

CLEAPSS
Design and
Technology

Futureminds

Tomorrow's world explored today



Spring 2020

CLEAPSS D&T e-newsletter

Welcome to the Spring 2020 edition of Futureminds.

News and updates.

We have been doing a lot of writing over the past few months, revising our Model Risk Assessments and the associated guidance. We are planning to have these go live around Easter.

There are a number of significant differences:

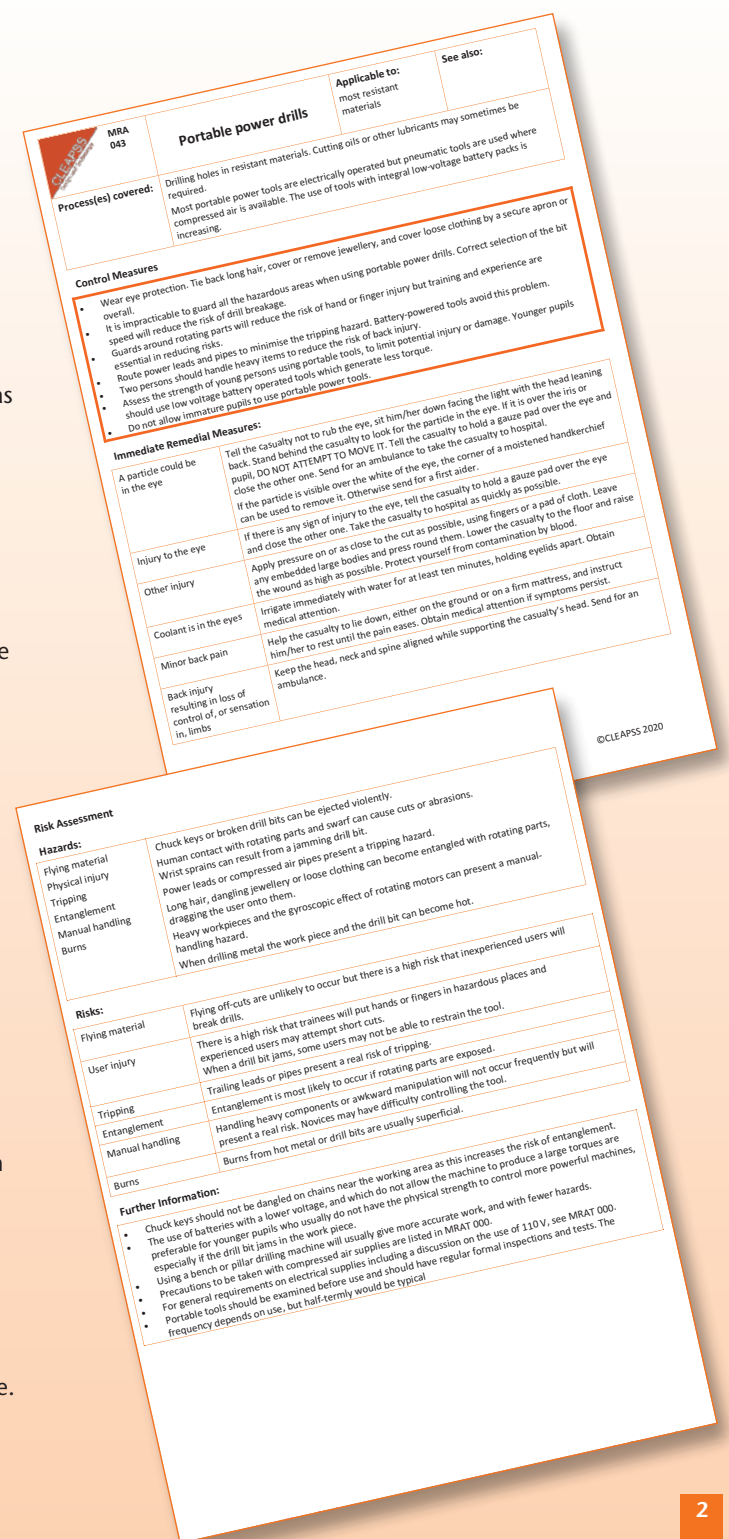
- Each MRAT has a three-digit code number
- There are no separate material areas
- All duplicates have been removed
- All technical data has been checked and updated
- The layout has changed
- A simple keyword search on the website will always find the required MRAT, and those which may include relevant information.

The previous MRATs had the hazard and risk as the main section on the front page of the MRAT. Through our experience of working with schools, we have found that the most important part of the MRAT for teachers and technicians is the 'control measures' section. We have moved this to a more prominent place on the front page and moved the hazards and risks to the second page. We have also moved the immediate remedial measures to the front.

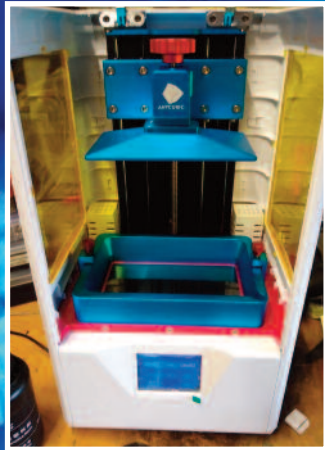
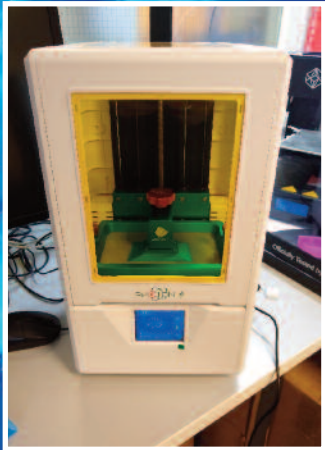
We hope that this makes it easier for staff to see what they need to put in place to control any perceived risk, and what to do if something were to go wrong.

We have also produced some accompanying documentation;

- an introduction (MRAT 000), explaining how the MRATs work,
- a Food document (MRAT 500) that pulls together a number of factors that we often get asked about, that are not strictly risk assessment materials,
- a list of Regulations for those who want to know why we say what we say. Although relatively brief, this explains how Regulations influence the guidance we give.



3D printing



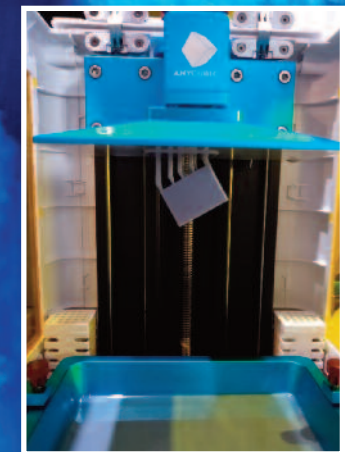
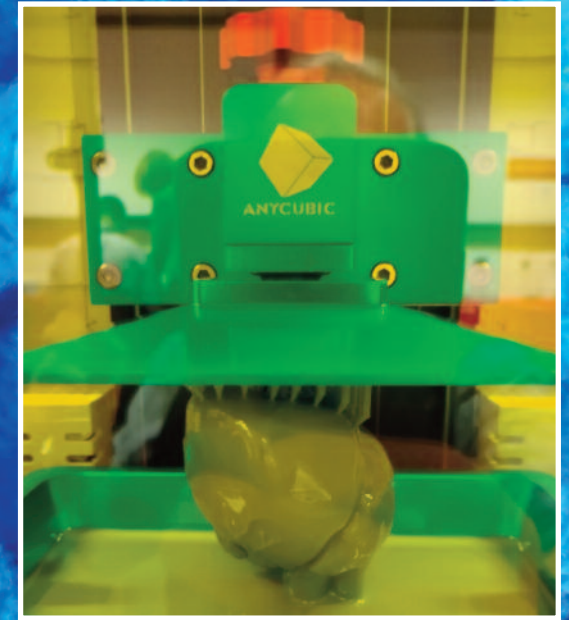
In December we took possession of a new 3D printer. It is a Digital Light Projection printer (DLP), which works on a very different principle to the FFF printers we have been using and testing over the past three years.

The DLP projects ultraviolet light into a vat of photosensitive liquid resin. The light 'sets' a small amount of the resin, which adheres to the underneath of a flat metal surface, which is the build plate. The build plate then rises a fraction of a millimetre and the process is repeated.

The shape of the light projection defines the shape of the 'set' resin. The light projects can be very fine which, therefore, can allow for incredibly sharp detail.

We plan to test this machine and produce a guide on its use for schools. The chemicals used for the resin and for cleaning the final print are particularly hazardous.

As you will have read in past editions of Futureminds, we have worked closely with HSE in developing our guidance and we are hoping to be carrying out some more testing of machines and materials in the next few months. These tests will include finding out what the emissions from the DLP process contain, as well as carrying out some emission testing with printers running in schools.



The ASE annual conference

The first week of term in January is when CLEAPSS decamps to the ASE conference. This year we were back in Reading.

This is a three-day exhibition and conference focussing mainly on science but including some technology. There are many workshops and talks, as well as a large exhibition space. CLEAPSS always sets up rooms with practical activities for the delegates, including a D&T space where we show off our latest practical activities. This year we ran the DLP printer non-stop, and we experimented with some metal filament we received from the Virtual Foundry in USA.

