, get in touch.

Laser Cutters

It has been brought to our attention that there are a number of pieces of laser cutting and engraving equipment available online that do not comply with national guidance and/or regulations.

In these machines the laser is not enclosed, which creates an increased risk of burning or eye damage.

CLEAPSS Model Risk Assessment 1.032 Laser Cutters

Cutters states that the laser beam should be totally enclosed and an interlock provided to prevent operation unless the laser is enclosed. This is necessary to make the system into a Class 1 device, which is then suitable for use in schools.

If you have purchased a machine where the laser is not enclosed you should stop using it **immediately**.

For further advice and guidance please contact CLEAPSS.



HSE Sector Plan for health and safety: Manufacturing

The Health and Safety Executive (HSE) has a programme of work across the country to try to minimize injury and death in the workplace.

The manufacturing sector covers a diverse range of activities, from small-scale motor vehicle repair, woodworking and metal fabrication, paper and plastic manufacture, food and drink production to car manufacture and shipbuilding.

On average, 27 workers are killed each year in this sector, accounting for almost 20% of all workplace fatalities. Known health issues across the sector include musculoskeletal disorders, work-related stress and occupational lung disease.

The sector plan for health and safety in manufacturing identifies a number of ways the HSE will try to help Britain work well. It includes canvassing the workforce and trade associations to develop a range of strategies to enable agencies to work together to:

- control exposures to substances causing occupational lung disease
- reduce the incidence of common work-related ill-health conditions, such as MSDs and work-related stress
- prevent serious incidents involving heavy loads, during maintenance activities and catastrophic events

If you would like to take part in the conversation or comment on the strategies or plans posed by the HSE, you can join the LinkedIn forum:

<https://www.linkedin.com/groups/8461157/>



CLEAPSS Suppliers' Directory

Corporate and not-for-profit CLEAPSS members CLEAPSS membership has been extended to include companies that supply school science and D&T equipment, furniture or chemicals, or provide a relevant service. We are compiling a list of these members which will be published on our website as PS62. You will be able to find out whether a company or organisation belongs to CLEAPSS before you engage with it. Membership will not mean that CLEAPSS has checked, or approved the services or products offered by the company/organisation, though reports of sub-standard services or equipment would be investigated and we could consider refusing further membership. However, it does mean that the company/organisation has access to CLEAPSS advice, which should mean, over time, that the products and services are better tailored to your needs.

Some recent tweets



Watch some interesting clips of new tech on the #ces BBC site including a smart scarf.
<http://www.bbc.co.uk/news/technology-38403944>



Look out for Joannas latest, a liver, #Cleapss #ase



10 people who had an impact on design in 2016 - lookout for no.8!! <https://www.designweek.co.uk/issues/19-25-december-2016/10-people-who-made-impact-design-2016/#.WG1tMLQqs-k.twitter>

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Chemistry was busy yesterday, come and see it today at #Cleapss #ASEConf

3D printers can go wrong, when was the last time you checked yours?
<http://hackaday.com/2016/12/07/dont-leave-3d-printers-unattended-they-can-catch-fire/>



Drones are very popular this Christmas, have you thought about a school drone club, contact CLEAPSS.



Handing out the #Cleapss primary competition prizes this morning at Kings College School, Cambridge, congratulations to the staff and pupils



#tesla island, using solar power instead of diesel, great starter video for #D&T
<https://news.vice.com/story/elon-musks-100-solar-island-is-a-test-run-for-the-u-s>

Coming up in the next edition:

Update on the new D&T qualifications

The latest from food

School projects

The progress of the CLEAPSS robot

Using 3D printers in school

The role of the D&T technician

Greenpower race teams update

And loads more...

If you have an idea for an article, get in touch.

Don't forget you will need the login and password for the CLEAPSS website to be able to access the materials, you should already have this in school, but if you are having difficulties, contact us

01895 251496, or via the website:
www.cleapss.org.uk

You can also follow us on twitter @CLEAPSS_DT