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COVID-19 and science activities

Posted by Anonymous on Fri, 2020-05-22 12:19

COVID-19 and science activities:

There is much conjecture about the need and safety of carrying out microbiology experiments in the school laboratory setting, especially in light of the recent pandemic caused by COVID-19. In general, specific precautions should always be taken when performing microbiological experiments and perhaps even more so in a COVID environment. Considerations for example:

- Should students be wearing surgical masks, protective eyewear and gloves when using microscopes to view microbes (in food and water)?
- In a COVID-19 environment, is it okay for students to do practicals involving nutrient agar Petri dishes and inoculating them using swabs from the environment (hard surfaces like light switches, floors etc)? There would be no swabs from the body and the Petri dishes would be sealed and not opened once incubated.
- Is it safe to grow bacteria on an agar plate under school laboratory conditions in a COVID-19 environment?

Voting:



No votes yet

Year Level:

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

Showing 1-2 of 2 Responses

Microbiology during covid19

Submitted by sat on 22 May 2020

Updated 27 February 2023

GOOD HYGIENE DURING COVID-19

Good hygiene should be strictly observed such as is stated in the Australian Health Protection Principal Committee (AHPPC) statements, see <https://www.health.gov.au/committees-and-groups/australian-health-protection-committee-ahpc>

In particular, see the sections on hygiene, routine care and environmental cleaning. The general hygiene advice is:

- Staff and students should stay away from school if unwell.
- Everyone should practise good hygiene: wash hands regularly, cough into elbows, minimise touching face.
- Clean and disinfect frequently used high touch surfaces and frequently used objects such as computers, photocopiers etc.

Safe Work Australia also has a wealth of good information related to the education and training sector, see <https://covid19.swa.gov.au/covid-19-information-workplaces/industry-information/education-and-training>

The Australian Health Protection Principal Committee (AHPPC) has advice for schools including the following:

Schools should implement a range of other strategies to reduce transmission, including the promotion of personal hygiene measures (frequent handwashing, reducing face-to-face contact, cough etiquette), physical distancing, reducing public gatherings (e.g., face-to-face school assemblies), and reducing the mixing of students (e.g., reduced use of common areas, staggered lunchtimes, and reduced after-school activities and inter-school activities).¹

Updates from the Australian Government Department of Health for general information regarding COVID-19 can be found at <https://www.health.gov.au/health-alerts/covid-19>

For the Latest statements from the Australian Health Protection Principal Committee (AHPPC) on coronavirus (COVID-19), see <https://www.health.gov.au/committees-and-groups/australian-health-protection-committee-ahpc>

It is important to take into consideration that some staff and/or students may be at higher risk of serious infection from the coronavirus disease including those that have compromised immune systems and staff members over 60 years of age.

Schools work at a frenetic pace, but time should be allocated to ensure particular attention is given to the advice provided by the Australian Government Department of Health.

This involves following guidance by the Department of Health encouraging the adherence by staff and students to maintain good hygiene and social distancing, including but not limited to:

- Frequent and thorough handwashing.

- Avoiding touching the face particularly near and around the mouth, eyes and nose.
- Maintaining a distance of 1.5 m where possible.
- Regular cleaning of frequently touched objects and surfaces.

SCHOOL SCIENCE ACTIVITIES AND COVID-19

School science activities have additional aspects to consider such as the use of shared safety glasses, (and shared microscopes), unpredictable student behaviour and students working in close proximity to collaborate on activities. Schools should have strategies to address these aspects in particular:

- The scrupulous cleaning of shared safety glasses (and microscopes) between use, see Should shared safety glasses be decontaminated after each use?
 - Note that it is impractical for the science technician to be responsible for this task
 - It would be reasonable for the school to ensure that other systems are in place, e.g., for students to be responsible for cleaning their safety glasses
- Regular cleaning of surfaces.
- Good classroom management of student behaviour.
- Constructing activities to enable maintaining as much distance as possible between people.
- Encouraging the washing of hands at the completion of the activity with soap and water, see 'How to wash and dry hands'.²

Schools should assess their ability to adequately manage each of the above and if it is not possible to meet these requirements then schools should err on the side of caution and not proceed with a particular activity as a student activity.

It may be better in these circumstances to conduct a demonstration, so that good hygiene and social distancing can be maintained.

USING MICROSCOPES DURING COVID-19

Microscopes should be cleaned and disinfected in between use. See the information regarding **Microscope cleaning and disinfection** in our question Purchasing and maintaining microscopes

MICROBIOLOGY DURING COVID-19

A site specific biological risk assessment should be conducted for all microbiological work as recommended in the Science ASSIST GUIDELINES for best practice for microbiology in Australian schools.

Viruses and their cultivation in the laboratory

There is no risk of the coronavirus growing on agar plates as it will not grow on bacteria and will not be propagated on the agar.