<https://www.thevirtualfoundry.com/>



 The Association
for Science Education
Promoting Excellence in Science Teaching and Learning

BETT

January also saw the BETT show, which is the biggest IT show in Europe. It is held at the Excel Centre in London. The format of the event has changed so, for the first time in a few years, CLEAPSS did not have its own stand.

We attended BETT as delegates and observed that there were fewer 3D printers this year, but lots of interactive white boards! There were a number of stands promoting virtual reality hardware and software, which will have safety implications for those using it and those supervising its use.

We also spent some time looking at tablet technology, using the new Microsoft Surface Studio. This would be a great machine for school use, but at over £3500 per workstation, it's unlikely we will see many of them in D&T for a while.

There were some interesting Arduino projects and other microcontroller ideas. We will be producing a few new pieces of kit over the next few months using this technology, so keep your eyes on the website.

Our attention was also drawn to the refreshment counter selling water, in aluminium cans. Still water in silver cans, sparkling water in black cans, both at £2.10 for 350ml. This would make a great discussion starter in D&T and Food lessons:

What are the environmental and sustainability issues around selling and consuming water in cans?



NEBOSH

Dave attended the HSE NEBOSH course last term and finally received his certificate in January. He now holds the NEBOSH HSE Certificate in Health and Safety Leadership Excellence.



The course was very interesting, particularly as CLEAPSS often comes across safety officers and others who hold NEBOSH qualifications.

The course is designed to support the person with responsibility for managing H&S to help them spot where things need to change, and gives them strategies to make those changes. It also looks at how setting targets for H&S may create unforeseen outcomes. It helps those in charge understand why people make errors of judgement, which lead to incidents.

One analogy that was used was the game of Jenga:

When an incident happens, the investigation often focuses on the person most immediately involved. In the analogy it would be the person who makes the tower fall. This is a blame culture. However, in Jenga, as in almost all incidents, each move made by everyone involved makes it more likely that the tower will fall. This leads to the conclusion that an incident can rarely be considered a single person's fault. It is often a group or a system that creates the difficulties, which led to the incident outcome. A good investigation will look to find all of those with responsibility, not just the person who knocked the tower over.



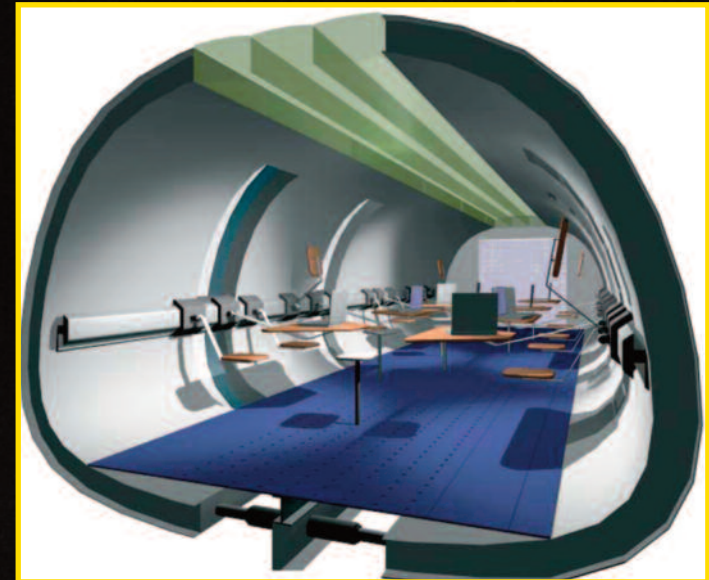
The Future...

Over recent weeks we have been in discussion with a few teachers around the country about the future of D&T, Food and Art in terms of facilities.

New facilities are a great advantage in delivering these subjects, but are they futureproof?

Over the next few months we would like to find out more about what teachers and technicians think are the essential, or non-negotiable, bits of kit they think they will need to deliver these programmes.

If you would like to get involved, please contact Dave by email: dave.parry@cleapss.org.uk or use the *Helpline*.



Design and Technology!

Design and Technology in schools has undergone a real period of change over the last few years and teachers have been given the important task of adapting their provision to ensure students are given the best possible opportunity to succeed.

Generating Design Ideas

Overview
After the client saying she liked the idea of the product resembling something natural. I tried brainstorming some other ideas which were based off nature. In this design, I based it off honeycomb with hexagonal modules which would join together allowing the user to customize their configuration.


Advantages


- Fits the client's given criteria
- Customizable by the client. Slots together easily.

Disadvantages

- Quite "modern" which might not fit the client's specification criteria.

Client's Thoughts
The client again liked that the product was based off honeycomb but did not feel it would really suit her current kitchen environment. She also said that the hexagonal pots although they look aesthetically pleasing might not be very practical.



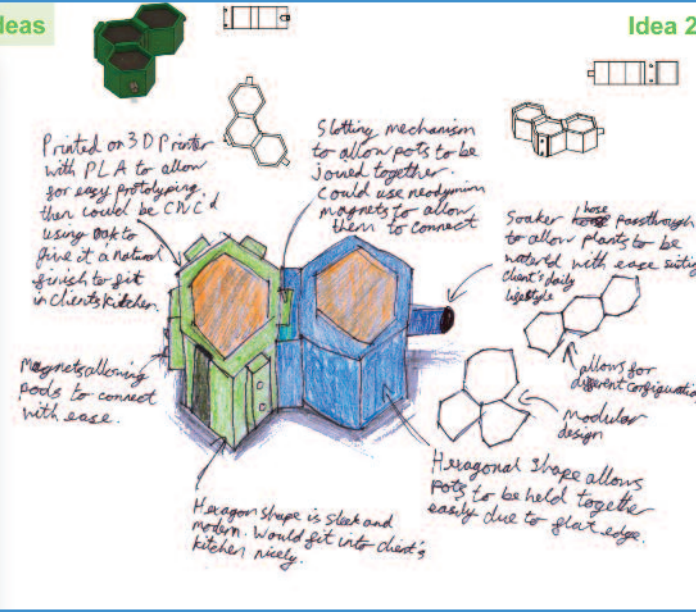


Printed on 3D printer with PLA to allow for easy prototyping. then could be CNC'd using oak to give it a natural finish to fit in client's kitchen.

Magnets allowing pots to connect with ease.

Hexagon shape is sleek and modern. Would fit into client's kitchen nicely.

Idea 2



Sliding mechanism to allow pots to be joined together. Could use neodymium magnets to allow them to connect.

Soaker hose pass through to allow plants to be watered with ease saving client's daily lifestyle.

allows for different configurations modular design

Hexagonal shape allows pots to be held together easily due to flat edge.

This student demonstrates iterative design, from generating ideas due to client information, to evaluating that idea with the client.

This example shows the student's thinking and uses a range of techniques.

This change has been challenging, with new requirements like the increase in mathematics skills and the need to assess these in the examination, creating real areas of development for students, teachers and management alike.

Teachers have worked exceptionally hard in preparation for the first year of entry of NEA. It's testament to their passion and determination that, in this first year, there have been some outstanding outcomes. It is really pleasing to see a good number of students who have genuinely embraced the opportunity to develop their designs in a more organic way, allowing

themselves to work through the problem by whatever means they feel appropriate.

One of the most exciting elements of the new Design and Technology GCSE is the opportunity for teachers and awarding organisations, to credit students who show an ability to solve problems autonomously. Students are now not expected to follow a certain method. They are rewarded if they embrace this freedom and clearly show their own unique, exploratory journey, one whose path is altered and fine-tuned according to their learning. The assessment of the

Continued on page 9...

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Design and Technology!

GCSE is designed to differentiate between students. Those students who are able to show that they are consistently evaluating and investigating, in order that they can generate more considered, and potentially more successful, products will enjoy more meaningful experiences, and therefore gain higher marks. Within the new specifications, reference to a client or user is key. In the past, some students have seen this as a hoop to jump through and we have seen many portfolios in which a client might be barely used or even imagined entirely. The tendency to do this for the new specification has been significantly reduced. We are seeing the client's

Attaching the Grip System to the Main Body
After ensuring that the first idea for the grip system worked, but deciding that my original method of screwing it onto the base would be ineffective and difficult to use, I decided that I needed to find an alternate method of attaching the system to the body.

For my next system, there will be no hole through the top of the plastic body, instead there will be two slots in the side of each one. This means that I can push in two aluminium bars into each side and attach them together. These aluminium bars would then be able to run through the bottom of my model and make sure that the grip system was firmly attached to the base.

Upon 3D printing my newer grip system I realised that the holes I had put in the sides were a fraction too small. However, since my model was not printed with a very high grip setting (less only set at 80%) it wouldn't be sensible to fix away the inside of those holes. As a result, I used the belt sander instead to remove some of the material off of the edges of each aluminium bar so they would fit in the holes.

Next, I needed to cut in the holes into the sides of my model to put the bars through. To do this I used a 8.5mm drill bit to chamfer drill in multiple holes next to each other. I was able to remove extra material and make the hole more rectangular using a file. Once the holes were in I could run the aluminium bars through and then push on the 3D printed parts at the end.

Overall, I am satisfied with the result of this system. Upon testing the system by pushing on the product from the same direction force would be applied during normal use, it seems that the system is strong enough to withstand that force.

However, in my next iteration I am going to alter the design of the knobs. Although the extended handle did act as a lever that made it easier to turn, that case was only really if the product was being handled from the side. Since it is on the ground, it felt like it would be easier and more ergonomic to be able to twist around from above, something this handle was unable to accommodate.

