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Demonstration Risk Assessment Form

SCIENCE IN SCHOOLS- ENERGY LIVE SHOW
SEPTEMBER 2017

Demonstrations include:

1. Ethanol Rockets
2. VDG with Barbie, Pie Dishes & Butane Bowl
3. Balloon Popping Race
4. Egg Drop
5. Paint Tin Steam Pop
6. Angle Grinder
7. Butane Bubbles
8. Electromagnet Tug of War
9. Hand Generator with Hat
10. Hand Generator with Microdet

Likelihood		Severity of impact		Current risk	
Certain	5	Death or total destruction	5	**Multiply Likelihood and Severity of impact to get Current Risk rating**	
High	4	Major injury or damage	4		
Medium	3	Serious injury or damage	3		
Low	2	Minor injury or damage	2		
Very low	1	Negligible	1		

Action Rating	
10 and above	**The work is too dangerous and should not be undertaken**
8 or 9	The work is high risk. Those undertaking the work must be fully competent and experienced for the type of work, equipment to be used and fully understand all risks present.
5 or 6	Moderate risk Workers must be fully competent for the type of work and risks present, or under competent supervision.
4	Low risk. Those undertaking the work must be aware or be made aware of the risks and mitigation measures required.
2 or 3	Slight risk. Those undertaking the work should be aware or be made aware of the risks and mitigation measures required.
1	Insignificant risk. Activity suitable for all workers

ACTIONS NEEDED BY VENUE:

1. Isolate Smoke/ Fire Alarms in vicinity of demonstrations
2. Ensure 1 x Fire Extinguisher is on Stand-by (only to be used in emergencies- should be either dry powder, carbon dioxide or water spray (not jet))
3. Ensure presenter knows Fire Evacuations procedures
4. Ensure presenter know location of nearest fire extinguishers
5. To inform presenter/ Ri (at least 24hr prior to performance time) if any of the attendees suffer allergies to latex, eggs or tomatoes.

Risk assessed by: **Fran Scott**

Date of last review: **23/09/2017**

Review date: **22/03/2018**

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Demonstration1: Ethanol Rockets

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y				Y

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**
A drainpipe drilled at certain points is its length and has straps attached so it becomes shoulder-mounted. **A one litre drinks bottles (made for carbonated drinks) has a 5mm hole drilled in its base. With your finger over the hole, a generous pour of ethanol is added to the bottle. The bottle is then shaken for at least 30 seconds and the excess ethanol poured out by turning the bottle completely upside down and allowing it to flow out from the lid. The lid is then replaced and the bottle placed into the pipe launched, base towards the opening. Using a long-handled gas lighter (with a gloved hand) the ethanol in the bottle is lit. This causes the bottle to fly out of the pipe. The launcher will be aimed into the space above the audience so that the**	Working with Ethanol UN1170 Safety data sheet can be found here; http://www.timstar.co.uk/media/download/chemical_sd_sheets/timstar_chemical_sds_ET2634.pdf	The ethanol used will be obtained from a reputable supplier (Timstar). To extinguish an ethanol related fire any of the following fire extinguishers can be used: Water spray (not water jet), alcohol resistant foam, dry powder or carbon dioxide. Goggles and nitryl gloves will be warn. Breathing in of vapours will be avoided.	2	3	6
	Transporting, Storing and Disposing of Ethanol	It will be stored in a non-conductive box (to prevent the build up of static electricity). It will be storage in areas that are well ventilated, cool and dry. It will be protect from direct sun and stored away from sources of ignition with containers kept closed when not in use. It will be kept well separated from oxidising agents (potassium chlorate). Excess ethanol will not be disposed of in places where it can add to the water or soil supply, therefore if necessary to be disposed of it will be burnt in a controlled manner, on a fire retardant surface.	2	3	6
	Hot Burn	Burns could occur from either the lighting of the ethanol or contact with the bottle are lighting.	2	2	4

