

GL352 - Managing practical work in non-lab environments (COVID-19 pandemic)

Introduction

The CLEAPSS *Helpline* receives a number of calls about the teaching of science practical work in non-lab environments. In the normal running of a school we advise against doing this due to additional risks it creates.

During the COVID-19 pandemic CLEAPSS understands that in order for a school to accommodate all the pupils for all of the time, there may be occasions when some science teaching in a non-lab environment is unavoidable. This is more likely to happen if a school's approach is one where 'bubbles' of pupils have all their teaching in one location.

It should be noted that the current DfE guidance (dated 7th August) does allow pupils to 'break' the 'bubble' in order to access specialist teaching, for example in science or design and technology. The following extract from the DfE Guidance for full opening: schools, 7th August 2020 :

<https://www.gov.uk/government/publications/actions-for-schools-during-the-coronavirus-outbreak/guidance-for-full-opening-schools#>

*'Both the approaches of separating groups and maintaining distance are not 'all-or-nothing' options, and will still bring benefits even if implemented partially. Some schools may keep children in their class groups for the majority of the classroom time, **but also allow mixing into wider groups for specialist teaching**, wraparound care and transport, or for boarding pupils in one group residentially and another during the school day.'*

Note that: CLEAPSS is very clear that the teaching of practical science outside of a lab environment should be seen as a response to the extraordinary situation presented by the global pandemic and **NOT** something that is acceptable under any normal circumstances.

Safety when teaching in a non-lab environment

A science lab is designed to provide additional layers of support to keep pupils and teachers safe during a practical activity. These may include gas & electrical cut offs, eye irrigation, fire extinguishers, specialist waste systems, and, of course, easy access to technical support.

Whilst it may be physically possible to carry out a particular activity in a classroom it is essential to consider how the teacher will respond in the event of an accident or incident. It is at these moments that the lack of normal lab facilities will have the greatest impact on safety.

If PPE such as eye protection is needed this will need to be taken to the classroom with the resources for the activity, and returned to the science department after the lesson.

Any activity that involves the risk of pupils (or staff) getting a hazardous chemical in their eye will require access to eye irrigation facilities. It is unlikely that the classroom will have a sink and, even if it does, the tap will not likely be suitable for the process. As a general rule, activities where this risk is high should be avoided in classrooms. Where the risk is low, alternatives to traditional tap and sink could include sterile eye wash bottles (which under normal circumstances CLEAPSS advises against) or access to an immediately adjacent toilet with suitable tap. Remember you will need to administer eye irrigation for at least 10mins.

Moving the apparatus and resources

In addition to the risks posed in the classroom itself, careful consideration needs to be given to how the equipment and resources will get to the room. Heavy items pose manual handling risks and the trolleys commonly used to move equipment around the science department may not be suitable for wheeling across a playground or other uneven surface. The nearer the classrooms are to the science department the better, although the nature of the terrain on the route could mean that in practice some spaces that are a greater distance away may be more accessible. Moving over greater distances will take time, and, if technicians are going to help with this, it will be important to ensure that there is sufficient technician capacity. Careful consideration will need to be given to when the equipment will be moved to avoid times when pupils are likely to be around e.g. break and lunchtimes.

Teaching in classrooms

As many of you will know, classrooms are often much smaller than science labs, therefore pupil spacing will be a lot closer than in a lab. This may influence which practicals you decide are possible with your pupils. In addition, the tables and chairs are lower than science benches / worktops, therefore they don't work well when standing up. Teachers will need to consider whether pupils will stand or sit during the practical work. Please remember all normal lab rules will apply whilst carrying out any practical activity.

Security

Normal classrooms do not have the same levels of security that science labs or prep rooms have. It is also highly likely that other staff will be teaching in these rooms. It is very important that science equipment is **NOT** left or stored unsecured in these rooms. This will require careful planning to ensure the prompt return of equipment to the science department after it has been used.

Impact on the curriculum

Practical activities from some areas of science can be adapted to classroom teaching more readily than others. Note that, if groups of pupils have all their science teaching in a non-lab environment, it is unlikely that the school will be able to provide the broad and balanced curriculum that the DfE has indicated schools are expected to deliver.

