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# Organising and managing hands-on STEM activities for Early Years and Primary.

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*Version 3.0- 18<sup>th</sup> February.*

This document focusses on practical STEM activity in the classroom. More detail, particularly about wider school issues can be found in the official Scottish Government advice which can be found here (<https://www.gov.scot/publications/coronavirus-covid-19-guidance-on-schools-reopening/>) and here (<https://www.gov.scot/publications/coronavirus-covid-19-early-learning-and-childcare-services/>) .

While many schools have not been fully shut over the latest lockdown, there will be much preparation needed as part of a careful, phased reintroduction of learners into the school environment, particularly for the introduction of practical STEM related activities.

The guidance on physical distancing in Early Years and Primary remains the same. There are no distancing requirements for learners. Teachers and other adults should keep 2m apart from each other and from learners wherever possible.

Unless your school policy prevents the use of any form of equipment, then the good news is that hands on STEM activities can happen in your primary school. However, in these unprecedented times, your approach to planning and delivery of activities will need to change. Everything may take longer, from planning to setup, delivery and clear up.

The situation will vary significantly across the country: learner rolls, numbers and location of teaching rooms, their dimensions and arrangements will all differ, not just from Authority to Authority but from school to school. The advice in this document, therefore, is necessarily general in nature but SSERC will be happy to provide specific advice to schools and colleges if needed.

It is important to emphasise that the whole procedure for making arrangements for re-opening to learners should be led by risk assessment. This risk assessment should directly address any risks associated with coronavirus so that sensible measures can be put in place to minimise those risks for learners, young people and staff.

Any further updates will be via a series of FAQs appended to the end of the document.

Check our website [www.sserc.scot](http://www.sserc.scot) , [Twitter](#) and [Facebook](#) posts regularly for news of updates.

## Versions

### Version 1 (June 24<sup>th</sup> 2020)

At present the guidance is that physical distancing is set at 2 metres. If there are any changes to this then we will change the guidance to reflect it.

### Version 2 (August 5<sup>th</sup> 2020)

Updated to reflect the changes announced by the Scottish Government at the end of July. Significant changes to the section on distancing but the hygiene and experimental sections are largely the same.

### Version 3 (February 2021)

Minor updates to reflect the situation with regard to the phased reopening, starting with P1-3.

## General Guidance

Guidance on important matters including general distancing, movement around the school, arrival and departure is outwith the scope of this document. Useful guidance has been provided by the Scottish government and can be found here (<https://www.gov.scot/publications/coronavirus-covid-19-guidance-on-schools-reopening/>) and here (<https://www.gov.scot/publications/coronavirus-covid-19-early-learning-and-childcare-services/>).

In Early Years and Primary education, there is much overlap between STEM activities and other classroom activities but there are some measures that are more specific to science and technology.

### A holistic approach

The measures outlined in this and other documents are none of them exclusive of others: they are part of a whole.

Good hand hygiene in your school does not mean that there is no need to maintain spacing. A reduction in interactions does not mean that you can neglect the cleaning of surfaces.

We all of us need to implement as many of these measures as far as we possibly can. It is the combination of approaches that will help us in our fight to keep the coronavirus under control.

## Early Years

The situation regarding STEM in Early Years education is largely covered by current government advice <https://www.gov.scot/publications/coronavirus-covid-19-phase-3-guidance-on-reopening-early-learning-and-childcare-services/pages/groups-and-cohorts/>

This gives guidance on:

- Hygiene and cleaning
- Limiting children's contacts
- Use of outdoor spaces and much more

As far as any STEM activities go, advice will be very much in line with that for other Early Years activities.

- Make use of outdoor learning activities where possible.
- Wash hands with soap and water after any outdoor activity or after using any sand, water, play dough etc. for STEM activities
- Where possible try to avoid the sharing of equipment for STEM activities. Discourage children from putting any shared items into their mouths – wash hands correctly after touching any contaminated resources.
- Follow the manufacturer's instructions and guidance from the Scottish Government and your employer when washing any resources or other equipment used for STEM activities.

## Primary Schools

### Classroom layout

The change in the distancing requirements mean that you will be able to have your full complement of learners in the classroom. That does not, however, mean that things are back to normal.

- You need to ensure that there is a 2m space between the teacher's desk (the back of it where the adult may sit) and the nearest of the learners. So if there are any tables right up against the teacher's desks, they will need to be moved.
- Try to ensure, where possible, in science classes that learners are not working face to face. If they are working together then it is much preferable if this is done side by side. This may involve some moving of tables/desks.

### Permanent or semi-permanent groupings

Consistent cohorts of 8 will no longer be required. However, this does not mean that settings should return to normal operation. It is still important to limit children's contacts.

The government advice is that where possible it is preferable to keep learners in fixed groupings. This is particularly relevant in group investigative work which, but its very nature, is likely to involve closer interactions.

Consistency of groups is beneficial, and efforts should be made to keep children within the same groups for the duration of the day or session, where possible. More than one group can use a large space, but children should not mix freely with children in other groups, including in open plan settings.