bottle will fall into the audience space.		To prevent the presenter being burnt they will wear a glove as they light. And although the bottle will be warm after the burning, it will not be hot enough to cause injury. Nevertheless the audience will be warned to not to touch the bottle for long if it lands near them. Goggles will be worn by the presenter throughout.			
	Impact Injury	The bottle is launched out the pipe at speed, however the bottle will be aimed in the area above the audience rather than at the audience themselves. This means a lot of the speed of the bottle will be dissipated by the time the bottles fall into the audience (and so won't have enough speed to cause injury). In addition, the audience will be warned to protect themselves if the bottle falls towards them.	2	1	2
	Fire	Ethanol vapour is flammable, therefore there is risk of fire. To negate the risks involving flammable materials we will do the following: - The ethanol will be stored within the appropriate lidded container (provided by supplier). With the lid always being replaced at the earliest opportunity. - Once poured into the bottle rocket and poured back out, both the ethanol bottle and the beaker of excess will be positioned at least 1m away from the launcher. - A fire extinguisher will be on stand by. - The presenter will position the firing end of the bottle away from their leg, so that the fire fallout goes to the side of the presenter. If ethanol is spilled, it will be mopped up using paper towels, the presenter ensuring that they do not get any on their clothes, ensuring that the paper towels are disposed on in the bin. If the ethanol is spilled in excess onto the clothes of the presenters, they should change clothes before conducting fire-based demonstrations. If not possible they should instead wear a lab coat for the other fire-based demonstrations. The presenter will wash their hands after performing this demonstration, before eating.	3	2	6

PPE Requirements

Item		**Item**		**Item**		**Item**	
Flameproof overalls		Gloves contact	Y	High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	

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Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection	Y		

Demonstration2: Van De Graaff Generator with Pie Dishes and Bowl of Butane

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**
A van de graaf generator is used by the presenter to create some sparks. Then a Barbie doll and some (approx. an 8cm high pile) small metal pie dishes are placed on the large dome of the van de graaf generator. When the van de graaf is switched on the Barbie doll's hair will become separated and the pie dishes will all gracefully fly off. **Then the wire normally going to the earthing globe is attached onto the side of a pyrex bowl placed on top of a heat proof pile. The presenter stands on an insulated**	Electrical fault	Ensure van de Graaff is in fully working order. The Van de Graaff will either be brand new (less than 6months old), or will be PAC tested..	1	1	1
	Trip hazard	If the wires are trailing over the stage they will be secured with gaffer tape.	1	1	1
	Static Shock	Only the presenter will be on stage when the Van de Graaf is switched on. All the presenters are fully trained in how to use a Van de Graaff generator and will ensure that the earthing globe/ earthing wires are used when necessary. They have no heart conditions that prevent them from using such equipment.	3	1	3
	Working with High Voltage Apparatus	As this machine uses high voltage it should not be used near those with pace makers or other electrical based health monitors, therefore the audience will be warned that if they do have a pacemaker to stand back at least 3metres	1	5	5
	Fire	The butane in the bowl burns for 3-10 seconds. It will be ensured that the immediate area is clear of flammable products including the butane aerosol just used. The bowl used will be Pyrex so it can	1	4	4

platform (rubber pads), sprays butane into the bowl for 7 seconds and then holds the top of the dome, turns the van de graaf generator on and holds a metal pole towards the end of the wire now attached onto the glass bowl. This will create a spark within the butane filled glass bowl, causing the butane to light.		withstand the heat produced by the burn. In addition the bowl will be placed on a heat proof tile. The butane MUST be squirted into the bowl BEFORE the VDG is switched on to ensure there is no risk of a spark entering the aerosol. The aerosol will then be placed at least 50cm from VDG. If the fire burns for a prolonged period of time (which it shouldn't) a second heat proof tile or lid will be provided to place over the bowl to starve it of oxygen.			
	Hot Burn	Presenter is experienced in this demonstration and has extensively practiced it so knows when to remove hand/ arm to ensure no serious burn occurs. This demo will ONLY be performed by the presenter. The bowl will be allowed to cool before being removed. The audience will not be allowed to touch it. The presenter will wear goggles whilst performing this demonstration.	2	3	6
	Working with Butane The Butane used will be from domestic canisters: UN 2037 Safety data sheet can be found here; http://www.farnell.com/datasheets/1801831.pdf	The butane used is available domestically, it is used as a lighter refill, however it should still be treated with respect. It will be sourced from a reputable supplier and canisters inspected for damage before use. Googles will be worn when lighting the butane. Butane can be extinguished using either water spray, dry powder or carbon dioxide extinguishers, though these will only be used in an emergency, with oxygen restriction being used as our preferred method.	1	4	4
	Storing and Transporting Butane	It will be stored in a non-conductive box at a temperature below 50^{o}C and away from sources of ignition. There will be a maximum of 4 canisters stored at one point. Due to the butane being domestic canisters and the small volume carried/ stored no special license or labelling is needed.	1	3	3