Before redeveloping my knob I should do some market research on pre-existing knobs and collect some anthropometric data.

New knob design
To get an idea of what I wanted the knob to be shaped like and how big I wanted it to be, I decided to use polymorph to model different ideas. To do this I heated water up to a boil with a kettle, poured the water into a pot and added some polymorph into the hot water. I walked into the water, was cool enough so I could safely remove the polymorph from the water, then I got down to modelling. I used my old handles as a base to build off of.

Set-up for using the polymorph, with the kettle and the pan.

This was my first model for a handle. The top of the handle is rounded so it fits comfortably into the palm of the hand. The handle extensions are for your thumb to push against to make turning it easier. On the right side of each protrusion there is an indent for the index finger to comfortably fit in. The main problem with this is that there aren't enough protrusions, there is only two, which means you have to do a full half turn, which cannot be done comfortably, or your hand will be in a very awkward position. Having specific indents also means that the product is more difficult to use for left-handed people.

This is one side after coming out of the 3D printer. One side of a piece that is 3D printed is always rougher than the other so I when printing I positioned the piece so the top would be rougher. Although aesthetically it is not as appealing, it was more important that the bottom was precisely manufactured to ensure that the piece functioned well.

This is a top view of my general plan for what the system will look like. The two aluminium bars connect the plastic pieces and are very strong so will resist the shear force that they will be under when the product is used. I decided to put two aluminium bars between the pieces because that will prevent the pieces from wanting to twist around or possibly become detached from the aluminium bars. Since the direction of motion on the system when the product is in use will be straight forwards, the plastic and aluminium don't have to be fixed together, the holes are tight enough so that the bars don't fall out. From an environmental perspective, avoiding using chemical adhesives like araldite makes recycling the product at the end of its life easier.

Pre-existing knobs

The shape of this knob is just like your typical door knob, an ellipsoid. However, instead of being made out of metal like most door knobs are, this is made out of plastic, with the outside covered in rubber. This allows the hand to get a better grip, making it easier to use and twist.

This knob is quite unusual I would say that shape is very ergonomic due to the curved surface which fits into the palm and the indents for the fingers which make it easier to grip and turn. However, the indents are very pronounced and may make the knob difficult to twist from more than one direction.

Anthropometric measurements of a hand

This was my third model. Like the other two it also had a rounded and slightly raised top so it was comfortable when the hand was pushing down on it. This model also had three prongs which made finding a grip and turning the knob much easier. There are no extra indents on either side of each prong so that the product is suitable for left-handed people to use. Overall, from testing each different knob I felt that this model was the best version, it was very comfortable and intuitive to use. In addition, I was able to get more grip and found this handle much easier to turn.

Testing how the handle would be held

needs and wants being an important factor in the process of decision making, with their involvement referenced at multiple points throughout the portfolio.

During a recent meeting with Brian Oppenheim, Ofsted's National lead for Design and Technology, I was encouraged to witness his passion for the subject and the opportunities for learning it can offer to students. The breadth of curriculum is vitally important within the new framework, and Ofsted views Design and Technology as a crucial subject in the offer to all students.

Good teaching of our subject not only enables students to pass their Design and Technology exams, but facilitates the development of transferable skills that can be used in all areas of the curriculum. Key personal development opportunities lie within the process of responding to a context, investigating a problem and developing a solution. Some of the most important of these being the ability to problem-solve, resilience and creativity.

Real investigation is happening in so many projects. Students are using modelling really effectively through a number of mediums.



Let's celebrate

Louise Attwood,
AQA Head of Curriculum – Design Technology

Design and Technology!

The iterative approach to designing championed by the new GCSE specification mirrors an approach to problem-solving highly valued in many fields of employment. We are now able to encourage students to take risks, and reward those who do.

While the changes in Design and Technology over the last reform of qualifications have not been without their challenges, many have overcome these and created inspirational learning opportunities for future designers.



We are seeing some high quality, simply constructed products that demonstrate a high level of skill, but don't take as much time as some of the legacy work.

"The curriculum is at the heart of the new inspection framework. Emphasis is given to the extent to which schools provide a broad and aspirational curriculum for all pupils. Inspectors will look at whether pupils study the full curriculum without it being narrowed. This means schools teaching the full range of subjects (as exemplified by the national curriculum) in key stage 2 and in Years 7 to 9. Secondary schools that have a two-year key stage 3 curriculum will need to ensure that pupils still have an opportunity to study a broad range of subjects in Years 7 to 9. Thus, schools will need to ensure that pupils are able to study design and technology up to the end of Year 9."

Brian Oppenheim
Ofsted National Lead for Design
Technology



Teaching the new D&T GCSE at Abingdon School

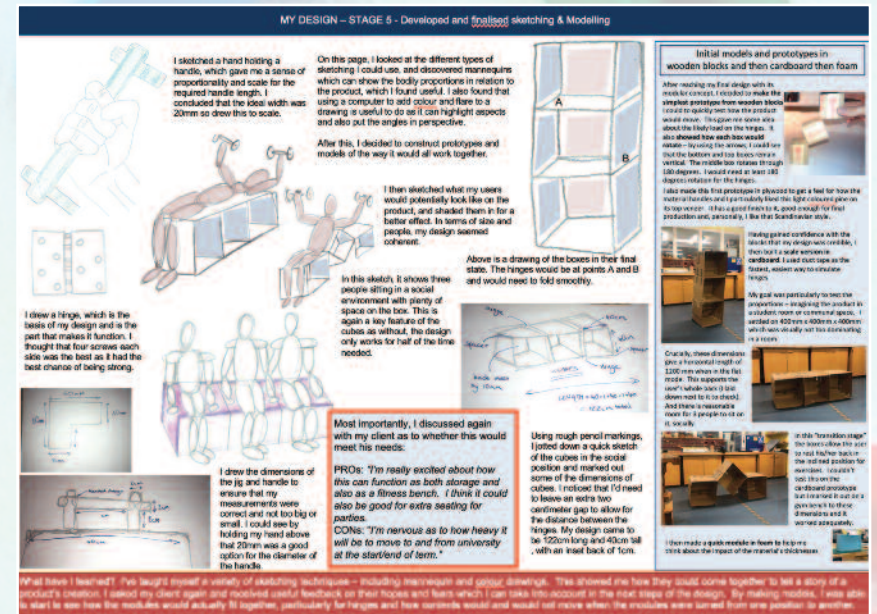
Dan Hughes, Head of Design and Technology (Abingdon school is an independent school for boys in Oxfordshire)

All boys at Abingdon follow Design and Technology at Key stage 3 and it is a popular option at GCSE with between 45 & 60 boys choosing the subject. We follow the AQA Design & Technology (9-1) specification. The introduction of the new specification in 2017 was an opportunity for us as a department to look at our teaching of the subject across all year groups, and develop our schemes of work to best prepare our pupils for the increase in the demand and rigour of the new course.

On our initial review of the specification, we were struck with the volume, or more the breadth, of the theory

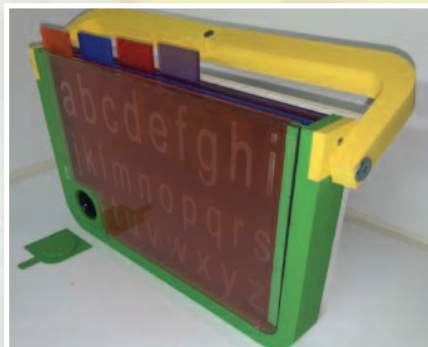
content. We looked across other departments at Abingdon to see where some of the core content was already being taught, and enlisted the assistance of our maths department to support our coverage of the maths skills. We decided to move some of the more straightforward material and elements of the core knowledge into our key stage 3 schemes of work, leaving the specialist technical principles to be covered in year 10.

The changes to the NEA were significant. The awarding bodies' context release date, level of support and feedback that we could offer pupils,



were areas we felt we must address proactively if we were to be successful.

We have always tried to encourage boys to identify genuine clients and designs that require them to demonstrate an element of empathy in their designing. The investigation and analysis of the three exam board contexts was not too





Teaching the new D&T GCSE at Abingdon School

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dissimilar to this approach and although our pupils still find this section demanding, it enables them to identify a wide range of individual opportunities to investigate. We offered all three contexts and had a fairly equal uptake of each.