PPE

It is unlikely that much PPE will be required, but teachers should check, part of their normal planning and risk assessment, on the need for PPE.

Each classroom used for practical work, will need the following items, kept in a sealed, clear plastic bag, marked 'For emergency use only', and stored in an obvious location. These items are to be worn by the teacher or technician if they need to administer IRM (Immediate Remedial Measures).

- disposable gloves
- a fluid-resistant face mask (FRSM Type IIR),
- disposable plastic apron
- eye protection (face shield, safety specs or goggles),
- paper towels,
- plastic bags for the disposal of used equipment and for any contaminated clothing.

Examples of potentially suitable activities

This is **not** an exhaustive list. It is designed to give you an idea of what practical activities **may** be possible in a non-lab environment.

Example activity	Additional Notes
Practicals that have been designed for a primary school setting.	Often you can extend the level of science quite easily to cover KS3/4 principles. Find our primary science practical procedures on our primary website.
Low-voltage circuits using batteries, not power packs	Use of power packs requires movement of heavy equipment. Their use will lead to a large number of trailing mains leads as most classrooms do not have mains sockets in accessible positions for pupils. In addition, classrooms do not have the facility to turn off the electricity in an emergency. Ensure correct batteries are being used, see CLEAPSS Guide GL225 for more information.
The effect of depth on the speed of water waves	These can get messy, so you will need to protect surfaces from damage. Maybe carry out the activities in trays.
Density of an object activities	These can get messy, so you will need to protect surfaces from damage. Carry out the activities in trays.
Hooks Law	Only use masses up to 100g
Masses and pulleys	Only use masses up to 100g
Leslie's cube	Only use water from a hot water tap, not from a kettle
Investigating terminal velocity through a liquid	These can get messy, so you will need to protect surfaces from damage. Carry out the activities in trays.
Investigating gas laws	See CLEAPSS Guide PP028
The monkey and hunter experiment using a video camera	See CLEAPSS Guide GL141
Activities which make use of small masses (up to 100g)	
Diffusion activities using household products like perfume	Staff using the room after you may not be so keen on the smell(s) you leave behind!
Use of magnets	If using neodymium magnets refer to CLEAPSS Bulletin 135 for suitable precautions when using these magnets.
Use of mirrors e.g. mirror writing	
Use of light filters with torches	
Practicals involving sound	Great care with transport and storage will needed if traditional CRO oscilloscopes are used as they are easily damaged. Warn adjoining classrooms that there may be 'loud or noisy lessons.' Do not sing, shout or use wind instruments. For example, PP065 - determining the speed of sound
Levers and moments practicals	
Measurements of force and speed	These may need the rooms reorganising to allow enough space to carry out activities like measuring friction or speed of toy cars. Ramps are heavy and bulky so will need careful handling and management.

Small scale pneumatic and hydraulic systems	Commercially available kits may be worth using here, such as Technic Lego.
Practicals using pondweed	These can get messy, so you will need to protect surfaces from damage. Carry out the activities in trays.
PTC taste test	See CLEAPSS Guide PP084
Activities using yeast or yoghurt in food rooms	Work with Food Technology staff over use of their space, and possible links to their curriculum.
Using a microscope to view <u>pre-prepared</u> slides	Great care with transport and storage will be required as microscopes are easily damaged. See Guide GL343 for more guidance on cleaning and quarantining. Microscopes which make use of mirrors or rechargeable battery packs are the best option here, as they avoid the need for trailing leads and access to mains sockets.
Looking at stomata	See CLEAPSS Guide TL020
Growing seeds / plants	These can get messy, so you will need to protect surfaces from damage. Carry out the activities in trays.
Invertebrate choice chambers	Don't leave behind in the room, other staff may not like them.
Planning and recording field work	A classroom which leads on to the field or other open space can be ideal for this.
Some microscale chemistry activities	These can only be done where no heating is required. An example of a suitable microscale activity : PP019 - Analysis of vinegar by small-scale titration See CLEAPSS range of microscale activities here . See also P001 - Investigating indicators on the CLEAPSS primary website.
Making models using Molymod kits or craft materials.	These can get messy, so you will need to protect surfaces from damage. See Bulletin 168 for our play dough recipe. Note, any used play dough will need to be disposed of after wards, and must not be shared.
Activities using 'kitchen chemicals'	These can get messy, so you will need to protect surfaces from damage. Do not use cleaning chemicals as they can often contain chemicals which can cause permanent eye damage.
Inspecting rocks and fossils	Do not carry out activities which use chemicals to test their properties
Investigating rock structures using chocolate and cake	These can get messy, so you will need to protect surfaces from damage. Search online or speak to geography colleagues for various teaching ideas about using chocolate and cake to show principles of rock formations.
Chromatography practicals	Only use water as the solvent
Measuring 'g' – the acceleration due to gravity	See CLEAPSS Guide PP024
Using a Van de Graaff generator	See CLEAPSS Guide GL190 – ensure enough distance (2m minimum) between Van de Graaff generator and all IT equipment. Ensure good security of the Van de Graaff generator.