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PPE Requirements

Item		Item		Item		Item	
Flameproof overalls		Gloves contact		High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection	Y		

Demonstration3: Balloon Popping Race

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**
Specially adapted hard hats are placed on the heads of two volunteers. These hats each have a bicycle pump attached with outlets in the top of the hats. 2 confetti-filled balloons are attached onto these two pipe outlets. The 2 volunteers then race to over inflated	Latex Allergy	The audience will be warned that the balloon are not latex free and so if a member of the audience has a latex allergy they are not to volunteer for this demonstration	1	3	3
	Over exertion It takes effort to make the balloons inflate to their popping point.	The volunteers picked for this demonstration will be visually assessed for the fitness, ensuring that they are of minimal fitness. It will also be verbally warned that this demonstration needs to 'fit' volunteers. The balloons used will be only 6 inch diameter.	1	2	2

the balloon until one of them pops.		If the volunteers seem to be over-exerting themselves at any point, the presenter will pause the activity until recovery has occurred			
	Loud noise from balloon popping	The popping balloon making a noise louder than is expected, therefore both volunteers will wear ear defenders (attached to the hard hat)	1	2	2

PPE Requirements

Item		**Item**		**Item**		**Item**	
Flameproof overalls		Gloves contact		High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection	Y	Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection			

Demonstration4: Egg Drop

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**

The presenter drops different eggs from various heights with the difference is damage to the egg being noted.	Egg Allergy	The teacher/ organiser is to notify the presenter/ the Ri at least 24hours prior to the performance if any of the attendees are severely allergic to eggs (i.e. cannot be in the same room as them). If this is the case, the eggs will be substituted for tomatoes. In addition the teacher/ organiser is to notify the presenter/ the Ri at least 24hours prior to the performance if any of the attendees are mildly allergic to eggs (i.e. cannot be in close to them) as this may affect them being used as volunteer in the other demonstrations. It will be ensured that the presenter does not have a touch allergy to eggs.	1	4	5
	Substance Spill	To avoid the eggs leaving a slippery surface on the stage/ performance area, they will be dropped onto a tray to contain the egg fallout.	1	2	2

PPE Requirements

Item		**Item**		**Item**		**Item**	
Flameproof overalls		Gloves contact		High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection			

Demonstration5: Paint Tin Steam Pop

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y				

Method Statement	**Hazards**	**Mitigation**	**Likeli**	**Sever**	**Current Risk**

			hood	**ity of impact**	
A butane powered blow torch will be used to heat up 2cm of water placed in the 250ml tin can in a heat proof (cork lined) retort stand and clamp. The water in the can will boil, produce steam until eventually the lid pops off. .	Fire. Butane is sustained flame.	Flammables items will be placed at least 1m away from the blow torch. The demonstration will be conducted on a heat proof tile. A fire extinguisher and blanket will be on stand. The smoke alarms will be isolated if present.	1	5	5
	Impact Injury	As the lid of can becomes a projectile there is risk of injury. To prevent this the demonstration will be performed at least 1.5m from the audience. The presenter will not at any times place their face over the lid of the can. The lid used is so light that it will not injury on impact	1	2	2
	Burn	Burns could result from using the blow torch or by contact with the hot water, steam or can. Those using the blow torch will be fully competent in handling it, it will not be used by a volunteer. The blow torch will be switched off as soon as possible. The tin can will be attached onto a retort stand and therefore if it needs moving whilst cooling the retort stand will be used to carry it, rather than contact with the can itself. As hot gasses and water may escape from the can when the lid pops off, the presenter will perform the demonstration with the blow torch at arms' length, wearing goggles and a heat proof glove on the hand holding the blow torch with the other one by their side.	2	2	4
	Working with Butane The Butane used will be from domestic canisters: UN 2037	The butane used is available domestically however it should still be treated with respect. It will be sourced from a reputable supplier and canisters inspected for damage before use. Googles will be worn when lighting the butane. Butane can be extinguished using either water spray, dry powder or carbon dioxide extinguishers, though these will only be used in an emergency,	1	4	4