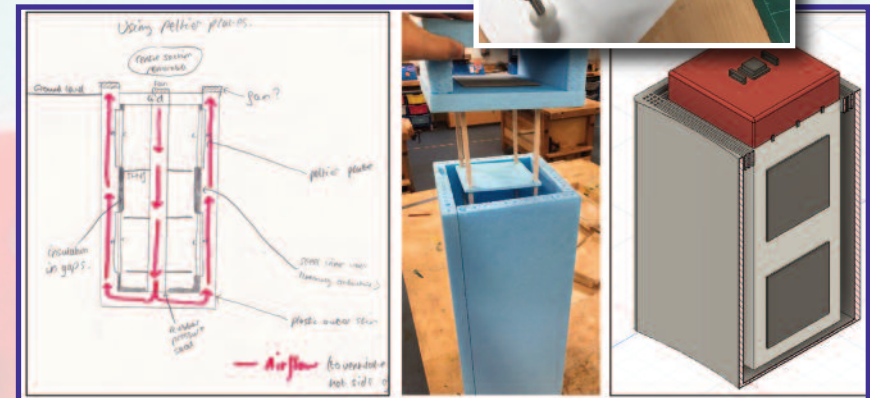
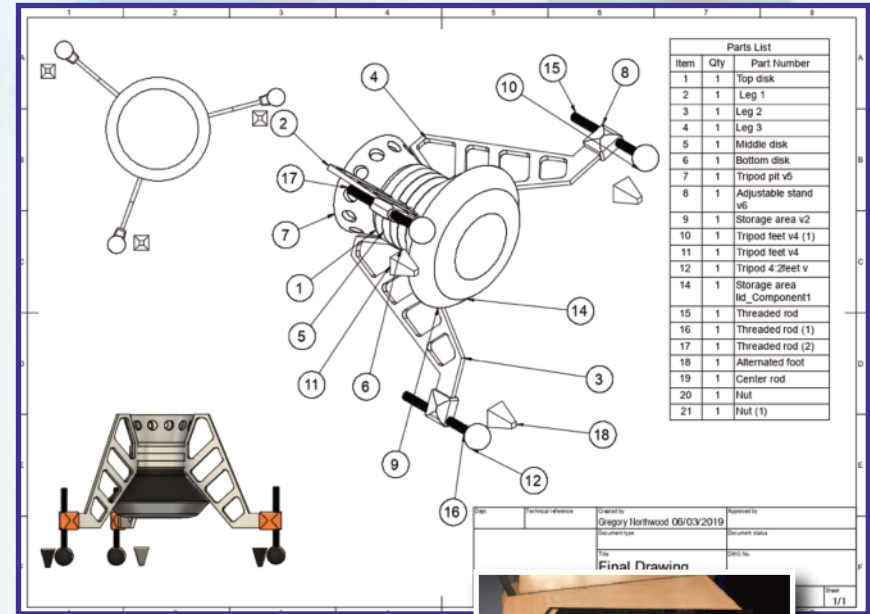
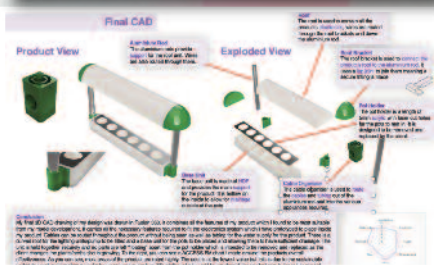
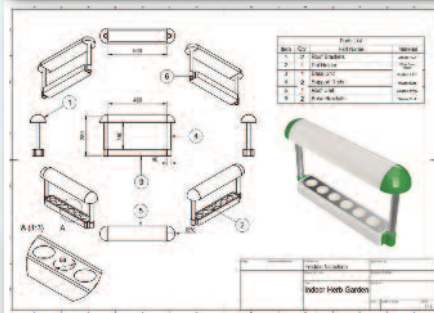
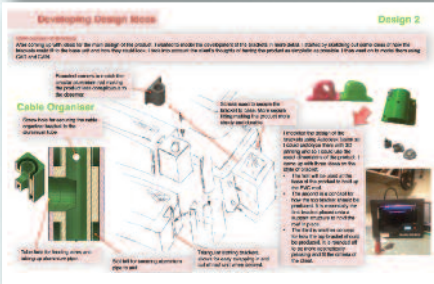
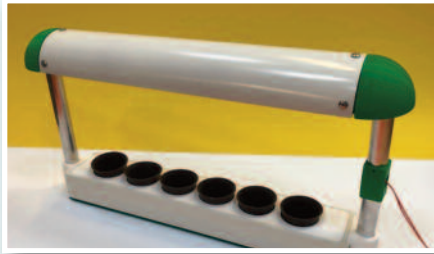
The need for the investigation to be specific and relevant linked to the new course than the previous 'research' section. The unfamiliarity of the pupils' chosen direction meant that they actively needed to investigate and research thoroughly before they felt confident in generating some initial concepts or ideas.

We encouraged pupils at this stage to generate design ideas, manufacture initial models and begin to test concepts simultaneously. They found throughout this section that they identified gaps in their initial research and investigation which they then had to undertake and

incorporate in their next iteration. The more successful pupils also involved their client throughout this stage, some face to face interviews, others emailing virtual models or design ideas for feedback.

As a department, we had to address our level of expectation in the practical outcomes that our pupils produce. The change in focus from a finished commercial product to a prototype is one that some of our pupils and staff have found challenging. We found that encouraging pupils to reduce the physical size of the practical outcome has helped them focus more on the function and features of their prototype.

The evaluation and testing section has historically been left to the end of the project and often suffered from pupils' time management issues. We have found the need and opportunity for ongoing testing and evaluation has embedded this activity in all stages of the

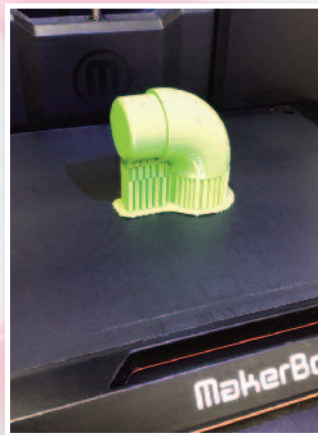




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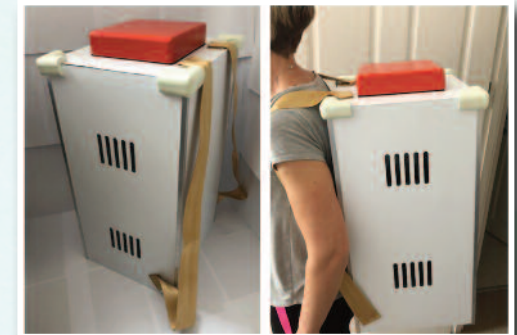
Dan Hughes, Head of Design and Technology (Abingdon school is an independent school for boys in Oxfordshire)

A summary of the strategies that we adopted and have found useful:



- Redesigning the teaching of the subject in the years preceding the GCSE course. Identifying opportunities that enabled us to cover a significant volume of the theory content along with introducing more consideration of design contexts in early projects.
- Ensuring that we have taught the skills necessary to successfully tackle Sections A and B, particularly of the NEA through a series of smaller projects. We have used these as an opportunity to provide guidance to students who can then reflect upon the skills learnt and staff feedback when tackling their NEA unit.
- Following the release of the brief on the 1st of June each year and pupils' early investigation of their chosen context, encourage them to contact a genuine client as soon as possible.
- Encourage pupils to start generating design ideas and early 3D models as soon as they feel they have identified and investigated the design possibilities sufficiently. We have found that this early practical development helps them identify areas for further research and allows them to discuss with their client or target user.
- Make use of CAD software to help communicate efficiently, develop design ideas quickly, and allow pupils to export their models and 3d print refined components. This has involved us actively teaching CAD modelling skills from the first year of entry, to ensure that their CAD ability doesn't hinder their creativity.
- Remember the restructuring of the assessment criteria and allocation of marks differs from the legacy specification and try to get the pupils to remember that the process is in many ways more important than the final physical prototype.
- Place greater emphasis on the evaluation and testing element of the NEA in line with the increase in marks available. Where possible test the prototype in situ with client interaction and plenty of relevant third-party feedback.

theory content a challenge, but those pupils who have really explored their context and the needs of the user have excelled. The diversity and creativity of some of the NEA work has been impressive and the journey of the pupils thoroughly valuable.



The new course has been successful for us. Our uptake at GCSE and A-Level is at a record high and our pupils have relished the opportunities to develop exciting prototypes and design solutions. Yes, some have missed the design and make style of the legacy specifications, some have found the breadth of the

You can follow the work of the pupils and the department on social media @abingdondesign on twitter or abingdon_design on Instagram

Skills for the Future: Education 4.0

Holly Neal, CreateEd, The CREATE Education Project brings together game changing technology with inspirational content and creative minds.



The following is CREATE Education's thoughts on addressing the Education 4.0 Initiative from the new World Economic Forum white paper *Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution*.

workforce being replaced by Industry 4.0 technologies such as Artificial Intelligence (AI), machine learning, and robotics.

The education system will be pivotal in preparing children, young people and workforces of the future by meeting these changing skill needs. The World Economic Forum (WEF) has stated that education models must adapt in order to equip pupils with higher-order cognitive and 'soft' or socio-emotional skills.

Industry needs to find innovative and emotionally-intelligent employees who can apply the principles of the technological revolution by being adaptive, agile and responsive, whilst having the ability to solve complex problems with both critical thinking and creativity.

Unfortunately, there is no current mandate for UK schools to develop the curriculum to include the knowledge and skills required by industry to prepare young people for future careers within Industry 4.0. The

focus must, therefore, be to engage forward-thinking educators to provide students with the opportunities to develop these skills and become confident with the new technologies available to them.

Whilst this currently takes place within STEM/STEAM learning, the perception of STEM/STEAM career pathways amongst some educators, parents and students needs to be altered. Good STEAM careers education, information, advice and guidance are key. STEM/STEAM learning should therefore not just be an extra-curricular add on, or an afterthought to the curriculum. It should instead be front and central to developing skills necessary to achieve the UK's industrial and economic goals and objectives.