In particular, where there is equipment being shared, these groupings are more important.

It is important to emphasise that **these are not all-or-nothing approaches**, and will bring public health benefits even where used partially (for example if membership of groups stays consistent throughout the day, but changes across the week).

## Managing hands on activities

### Planning

We know that, for a range of reasons, practical activities are most often carried out in groups. While there is no longer a strict expectation that learners will need to work individually, Wherever possible, working independently should be the first choice. Your approach to planning will need to take account of the following:

### Equipment

Does your school have enough equipment for individual working, as each learner would need to have their own set of equipment. This needs to be assessed before school starts and extra purchased if needed.

### Assisting learners

It is expected that where possible, teachers (and classroom assistants) will keep a 2m separation from learners as well as each other.

However, the guidance does accept that brief interactions between teachers and learners closer than 2m are inevitable in the teaching process.

Common sense suggests that these interactions should be as brief as required to achieve the aims and the distances involved should be the maximum appropriate.

Government guidance does not **require** the use of face coverings in these cases though if individual teachers may feel it appropriate, they are quite entitled to. Likewise, any children who have a desire to wear a face covering should be allowed to.

### **Choice of activity**

- Each learner will have to work alone; some may struggle to do this, activities should be planned that can be undertaken without the need for additional hands-on support.
- Some types of inquiry or activity will be more suited to working alone than others. For example, a simple classifying activity - such as exploring magnetic and non-magnetic materials e.g. [Marvellous Magnets](#) or exploring [Optical Illusions](#) should be possible. Learning opportunities that rely upon comparative testing, such as investigating [Hydrogels](#) or [Let's Talk Bogs](#) - where learners compare the absorbency of different materials, will be difficult for a single learner to complete. This doesn't mean the activity cannot be done. Try simplifying activities, for example by cutting down the number of variables, alternatively, you can give each learner a different material to test and then collate class data at the end.
- Choose activities that the learners will have a reasonable chance of completing on their own, especially activities that have supporting video tutorials and require minimal resources, yet support understanding of scientific concepts – [Build a Climbing Bug – Exploring Friction](#) or [Make a Balancing Butterfly – Centre of Gravity/Balance](#)
- Challenging tasks may demotivate learners if they cannot finish them and 2 m distancing prevents you from providing the support that you usually would.
- Do not rush to introduce new practical skills, certainly until the learners become more confident in working on their own, choose activities that you know they will be able to carry out safely and successfully. How skilled/dextrous are the learners when working with equipment? How much experience have they had in relation to using a piece of equipment?
- Look for activities that use recyclable resources rather than the standard equipment that will have to be cleaned. Make use of recycled/recyclable materials that learners may be able to bring in from home themselves – e.g. experimenting with sound by making a [clucking cup](#) (with additional information available via SSERC STEM [Bulletin 69](#)) or exploring the properties of gases by making a [pneumatic snappy dragon](#) (with additional information via SSERC STEM [Bulletin 75](#)).
- Step by step instructions and the explanation of key concepts could be viewed by learners via on-line tutorials, such as those provided by [SSERC's home learning pages](#) – further activities and advice will be posted on an on-going basis
- Practitioners will need to consider the platform used to view these videos and ensure content is age and stage appropriate. If learners are spending a proportion of the week learning from home, practitioners may consider teaching key concepts in class and setting engaging practical STEM investigations/ challenges for completion out of school – for example exploring forces acting on a

rocket in school and setting a [balloon rocket challenge](#) for completion at home. You may wish to share links with parents/carers if home schooling continues.

- The incorporation of practical activities that require minimal, easy to source resources is essential to ensure that all learners can access these learning opportunities at home and school.
- When considering the use of non-recyclable resources in class select easy to clean, waterproof items (rulers for example), as they can easily be disinfected by placing in detergent and then leaving to dry. Alternatively, if there is a kit available for each pupil, this is less of an issue.
- Think carefully about activities that often require troubleshooting/adult intervention or replacement equipment, for example electrical circuits. These can be unreliable and you will not be able to directly support the learners. Again, this doesn't mean that this type of activity cannot be done, but more planning and management will be required.
- Can you do activities outside where there is more space? Now is a great opportunity to think about activities that can be done in your school grounds. Learners could construct models in the classroom and then take them outside for testing e.g. [o-wing gliders](#) – there is a short [video](#) made by learners accompanies this activity. [Balloon powered cars](#) might be another possibility. Further examples include observing shadows and making a sundial, [photo-orienting](#), [Investigating bubbles](#), bug hunts and making a simple [science pocket book](#) or even [making paper](#) Are there activities that you might normally do in your classroom that could be done equally well outside whilst keeping learners socially distanced? Examples include, [Launching a Rocket Mouse](#), [Making a wormery and observing worms](#), [Exploring transpiration in plants](#) using food dye and white flowers - this investigation works well with daisies collected from the school grounds. Investigating chemical reactions with vinegar and bicarbonate of soda could also be carried out in the playground rather than in the classroom.
- You might consider introducing discussion activities with a STEM theme to encourage learners to interact verbally. SSERC have a number of discussion activity resources, developed in partnership with the Primary Science Teaching Trust (PSTT):

[A Waste of Space](#)

[A Level Playing Field](#)

[Let's Talk Plants](#)

[Let's Talk Bogs](#)

[Let's Talk Environmental Issues](#)

### ***Lesson length***

Hands on lessons delivered under these new circumstances may take longer than usual to complete, so bear this in mind when planning your day. As well as learners needing additional time to carry out each step of the activity alone, you will require extra time for set up and clearing up.