	Safety data sheet can be found here; http://www.farnell.com/datasheets/1801831.pdf	with oxygen restriction being used as our preferred method.			
	Storing and Transporting Butane	It will be stored in a non-conductive box at a temperature below 50°C and away from sources of ignition. There will be a maximum of 4 canisters stored at one point. Due to the butane being domestic canisters and the small volume carried/ stored no special license or labeling is needed.	1	3	3

PPE Requirements

Item		Item		Item		Item	
Flameproof overalls		Gloves contact	Y	High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection	Y		

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Demonstration6: Angle Grinder

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y				

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**
An angle grinder is turned on and used to cut (or start cutting) a steel pole on a retort stand.	Electrical fault	Ensure the angle grinder is in fully working order. The Angle Grinder will either be brand new (less than 6months old), or will be PAC tested.	1	1	1
	Trip hazard	If the wires are trailing over the stage they will be secured with gaffer tape.	1	1	1
	Flying sparks	As the angle grinder cuts the steel pole several sparks will be produced. Only the presenter will operate the angle grinder. To prevent these sparks causing harm to the presenter, they will wear gloves, a labcoatanf googles. Ear defenders will also be provided which the presenter can weat at their discretion. The surrounding area will be protected by a fire blanket. Please note: although the sparks look hot at not actually that hot and will not burn the surfaces on which they fall. The presenter will position themselves between the pole and the audience and will cut the pole in such a way that the spark fly away from the audience.	3	1	3

PPE Requirements

Item		**Item**		**Item**		**Item**	

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Flameproof overalls		Gloves contact	Y	High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat	Y	Eye protection	Y		

Demonstration7: Butane Bubbles

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**
Butane will be piped from a domestic canister into soapy water such that butane bubbles are created. These bubbles will be lifted by a metal paddle and set on fire using a long handled gas lighter. A volunteer from the audience will be holding the paddle.	Fire. Butane is sustained flame.	The butane will be lit on a fire retardant panel. It will be lit not overhanging the remaining butane bubbles. Flammables items will be placed at least 1m away from the bubbles. The headspace above the bubbles will be checked for flammable items (3m clearance minimum). A fire extinguisher and blanket will be on stand. The smoke alarms will be isolated if present. In addition the table on which this demonstration is performed will covered in a fire blanket. The volunteer will be wearing safety glasses and heat proof glove and will be verbally warned that the fire will be relatively long lasting and that they are to keep hold of the panel.	1	5	5
	Burn	The presenter and volunteer will wear goggles, perform the lighting with a long-handled lighter, and the volunteer hold the paddle at arms' length whi8lst wearing a heat proof glove.	2	2	4

	Working with Butane The Butane used will be from domestic canisters: UN 2037 Safety data sheet can be found here; http://www.farnell.com/datasheets/1801831.pdf	The butane used is available domestically, it is used as a lighter refill, however it should still be treated with respect. It will be sourced from a reputable supplier and canisters inspected for damage before use. Googles will be worn when lighting the butane. Butane can be extinguished using either water spray, dry powder or carbon dioxide extinguishers, though these will only be used in an emergency, with oxygen restriction being used as our preferred method.	1	4	4
	Storing and Transporting Butane	It will be stored in a non-conductive box at a temperature below 50^{o}C and away from sources of ignition. There will be a maximum of 4 canisters stored at one point. Due to the butane being domestic canisters and the small volume carried/ stored no special license or labelling is needed	1	3	3

PPE Requirements

Item		Item		Item		Item	
Flameproof overalls		Gloves contact	Y	High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection	Y		

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Demonstration8: Electromagnetic Tug of War