Education 4.0 provides an opportunity for education and industry to work together, to give students hands-on opportunities to develop the skills required by industry alongside their standard curriculum delivery. Students need to experience ground-breaking

"The current technology that is available, provides a once in a generation opportunity to address the skills gap and stimulate the appetite of stakeholders to make it happen."

Paul Croft – Founder of CREATE Education and Director of Ultimaker GB.

technologies. This can help to future proof our workforce in a globally competitive marketplace, and maintain the UK's place as the sixth biggest economy in the world.

For details about our training, or other support, please contact

Nicola at n.shaw@createeducation.com or on 01257 276 116 to chat through the opportunities further.

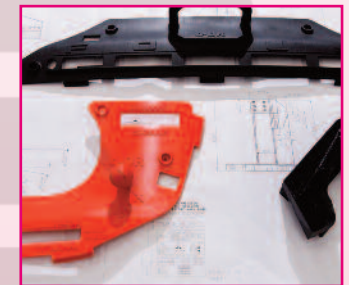


Globalisation and rapid advancements in technology continue to transform the world of work. Whilst automation is likely to displace workers, new occupations will be created, requiring learners to learn new skills.



Despite the pessimistic outlook and predictions often reported, research suggests that

employment levels could thrive. Employees could work in conjunction with new technologies via integrated thinking or 'systems thinking' instead of the perceived threat of the



Improving the extraction on 3D printers

Nigel Harris,
D&T technician at Churston Ferrers Grammar School

In November last year, Nigel contacted CLEAPSS about the guidance on the fumes and particulates emitted by 3D printers. The school was considering the options of making a cabinet, using the CLEAPSS designs or designing their own filtered extraction units for their machines.

The printers used in the department are Flashforge Dreamers, which are fitted with fans, which seem to be used for temperature controlling the build space rather than for extraction. In discussion, we were able to identify a better type of fan and filter, which enabled the staff to design, manufacture, and fit small extraction units to their machines. The following article explains some of the design work that the school worked through to develop their solution.

We discussed fan sizes and speeds, filter combinations and the advantages of a hood over individual extraction units. Low speed, high volume fans, can be placed outside the filter, so that the air is drawn from the build space, through a filter then through the fan, and cause minimal air disturbance in the build area.

The benefit of using a cabinet, is that there are no drafts because the air around the build area is not disturbed. However, a cabinet is a large piece of equipment, whereas a small extractor may be less obtrusive. As the school decided to work with small extractors staff had to work through some constraints:

- The filter size
- The aperture
- The fan size

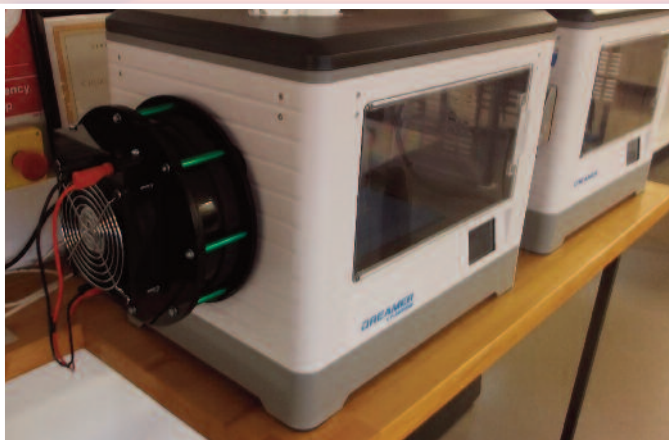
The filter has to be capable of controlling fumes and particulates, so we chose to use a Levoit filter (LV-H132-RF), because it was large enough to cover the rectangular hole on the side of the printer, where the side grill pops out. It cost £16 and is cheaper than the larger rectangular one used in the CLEAPSS hood. The filter size also matched the computer cooling fan from the IT department (a Delta Electronics AFB1212HHE 12V 0.7A & will run between 6 & 12 Volts, liberated from an old server).

These fans are still available, costing around £24, with postage. There are cheaper fans on Amazon and other retailers, but they are not powerful enough. Nigel tried one at 0.07A and found that the decimal place makes a big difference! Using *Fusion*, Nigel drew up a 3D housing which was split into 2 so that the filter could be loaded and that the print shape would fit the printer bed. This design required 48 hrs to print, so was scratched in favour of laser cutting a number of connecting discs & rectangles. The 2D design drawing is available if you contact CLEAPSS. For the spacers we used an

old broken DofE tent pole that was cut and faced off on the metal lathe (these are the green anodised tubes, which looks nice on the black). Inside these is some M4 stud cut to length, which clamp the fan & fan discs together, and help locate the unit onto the printer.

Power is provided from a 30W max2A universal adapter that can be set at various increments from 3-12v. At 12 V the fan will shift some air (probably too much) so it's generally running at 7.5V. The extraction has been in use since Christmas and it seems to work well. The school use PLA, and staff have not tried the units with ABS or anything else.

As the filters are relatively cheap, the staff will probably aim to change them annually, but they will need to be checked regularly to make sure they are not clogged or damaged.



Fish in School Hero The Food Teachers Centre



'Fish in School Hero' aims to ensure that every child gets a chance to prepare, cook and eat fish before they leave school. The programme aims to train over 400 secondary food teachers to be confident in preparing and cooking fish with students in their classrooms. Teachers will be supported by local 'Heroes', such as fishmongers, fish-loving chefs and fish suppliers, as well as other 'Heroes' who will come into schools to talk about their role in bringing seafood from the sea to the plate, highlighting careers and opportunities in the fish industry.



Supported by the Fishmongers' Company's Fisheries Charitable Trust, 'Fish in School Hero' is managed by the Food Teachers Centre and its volunteer team throughout the UK. Launching in East Coast schools, in 2020 and 2021 the programme will be extending throughout the UK, reaching over 60,000 pupils in 3 years.

Follow us on Twitter #fishheroes

Check the blogs about the launch from Bingley Grammar School
<https://www.bingleygrammar.org/latest-news/yr-9-yr-10-fish-heroes/>

and Emma @Girlyfishmonger <https://girlyfishmonger.wordpress.com/2019/12/05/is-a-seafood-education-important-for-future-generations/>

The pilot programme across Grimsby and Peterborough, Newark, Lincoln, area .
In the first year we will be:

- Providing lesson plans and recipes
- Providing a set of curriculum-linked, 'seafood' teaching resources and lesson plans, for use in KS3/4 classrooms. Tailored modules on five to seven different key seafood species, with information on basic biology, method of capture/farm cultivation, sustainability, careers involved in delivering seafood to consumer, cooking methods and health value.
- Compiling a directory of "fish advocates"
- Compiling a diverse database of seafood advocates, willing to visit schools and talk about seafood careers, and offer guidance for those talking to classes.
- Locating regional seafood suppliers (fishmongers, catering supply companies, producer organisations, retailers, etc), willing to provide affordable product suitable for use in the classroom. This enables a "dating service" to match local schools with the best, local, seafood source, helping teachers plan.
- Providing teacher training introducing this material to food teachers in regional workshop sessions
East Coast area schools can register here to take part in the programme.
<https://fish-heroes-grimsby.eventbrite.co.uk>

For more information do get in touch info@foodteachercentre.co.uk



Guidelines for producing education resources

Frances Meek,
British Nutrition Foundation



Food education continues to be part of the solution to ensure that pupils learn how to make healthy food choices now, and in the future, and forms part of the strategy to tackle childhood obesity in the UK.

In 2018, the British Nutrition Foundation, with the Agriculture and Horticulture Development Board, initiated work to develop a set of voluntary guidelines to support food education in schools, ensuring that pupils use up-to-date, evidence-based and high-quality resources to support their learning.

The result was [Guidelines for producers and users of school education resources about food](#), a guide that sets and promotes high standards, expectations and requirements for the production of resources in relation to food education for schools. There are 14 guidelines, five covering key content, such as healthy eating, food provenance and food preparation, and nine focusing on areas such as the curriculum, being evidence-based, and design.

The Guidelines can be adopted as part of a good practice approach by those who produce and use food education resources for schools and cover all types of resources. It is anticipated that the guidelines can be used in a variety of ways, including helping resource providers and teachers create resources that are reliable, not misleading and evidence-based. A useful checklist, that could be used for planning and production purposes, as well as auditing, has also been provided as part of the *Guidelines*.

Since publication in June 2019, the [Guidelines](#) have been downloaded over 1,000 times and are currently being used in a variety of educational settings and by organisations.

It is hoped that teachers will use the guidelines when selecting materials or devising their own resources (see case study). For further details, go to: <https://www.foodafactoflife.org.uk/whole-school/whole-school-approach/guidelines-for-school-education-resources-about-food/>

Case study: *Kate Hufton, Limes Trust*

I was given responsibility for raising the profile of food education and to establish a structured approach to food and life skills at a Special School in Havering. The school has about 100 students from 3-19 years who have a variety of Special Educational Needs and Disability (SEND), including PMLD, SEMH and ASC.

By using the *Guidelines* to audit and review ready-made resources from education websites, it was clear to me that there are differences in the quality/accuracy of the information provided by publishers on different websites. For example, one website features healthy eating images and activities based on the 'food pyramid' and old versions of the Eatwell plate, which are not reflective of UK healthy eating messages. While it is acknowledged that some websites have an international audience, there is no information that identifies that the resources might not be appropriate for certain curricula and Schemes of Work.