Demo of digestive systems using bananas and tights	This can get messy, so you will need to protect surfaces from damage
Catalase (including from veg or other natural sources) and hydrogen peroxide. Use small volumes; 10ml per student	Will need to be prepared by technicians before the lesson
Food tests – iodine, biuret in small dropper bottles, grease spot test, dropping tiles	These can get messy, so you will need to protect surfaces from damage.
Protease enzyme action on skimmed milk. Can vary the skimmed milk conc. or pH. Use small vials to carry out experiment and small plastic bottles of enzymes	These can get messy, so you will need to protect surfaces from damage
Blood typing. Only if kits are used, but medical sharps container needs to be controlled	These can get messy, so you will need to protect surfaces from damage
Diffusion using cresol red agar in 0.1M HCl	These can get messy, so you will need to protect surfaces from damage
Osmosis. Use potatoes / beetroot/ celery in salt/sugar solutions. Use a balance or ruler for measuring	These can get messy, so you will need to protect surfaces from damage. Maybe carry out in a food room.
Investigating artificial urine samples	Other staff may need reassuring the urine is in fact artificial!
Plant hormones/tropism. Growth is possible in a room as long as plants are watered and not tampered with	
Respiration of living organisms, using peas or maggots	Probably best to use peas, other staff may not be keen on maggots in their classroom.
Observing plants e.g. using ink through stem, looking at flower and seed structure, leaf adaptation. Needs mounted needles, white tiles, scissors	
Dissections	Needs to be in a classroom with a sink and hot and cold water supply for hand washing. Will need technician support in clearing up, and ensuring good security of any sharps used. Other staff using the room may not be keen on this activity.

Examples of potentially unsuitable activities

This is **not** an exhaustive list. It is intended to give you an idea of the sorts of practical activities that are not suitable for carrying out in a non-lab environment.

Example activity	Additional Notes
Acid & alkali neutralisation / use of acids or alkali solutions, unless microscale.	
Any practical which involves heating chemicals or equipment	
Group 1 metals demonstrations	
Use of tea lights and spirit / small portable gas burners	
All of the activities covered by CLEAPSS Supplementary Risk Assessments (SRAs)	
Microbiology activities	
Use of radioactive sources	Too many security issues. Measurement of background radiation or Low Salt with GM tube and counter are OK
Use of the bell jar for low pressure activities	Manual handling of equipment
Observing/classifying preserved specimens	
Fermentation/composters	
Cauliflower cloning	Aseptic conditions required to reduce contamination

Activities to be avoided (in a lab or classroom) during the Corona virus pandemic

Given the continued uncertainty around the rate of infection in the general population and the rapidly developing understanding of COVID-19 and its pathology, it would be prudent, as a precautionary measure, **not** to attempt the following activities:

Cheek cell sampling
Lung volume / capacity & other breathing-based activities
Activities which make use of saliva
Activities which make use of straws or other equipment for blowing through e.g. blowing through limewater
Activities with sound where a musical instrument which you blow through is used

For further advice about practical work during the pandemic please see CLEAPSS [Guide GL343 – Guide to doing practical work during the COVID-19 Pandemic, science](#)