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

Activity	**Hazards**	**Mitigation**	**Likelihood**	**Severity of impact**	**Current Risk**
An off-the-shelf electromagnet is attached to 2 ropes. 2 volunteers are selected to pull on the ropes and attempt to pull the electromagnet apart. **When switched on the electromagnet will**	Volunteers may sustain injury through falling during the tug-of-war, for instance, if a member of the other team suddenly lets go, or if a volunteer loses grip on the rope.	The presenter will be on hand to act as 'catchers' in the event that any of the volunteers suddenly fall backwards. In addition the volunteers will be instructed to not pull each other and to concentrate on working together rather than as if they are separate teams (it's both teams against the electromagnet). The y will be instructed to take a wide	2	4	4

stay strong, only when it's switched off will the electromagnet separate.		stance to minimise the probability they will fall.			
	Friction burns from rope.	The presenter should instruct the volunteers not to wrap the rope around their arms.	2	2	4

PPE Requirements

Item		**Item**		**Item**		**Item**	
Flameproof overalls		Gloves contact		High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection		Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection			

Demonstration9: Hand Generator and Hat Light

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

Method Statement	**Hazards**	**Mitigation**	**Likelihood**	**Severityof**	**Current Risk**

				impact	
Hand cranked generator is used to build up a voltage which lights up an led light connected to a bowler hat	Strong Magnets: The magnet used here is extremely powerful. It will attract ferromagnetic objects very strongly, sufficiently to cause injury to body parts caught in the way. This can happen very suddenly and very rapidly. If two such magnets are allowed to come together, they may cause severe crushing injuries, especially to fingers, which may even be severed. Even if they fly together without trapping fingers they may shatter from the impact and project shards of magnet through the air.	The generator has been built by a respected prop builder and supplied to us with a full users' guide. During transport, storage and when not in use, the magnet will be aligned with the end plates which form the structure of the generator. That way they will stay in place and attract minimal extraneous material. It will also be ensured that the operator of the generator (presenter or volunteer) does not have any medical equipment on them that will be affected by strong magnetic fields. Others will be kept at a distance of 2m.	3	3	9
	Impact Injury: As the generator is weighty, it could cause damage is it falls	The generator will always be placed on a stable table away from the edge	1	4	4
	Lifting Injury: As the generator is weighty, lifting it could cause damage is not undertaken correctly	It will only be lifted by our presenters, all of which are trained in the correct (bending the knees) procedure.	1	3	3
	Electrical Injury	As a voltage is generated there is risk of electric shock, to prevent this all wires will be fully insulated and the volunteer will be advised to keep their hands away from the wires. If a shock does occur it will be minimal current and would cause discomfort rather than harm.	1	2	2

	Spreading of Head Lice Due to the hat being placed on volunteers on several different occasions there is the risk that it could lead to the spread of head lice	Anti head lice spray will be sprayed into the hat on occasions to prevent the growth and survival of the head lice	1	1	1

Demonstration 10: Hand Generator with Microdet

Those at risk (please tick)	Ri Staff	Contractors	Tenants	Volunteers	Others
	Y			Y	

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Method Statement	Hazards	Mitigation	Likelihood	Severity of impact	Current Risk
Hand cranked generator is used to build up a voltage which ignites a squib (microdet). This ignition of this microdet (an off-the-shelf pyrotechnic) causes a loud bang.	Strong Magnets: The magnet used here is extremely powerful. It will attract ferromagnetic objects very strongly, sufficiently to cause injury to body parts caught in the way. This can happen very suddenly and very rapidly. If two such magnets are allowed to come together, they may cause severe crushing injuries, especially to fingers, which may even be severed. Even if they fly together without trapping fingers they may shatter from the impact and project shards of magnet through the air.	The generator has been built by a respected prop builder and supplied to us with a full users' guide. During transport, storage and when not in use, the magnet will be aligned with the end plates which form the structure of the generator. That way they will stay in place and attract minimal extraneous material. It will also be ensured that the operator of the generator (presenter or volunteer) does not have any medical equipment on them that will be affected by strong magnetic fields. Others will be kept at a distance of 2m.	3	3	9
	Impact Injury: As the generator is weighty, it could cause damage is it falls	The generator will always be placed on a stable table away from the edge	1	4	4
	Lifting Injury: As the generator is weighty, lifting it could cause damage is not undertaken correctly	It will only be lifted by our presenters, all of which are trained in the correct (bending the knees) procedure.	1	3	3