The *Guidelines* were also useful to check the accuracy of information for resources on another website, as well as suitability for SEND pupils, for example, resources are often too wordy and are not visual enough. From a personal perspective, I also have some concerns around plagiarised materials and copyright. The Guidelines not only provided a useful audit tool to check for accuracy of content, but also helped me to review other aspects such as layout, spelling and grammar.





Fume Extraction and Laser Filtration

Steve Cockerham, HPC Laser

Although laser machines themselves don't produce fumes during operation, the material being processed usually does. It's essential to have these fumes removed from the working area and either out of the building or into a self-contained fume filter.

We're often asked about the differences between our standard extraction to atmosphere and the option for a fume filter system. Let's take a closer look at the options available for dealing with the fumes emitted by cutting acrylic, one of the most common materials processed on a laser machine.

Laser cutting acrylic thermally decomposes the material and produces fumes which are 90% volatiles (extremely hazardous - see <https://www.alencorp.com/pages/he-epa-on-the-dangers-of-volatile-organic-compounds>), the remaining 10% are sub-micron particulates.

As standard, our machines are supplied with an extraction fan unit and two lengths of flexible hosing. One hose is installed between the laser machine cabinet and the extraction fan. The other hose is installed between the extraction fan and the interface to the outside world, typically a hole in an outside wall together with a louvred or flapped cover plate on the outside to prevent rain and moisture entering the extraction system.

If the layout of the room or building is not suitable for extraction to atmosphere, it is worth considering a self-contained fume filter system. Instead of ventilating the laser fumes to the outside world, a fume filter typically uses a combination of a HEPA (High Efficiency Particulate Air) pre-filter and a combined filter which contains activated charcoal. The HEPA filter captures the airborne particles in the extracted air and the charcoal filter removes the aroma. The result is extracted air which is safe to circulate within the room. For this reason, we use fume filters to demonstrate laser machines at exhibitions and they are often selected for larger premises such as schools and universities where it may not be possible to extract through an outside wall.

For fume extraction into a filter system, HPC Laser work directly with the global lead in fume extraction technology, **BOFA International**. Our working relationship with BOFA means we supply fume extraction filter systems and filter replacements for an excellent price.





Fume Extraction and Laser Filtration

Steve Cockerham, HPC Laser



Bofa filter cartridges need to be changed once they are saturated. Depending upon the exact model of filter unit, an alert would usually be produced once the pre-filter was sufficiently full to affect airflow. Once the carbon filter is saturated an increase in fume aroma will be noticed, indicating that it is time for the filter to be changed. Some models of Bofa fume filters have an additional VOC (volatile organic compound) sensor that enables an alert to notify when it is time for the carbon filter to be changed.

The time taken for the filter cartridges to require changing varies significantly depending upon machine use and the particular materials that are being processed. For example, MDF produces a high concentration of dust and airborne particles which will fill the pre-filter cartridge much faster than acrylics which are typically low on airborne particles and have much higher levels of volatile organic compounds which will saturate the carbon filter.

Some materials such as **HPC's laser plywood** is particularly well suited to laser cutting and produces excellent results with a minimum of smoke and fumes.

You can generally cut most types of plastic with a laser machine without any issues, providing you don't cut PVC. This material emits chlorine when heated, a very hazardous substance that is likely to damage components within your machine, and even worse, the health of those in the immediate vicinity. If you are in any doubt about the suitability of any materials to be cut with a laser machine please always contact the material manufacturer for advice.

Packages including bespoke extraction systems are available.

For more information, please contact us:

Email: sales@hpclaser.co.uk

Tel: 01422 310800

Live Chat: www.hpclaser.co.uk



AN INTRODUCTION TO IDENTIFYING AND CONTROLLING PERSONAL EXPOSURE TO

Dave Lombardi, EEUK Ltd

At EEUK Ltd we work in the area of Occupational Hygiene, which is the health and safety specialism concerned with the anticipation, recognition, evaluation and control of chemical, physical and biological agents in the workplace. It brings together disciplines including science, mathematics and engineering to understand personal exposure to workplace hazards and implement adequate control solutions.

Our work is primarily concerned with the management of COSHH (Control of Substances Hazardous to Health).

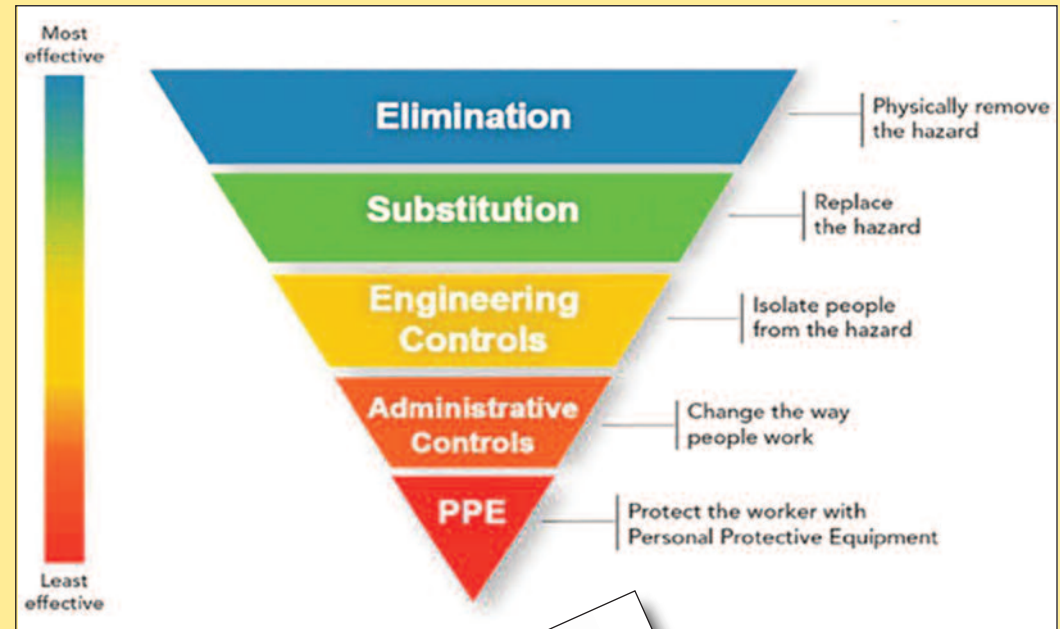
Before we can quantify or control personal exposure to chemical agents, we must firstly understand the foreseeable risks. This is determined through risk assessment. A risk assessment which covers COSHH materials brings together several components to determine the risk and provide a list of required actions. These components include:

- an understanding of the substances involved,
- how they are used and by whom,
- what the routes of exposure are, and
- what control measures are currently being used (such as fume cupboards and gloves).

Recommendations for exposure monitoring or further controls are based on the foreseeable risk outlined in the risk assessment.

Workplace Exposure Monitoring is used to quantify the foreseeable risk. This can be undertaken in two forms:

- workplace air monitoring which demonstrates the personal exposure risk via inhalation or
- biological monitoring which identifies the total uptake of the body by all routes of exposure including inhalation, ingestion and skin contact.



Does this look like a good solution to controlling fumes or dust?

AN INTRODUCTION TO IDENTIFYING AND CONTROLLING PERSONAL EXPOSURE TO

Dave Lombardi, EEUK Ltd

Once the foreseeable risks have been identified and quantified it is time to prevent, or where this is not possible, reduce personal exposure to the substances of concern as low as reasonably practicable. This is achieved through the principles identified in the hierarchy control. These identify technical and procedural measures which, at their most effective, removes the substance from the workplace all together, at their least effective, controls exposure on an individual basis through the use of RPE or PPE.

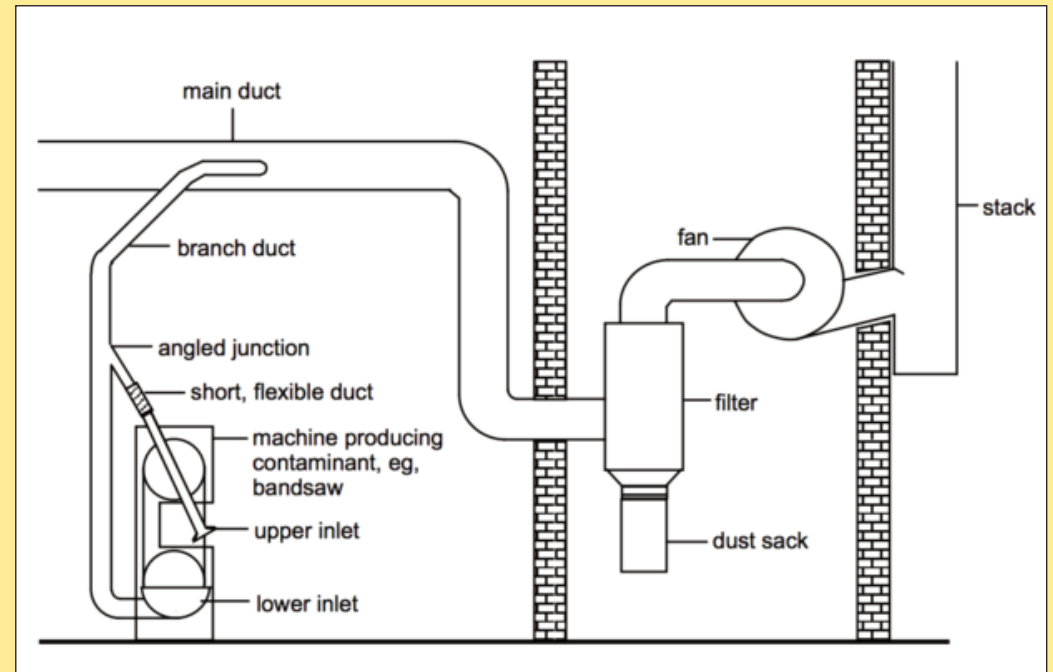
One of the most effective methods of exposure control is the use of local exhaust ventilation (LEV). This is an engineering solution that comes in all different shapes, sizes and applications. The key here is to know how the substance needs to be controlled. For example, if the substance is a hot, buoyant vapour you may wish to look at a receptor style hood or if it is a dust you may find a capture hood is more suitable. The overall principle of LEV is to remove the substance from the breathing zone of the worker as well as away from the general working population. Training on the use of the LEV system is as important as its design.