Viruses are unable to be grown on agar plates or in microbiological broths as viruses require a living host cell such as plant or animal cells in order to replicate. Specific cell culture systems or the use of embryonated eggs would normally be required. The exception is Bacteriophages that infect bacteria. These can be grown with bacteria on special agar plates; however, these are not used in schools (Megan Lloyd, personal communication, 2020. Chair of the Education Special Interest Group of the Australian Society for Microbiology).^{3, 4, 5}

Wearing masks

Masks are not required if you are well and working with standard microbiological procedures, see:

- **'How to protect yourself and others from coronavirus (COVID-19)'**, Australian Government Department of Health website: <https://www.health.gov.au/topics/covid-19/getting-vaccinated?language=und> and the link to the fact sheet <https://www.health.gov.au/topics/covid-19/clinical-guidance-about-covid-19>
- **'Does wearing a mask help reduce my risk of COVID-19?'** Health Direct website: <https://www.healthdirect.gov.au/coronavirus-covid-19-how-to-avoid-infection-faqs#mask>

General note: Staff and students should not be at school if they are unwell, so there is no need to wear masks. If disposable masks are used, they must not be reused and must be removed and disposed of properly to avoid increasing risks of infection.

Wearing safety glasses

Safety glasses should be used when conducting microbiological activities including preparing microscope slides to protect from biological splashes and aerosols. They are not required for viewing prepared slides under a microscope, as they may also introduce new risks such as additional face touching.

Shared safety glasses should be cleaned/disinfected between users, see the Science ASSIST Q&As on this topic: [Should shared safety glasses be decontaminated after each use?](#) And [safety glasses and assessing risks](#)

Wearing gloves

Gloves are not a substitute for frequent handwashing and can pose a higher risk of spreading disease if not used correctly. See <https://covid19.swa.gov.au/covid-19-information-workplaces/industry-information/general-industry-information/hygiene>

They are not required for standard microbiological procedures unless a person has cuts or other skin problems such as dermatitis.

In the current COVID-19 situation we recommend that gloves are worn if your school chooses to conduct environmental sampling to further minimize risks of infection, see below the section on Environmental sampling.¹

Note: gloves are not appropriate if using Bunsen burners.

Environmental sampling

Environmental sampling poses an additional risk during this pandemic, due to the possible presence of the coronavirus on surfaces that are being sampled. I.e., touching something that someone has touched who has the virus.

Therefore, we recommend that gloves be worn by staff/students who are sampling from different environmental surfaces⁴ and the observation of strict safe procedures:

- Do not touch your face whilst wearing the gloves.
- Remove gloves correctly without touching the outside of the glove.
- Wash hands thoroughly with soap and water or use hand sanitiser afterwards (note washing with soap and water is the preferred method).

Note: Schools have increased their cleaning regime and there may not be many microbes present, however wearing gloves has the additional benefits of

- providing an additional layer of protection if the current cleaning regime is reduced and we have a second wave of infection.
- providing an additional safeguard of excluding the swab takers microbes.

Standard microbiological precautions apply, i.e.

- Sampling can occur with sterile swabs or microbiological loops from
 - various water samples such as tap water, pond water, or flower water from a vase onto nutrient agar.
 - various food samples such as cheeses, yoghurts, fruits or any rotting vegetables onto nutrient agar.
 - suitable environmental surfaces such as laboratory benches, windowsills, taps, computer keyboards, light switches and pens or pencils (see next heading 'Environmental sampling' below for more information).

Note that these agar plates should never be opened or subcultured as they will contain unknown wild microorganisms some of which may be pathogenic.

- Sampling should never occur from
 - raw meats, or surfaces used in the preparation of raw meat.
 - toilets or unsanitary locations.
 - human body fluids.
 - skin areas.
 - animal sources.
 - soil samples.

For more information on this activity, see the 'SOP: Microbes are everywhere' contained in Attachment 1 in the GUIDELINES for best practice for microbiology in Australian schools.

Standard precautions apply as below.

The growth and subculture of pure cultures of microorganisms

Standard microbiological practice should be followed:

Aseptic techniques should be used to avoid generating microbial aerosols which can contaminate agar plates, students or staff, work surfaces and the environment These include:

- Washing hands before and after work.
- Disinfecting benches before and after work.
- Covering any cuts on the hands with a waterproof dressing or wearing gloves.
- Wearing safety glasses to protect the eyes from any microbial aerosols.
- Using sterile swabs or bacteriological loops.
- Working close to a Bunsen flame.
- Flaming the mouth of all test tubes and bottles both when the cap is removed and before it is replaced.
- Opening plates for a minimum amount of time for inoculation.
- Sterilising all plates in a pressure cooker, or autoclave, at 15psi, 121°C for 20-30 minutes before disposal.

Note: There must be no opening and no subculturing from plates or broths inoculated by students.

Other school requirements:

- Using only a general all- purpose medium such as nutrient agar which does not select for pathogens.
- Taping agar plates closed with four pieces of sticky tape to prevent opening but allowing air exchange to generate an aerobic environment.
- After incubation, the plates should **not be reopened** and should be sealed around the whole circumference to reduce the risk of students opening the plates before distribution to students for examination.
- Incubation of cultures between room temperature and 30°C for 24-48 hrs.

For more detailed information of microbiology practices, see **GUIDELINES for best practice for microbiology in Australian schools.**

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Great responses! Thank you.

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