	Squib (microdet) creates loud explosive noise and amount of shrapnel on ignition	All audience to be advised to cover their ears ahead of explosion. Those with sensitive hearing to be advised to leave the room. Presenter to wear ear defenders. Protective shield to go in front of squib to protect audience from cardboard pieces released from the shell. Audience to be at a minimum of 3 meters distance from squib.	2	4	8
	Working with Microdets (pyrotechnics): Microdets (also known as squibs) are small pyrotechnics. Classification 1.4G (UN0431) http://www.lemaitreltd.com/p/Microdets/0zzjc%5B%5DyA98g http://www.lemaitreltd.com/_includes/images/uploads/ecommerce/documents/SDS%20Flash%20Reports,%20Maroons%20and%20Microdets%20(2017)%20-%20u5n52btf.ksd.pdf They are small cardboard tubes filled with aluminium powder, magnesium powder and an oxidizer with a remote igniter.	Microdets to be sourced from a reputable supplier (Le Maitre). When handling Microdets, goggles are to be worn at all times and there will be no naked flames, smoking or eating within the immediate area.	2	4	8
	Storage and Transporting Microdets: As microdets are classified as a pyrotechnics there are rules and regulations governing their storage and transport. http://www.legislation.gov.uk/uksi/2014/1638/contents/made	Microdets are classified as category 1.4G (the second lowest – safest- there is). The law states that is NEC (net explosive content) is lower than 5kg then no licence is needed. We will always ensure that the NEC is well below this limit. Each microdet has a NEC of 0.15g, therefore we could need to carry over 30,000 of them to exceed this limit (we normally carry 24 as a maximum) Microdets will always be stored and transported within a corrected labelled (1.4G) UN box. They will be kept in a cool, dry location, away high temperatures, shock, static discharge, vibrations or other	2	4	8

		physical stresses that might result in a hazardous situation.			
	Non-Standard Ignition System: As we are using a non-standard ignition system we need to take care to avoid premature ignition.	Premature ignition will be negated with the use of a 'circuit connecting system'. Until the button is pressed on this 'circuit connecting system', no connection will be made between the generator and the microdets and so no ignition will occur. The 'circuit connecting system' will be fitted with a turn key to ensure no unconscious ignition can occur. The procedure for firing the microdet will be as follows: 1. Microdets will be positioned in laboratory clamp 2. The 'circuit connecting system' will be attached onto the generator 3. The microdet will be wired into one side of the generator (still a broken circuit in three places) 4. Volunteers will be invited on stage 5. With ear defenders on both the presenter and the volunteers the second wire from the microdots will be connected to the generator 6. The key will be moved to the armed position 7. The generator will be rotated and when fully ready the button on the 'circuit connecting system' will be depressed completing the circuit and igniting the microdots. 8. The key in the 'circuit connecting system' is moved into the unarmed position. IN THE EVENT OF A MISFIRE the following procedure will be followed: 1. The audience will be instructed to keep their hands over their overs.	2	4	8

		2. The key in the 'circuit connecting system' will be moved to the unarmed position 3. One wire from the microdets will be disconnected from the generator. 4. Audience can stand at ease 5. Another microdet will be loaded on the laboratory stand. 6. And the normal procedure then followed.			
	Disposing of Microdets	Once fired the microdets can be disposed of in the normal rubbish. If a misfire occurs and the microdet doesn't fire, it will be disposed of according to advice from the supplier. Therefore it will be immersed in water for 24 hours (ensuring that they are sunk under the surface of the water) and that any paper tops so should be pieced so that the water can easily permeate the device. After which they can be disposed of in the normal rubbish.	1	2	2

PPE Requirements

Item		**Item**		**Item**		**Item**	
Flameproof overalls		Gloves contact		High visibility		Waterproof clothing	
Hardhat		Dust Mask		Gloves chemical		Wellington boots	
Hearing protection	Y	Mask chemical vapour/mist		Safety shoes			
		Laboratory Coat		Eye protection	Y		