One of the most problematic method of control is the use of respiratory protective equipment (RPE). RPE can come in all different shapes, sizes and applications. As it is a 'personal' measure, the correct selection of such a device is critical for it to offer the user the required level of protection. When selecting RPE the substances used, facial anthropometrics and fit testing must be considered. There is a useful document on the CLEAPSS site: 'GL310 - A guide to the use of Respiratory Protective Equipment (RPE) in school D&T and science'
<http://dt.cleapss.org.uk/Resource/GL310-A-guide-to-the-use-of-Respiratory-Protective-Equipment-RPE-in-school-D-T-and-science.aspx>

It is hoped that this article has gone some way to providing a brief overview of COSHH. If you wish to know more please feel free to connect with the author on LinkedIn.

About the Author

Dave Lombardi is recognised through the British Occupational Hygiene Society (BOHS) as a Masters degree level Certified Occupational Hygienist and is a member of the Faculty of Occupational Hygiene as a Licentiate.



Dave's Allotment

You can follow the progress of the CLEAPSS allotment on Instagram, @parrys_plot
https://www.instagram.com/parrys_plot/

The winter is a quiet time on the allotment, and this winter has been particularly wet, so even quieter than normal. The sprouts and root vegetables were a great success at Christmas, a couple of sticks of sprouts even got donated to the local pub for their Christmas dinners. The swedes, carrots and potatoes were excellent, and the green beans and other vegetables that had been frozen earlier in the year all got used over the Christmas period.



As January started to roll on, the allotment started to come back to life. The daffodils and anemones sprang back, with snowdrops brightening up the plot. There were some occasions when it wasn't too wet to do anything, so some more flowers were planted around the trees. The fruit trees did produce some tasty produce last year, but the apple tree had to be removed as it had developed canker. This is being replaced in the next few weeks. The area around the trees is going to be a flower bed, to attract the bees and other pollinating insects.



One of the great successes last year was squashes, so that's a plant that will be going in again. But broccoli was poor so that probably won't be making an appearance. The brassicas take a lot of work, including building a cage to try to combat the nasty little cabbage white butterflies, and the returns weren't very good, apart from the sprouts.



Beans were heavy croppers last summer, but there were too many plants. This year, rather than 80 plants, perhaps 40 may be better. This will also free up space for more squashes!

Potatoes are always a good return, as long as they avoid the frost. Last year many of the other 'allotmenters' planted their potatoes in pots and bags, rather than directly in the ground. This makes it a lot easier to harvest, and it helps to avoid 'missed' potatoes self-seeding later in the year. However, this year the potatoes will be going in the ground in the half plot that needs the most digging.



Soft fruits were a bit hit and miss last year, but there are new strawberry plants for this year. The gooseberries, raspberries, blackberries and others have all had another year in the ground, which should help them to bear more fruit this summer.

Over the next few weeks there will be lots of digging and weeding to do, but that should make the plot much tidier when the plants go in, and easier to maintain over the summer and autumn.



CLEAPSS **small print**

Laser cutters

Although laser cutters a very useful tool in D&T, it is important that schools do not use machines which are inherently unsafe.

In *Futureminds* 12, and earlier in this edition, we have run articles about laser cutters, which clearly state the dangers of using machines that do not have all of the safety systems in place.

A laser machine which can be opened without automatically shutting down the cutting laser must not be used in school. It is considered a class 4 laser, and could cause severe burns and eye damage.

There are also some 3D printer units that can have a laser, or an engraving head, fitted in place of the printer nozzle. These can only be used if the machine is fully enclosed and the enclosure is interlocked, so that the laser is immediately switched off if the enclosure is opened. The enclosure must protect against the potential scattering of the laser.

All laser cutting and engraving machines must also be fitted with some form of extraction, as burning materials produces harmful combustion gases and fumes, and engraving produces potentially harmful dust.

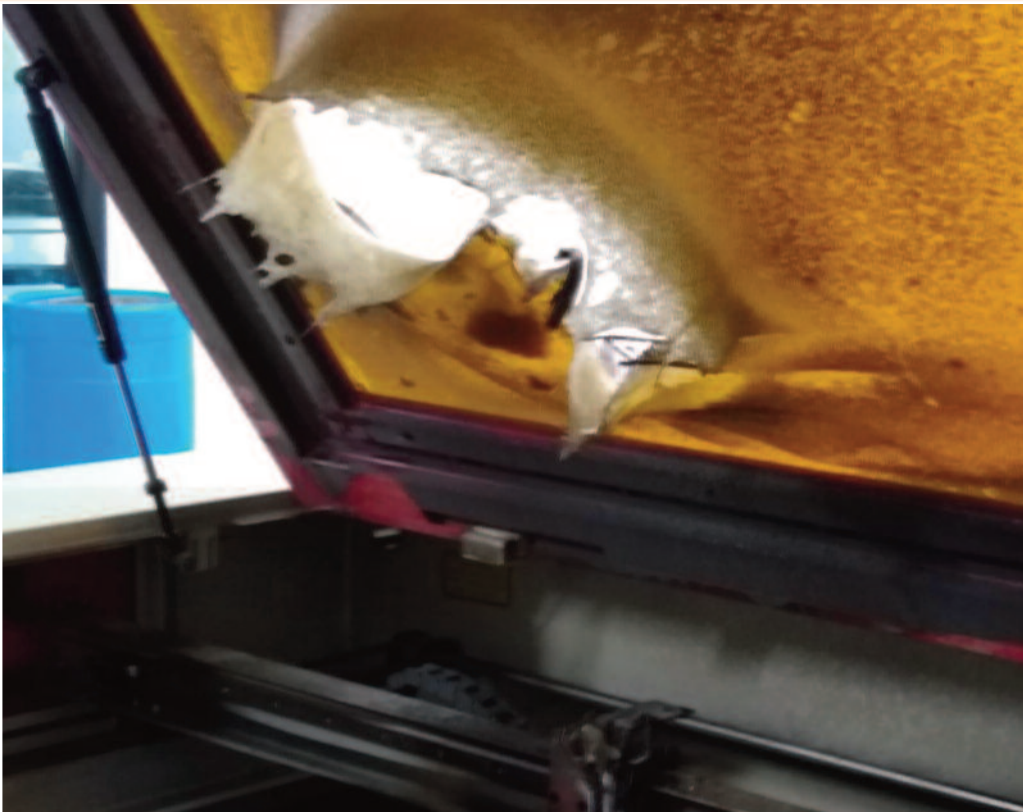
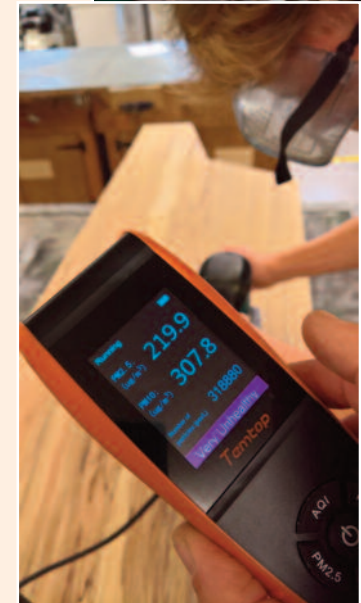
Remember, cheapest is not always best!

Latest news from HSE regarding Work Exposure Limits (WELs)

All LEV professionals, and everyone working with wood, need to be aware of the 40% reduction in the statutory exposure limits for hard wood and mixed hard/ softwood dusts from January 2020. This also applies to MDF and particle boards as they are typically mixed woods.

The WEL (Workplace Exposure Limit) for hardwood and mixed hard/softwood dust is now to as far below 3mg m^{-3} 8hr TWA (time weighted average) as is reasonably practicable. In Jan 2023 it will reduce further to 2mg m^{-3} . The new EH40 (Workplace exposure limits) document can now be downloaded from the HSE website. There are new or revised entries for the following substances:

- Hardwood dusts (including mixed hard/soft wood dusts)
- Chromium (VI) compounds
- Refractory ceramic fibres
- Respirable crystalline silica
- Vinylchloride monomer
- Ethylene oxide
- 1,2-Epoxypropane
- Acrylamide
- 2-Nitropropane
- O-Toluidine
- 1,3-Butadiene
- Hydrazine
- Bromoethylene



Allergens

We have had a couple of helplines recently regarding pupils with allergies to certain food stuffs, such as eggs.