### ***Spillages***

Additional planning will be required for activities that might result in spills. For example, if you are carrying out our [Hydrogels](#) or [Let's Talk Bogs](#) activities, learners will need to have paper towels and be taught how to clear up a spill should it occur. You need to ensure you have a plan for what to do in the case of a large

spill, and what the learners need to do. For example, you may need to move some, or all, of the learners while you clear up, however under most circumstances we envisage that any clearing up can wait until the end of the lesson.

### ***Clearing up***

Hands on activities always require clearing up but this will be different under current circumstances. The extent to what learners can help will depend on their age and ability to tidy/clean/follow instructions. Bear in mind tables may need wiping, so plan who will do it and the time it will take. Support older learners to clear up their own workspace, provide extra paper towels in their trays and show them what to do.

### ***Carrying out practical work***

- All equipment for STEM activities should be clean before it is used. Use proprietary household cleaning liquids to wash equipment, and tables etc. Use the products and cleaning regime recommended by your school. We advise that after the equipment has been cleaned, adults must wash their hands well using soap and water. If this is not possible, use hand sanitiser in the immediate term and then proceed to a sink in order to wash hands when you can. Do not touch your face at all during this process. Alternatively, although we realise this is unlikely, the individual equipment kits could be left undisturbed for 72 hours before being used.
- Where possible, use recyclable equipment/resources that can be placed in the appropriate waste at the end of the lesson. One way might be to organise children to put disposable items in the correct bin, one child at a time as they leave the classroom. Recycling bins will need to be emptied frequently.
- Think carefully about any learners with additional support needs that would ordinarily have extra support during a hands-on science or technology activity. While support for learning practitioners will be able to provide direct assistance if this assistance is likely to be prolonged, you should consider an alternative lower risk activity. If the activity is essential to learning then make sure the support for learning practitioner has any requisite PPE.
- Avoid higher risk activities that may require extensive supervision or direct adult support as a matter of course. For example, investigating burning, or making a fire extinguisher, normally requires an increase in the amount of supervision, i.e. more adults in the room.
- If an accident occurs, follow your school's guidance. Make sure you know this guidance before the lesson and how to implement it. You will need to talk to the class about what to do if an accident happens during this new way of working. What you say will depend upon on the activity you have planned.
- Taking learners outside is a great choice, but don't forget that. It is still important to reduce interactions between learners and maintain distance where possible as if you were indoors.

## *Classroom management during a hands-on activity*

### **Before the lesson:**

- Setup any equipment at the tables before the lesson.
- If learners are working individually setup equipment in individual trays. This will help speed up setup and clearing away and the trays will contain any spills.
- If water is required for the activity, then this should be provided as part of the equipment. (Whether work is taking place as a group or as individuals). Learners should not leave their table to collect anything. Where it is not possible to do this then any access to, eg a tap, needs to be controlled by the teacher to minimise risk.
- Adults will need time prior to and after the lesson for setting up/clearing up.

### **During the lesson:**

- Teacher demonstrations may be required for learners to access the activity. Learners must not leave their tables to crowd round a demonstration table, so make use of data projectors and digital cameras / visualizers/video clips to project what is being demonstrated.
- Use large visual aids to support instructions. Within this highlight/incorporate safety messages, for example, step by step PowerPoint slides on a whiteboard.
- If at any point during the lesson, you feel that the activity isn't working as you had planned or something is about to go wrong, for example, an accident may happen (even though nothing has yet), then stop the activity. This might mean stopping an individual child or stopping the whole class. Ordinarily you would intervene, but now this is much harder/you can't, so you need to take alternative steps. If necessary, swap to a pre-planned written/oral activity.

### **End of lesson:**

- Once the activity has finished, learners should place all equipment back into their tray. An adult must clear the trays away when the learners have left the classroom, and then carry out any cleaning of equipment as required by your school (see Risk Assessment).
- If your planning has highlighted that clearing up will need to be done. Think about how this will happen and how long it will take.

## *Opportunities to extend learning using simple hands on activities*

None of this means you will have to compromise on learning outcomes or experiences. Use the time to extend the learning in other ways, simple or low risk activities present new and exciting opportunities. For more ideas about making the most of hands on activities during this time keep up to date with the SSERC website and social media posts.

If you have any questions about practical STEM activities in and out of the classroom contact [enquiries@sserc.scot](mailto:enquiries@sserc.scot)