We suggest you work with your inclusion coordinator, year team lead, Head of House or other pastoral staff, who have links to family members who are likely to have been managing the situation for some time. Some key questions to ask:

- Can/does the child manage their own symptoms in other settings?
- Has the pupil had a full diagnosis yet?
- Has the family doctor prescribed an EpiPen?

The link to the Allergy UK website, gives more on allergy to eggs.

(https://www.allergyuk.org/information-and-advice/conditions-and-symptoms/36-types-of-food-allergy#download_access).

You may find resources from the Anaphylaxis Society useful:

<https://www.anaphylaxis.org.uk/>,

1 Alexandra Road, Farnborough, Hampshire, GU14 6BU. Tel: 01252 546100.

It also provides information relevant to schools: <https://www.anaphylaxis.org.uk/schools/schools-help/>

From FAQs for schools on the Anaphylaxis Society :

"There is no need to exclude an allergic child from cooking lessons, but care is needed with foods that any child is allergic to. Minimise risk with measures such as cleaning the cooking area thoroughly before use and ensuring that recipes are thought out carefully."

There is also a link to a paper: *Task Force on the allergic child at school* (TACS) position document 2009, which contains more information. The 'Action points for all children with allergic disease in school' includes the statement:

"4. Reasonable measures should be instituted to ensure appropriate allergen avoidance."

"7. Ensure lessons avoid the use of provoking food allergen (e.g. using peanuts during science or art lessons)."

"Some schools have a separate bench, with a set of equipment that is kept for those who may have an allergic reaction to some food stuffs, or, for other reasons, are not able to use ingredients that others may use. These utensils should be clearly marked to ensure that they are not used for other uses."

And, under the section on food allergy:

"3. Staff should be made aware of how to handle potential food allergens safely, including effective cleaning of surfaces and utensils."

YOUR QUICK GUIDE TO....
Milk Allergy
Advice provided by allergyuk.org

Cows' milk allergy - affects around 3-6% of infants and young children who usually start to have symptoms in their first few months. This causes many health problems frequently not diagnosed until many months to years of age.

Most children outgrow their allergy by five years of age. Allergy in older children is extremely uncommon.

Milk and dairy form an important part of our diet. They contain many nutrients including calcium, protein, minerals and vitamins. They are therefore important for growth, bone and muscle development. It is therefore important to think that you or your child are allergic to cows' milk. See your GP or Health Visitor for advice.

Cow's milk and dairy products can cause an allergic reaction. However, if these are consumed in the diet, it is important that they are sourced from other countries.

Prevention of milk allergy

New research (3) has shown that the risk of developing peanut allergy can be reduced in infants at high risk of this allergy (i.e. those with significant eczema and/or egg allergy) by introducing food containing peanut into infants' diets within the first 12 months of life.

Early introduction is thought to help the immune system tolerate peanut protein. Infants with no eczema or known food allergy can be given food containing peanut from the time that solid food is introduced, at around 6 months, when baby is developmentally ready, but not before 4 months. This should be in the form of smooth peanut butter or peanut snacks suitable for babies (never use crunchy peanut butter or whole peanuts due to the risk of choking). If they have been diagnosed with a food allergy or eczema it is important to discuss introducing peanuts with your GP, Dietitian, Paediatrician or Health Visitor. (Delaying the introduction of peanut can increase the risk of developing a peanut allergy) so ensure you speak to your health professional as soon as possible.

It is safe for pregnant and breastfeeding women to consume peanuts unless they are allergic themselves.

What are the signs and symptoms of an allergic reaction to peanut?

Signs and symptoms usually occur within minutes of eating or drinking the allergen.

Who is at risk of peanut allergy?

Infants with eczema and/or egg allergy are more likely to develop a peanut allergy (2). It is important to know that peanuts are a legume and from a different family of plants to tree nuts (almonds, Brazil nuts, cashews, hazel nuts, macadamia, pecan, pistachios and walnuts). A peanut allergy does not automatically mean an allergy to tree nuts although it is not uncommon to be allergic to both peanuts and some tree nuts.

An allergy to peanuts does also increase the likelihood of an allergy to sesame and lupin. Advice on whether it is safe to have sesame, lupin or tree nuts in the diet should be sought from your GP/allergy specialist.

How common is peanut allergy?

Peanuts are a common cause of food allergy, caused when the immune system reacts to the protein found in peanuts. Peanut allergy affects around 2% (1 in 50) of children in the UK and has been increasing in recent decades.

It usually develops in early childhood but, occasionally, can appear in later life. Peanut allergy tends to be persistent and only approximately 1 in 5 children outgrow their allergy, usually by the age of 5 (1).

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Key facts

Infants with eczema and/or egg allergy are more likely to develop a peanut allergy

There is no evidence that peanut protein can be circulated in the cabin air and cause a severe reaction on a plane

It is important to know that peanuts are a legume and from a different family of plants to tree nuts

For more help, contact the Allergy UK helpline:
Monday to Friday, 9am to 5pm
01322 619 898
info@allergyuk.org

AllergyUK

YOUR QUICK GUIDE TO....
Egg Allergy
Advice provided by allergyuk.org

The information in this Factsheet has been written to help you understand more about egg allergy.

Eggs are one of the most common allergens to trigger allergic symptoms in children. An egg allergy will usually develop in the first few years of life. In some cases it will persist into adulthood, but in rare cases, adults can occasionally develop an egg allergy.

Reactions to egg are usually mild and occur within minutes of eating the protein part of the egg (egg white). Babies with an egg allergy often have an increased likelihood of having other food allergies. Having a food allergy, for example, a family history of allergy increases the risk.

Allergic Symptoms

Allergic reactions to egg can range from mild to moderate or severe (e.g. anaphylaxis). Some are certain things that can cause an allergic reaction. The amount of egg eaten and how the egg was cooked.

Egg does not have to be eaten to cause an allergic reaction, coming into contact with egg shells or touching (raw) egg can cause allergic symptoms usually affecting the skin in highly sensitive individuals.

Most reactions to egg are mild and symptoms are seen soon after eating egg or foods containing egg. Babies will usually outgrow their allergy by the age of 5.

Prevention of egg allergy

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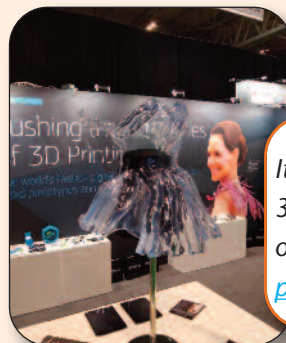
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Monday to Friday, 9am to 5pm
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info@allergyuk.org

AllergyUK

Some recent tweets



We are doing a lot of work on [#3DPrinting](#) with [#resin](#) and [#metals](#) over the next few months, if you are trying this in school, please get in touch via the helpline: dt.cleapss.org.uk/helpline/helpl...



It's not all chess pieces in the world of 3D printers, fantastic fashion creations on show at [#TCTShow](#) protolabs.co.uk/about-us/press...

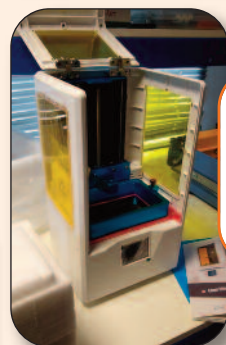


CLEAPSS audits & training are available to all our members Many overseas schools combine an audit with training to save on costs this helps to improve their D&T facilities & practical work, contact us via the helpline: dt.cleapss.org.uk/helpline/helpl...

Really interesting presentation at the [#fflconf2020](#) last Saturday, Great to see so many teachers there.



Design and Technology - Why is it important? Watch the new series of short films by [@DTassoc](#) really capturing the 'magic and creativity' of Design and Technology. Watch it here youtu.be/1GlyOMoFpks



New piece of kit in the [#CLEAPSS](#) [#makerspace](#) a [#photons](#) [#DLP](#) [#3dprinter](#) looking forward to firing it up and seeing where the issues may be for schools to adopt this technology.

Roundup; Monday and Tuesday catching up after [#ase2020](#), [#3Dprinting](#), and helplines, Wednesday supporting [#AQA](#) student voice at Westminster, Thursday meeting with [#flamefast](#), Friday updating documents. The life of a [#DT](#) adviser



Off to [#Bett2020](#) today, what's the best bit going to be?



Back from [#bett2020](#) lots of interactive whiteboards... Also some interesting ideas, the [#Arduino](#) stand had a great automatic greenhouse.



The summer edition

In the next edition of *Futureminds*:

We will have a detailed article about the use of the new Model Risk Assessments.

There will also be articles about the ongoing 3D printing research, more information about the work on new facilities for D&T, Food and Art, articles from the Food Teachers Centre and the Textiles Academy, and lots of other interesting stuff.

If you want to put together an article about something you are doing, or want to do in school, please get in touch and we will help you.

You can also follow us on twitter [@CLEAPSS_DT](#)

You can also follow Daves allotment progress on Instagram [@parrys_plot](#)

The password and login details for the site have changed, you will need the latest printed Bulletin to get the details, ask your science department or ring CLEAPSS (have your school postcode ready): 01895 251496

